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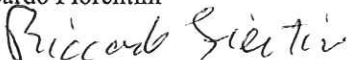29th Cycle – A.Y. 2013/2014

THE EURO AREA: POLICY LESSONS FROM A MINSKY-KALECKIAN APPROACH

S.S.D. P/02 – Political Economy

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The Euro Area: Policy Lessons from a Minsky/Kaleckian Approach
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Financial and macroeconomic instability endogenously arises from within the system: this was the conclusion of Hyman Minsky's PhD dissertation at Harvard on the 1929 Great Crash and the dynamics of a capitalist system. In light of the 2008 Great Financial Crisis, his financial instability hypothesis seems to be almost prophetical. The goal of thesis is to investigate the Euro Area's macroeconomic instability according to this interpretative framework. The objective is twofold. On the one hand, the research aims at disentangling the causes leading to the current divergence in growth and unemployment rates between Northern and Southern Euro Area countries. On the other hand, it aims at assessing the effectiveness of economic-financial reforms implemented in the aftermath of the crisis, and provides policy implications to stabilize the European macroeconomic system. Chapter I presents and critically discusses Minsky's business cycle theory and frames the context that eased and allowed the Great Financial Crisis to happen. Chapter II presents the Euro Area's imbalances, and through a VAR methodology characterises the growth strategy of the Northern and Southern blocks as well as the source of intra-EA trade imbalances. Chapter III aims at analysing the sources of growth differentials between the Northern and Southern countries focusing on the role investments and unemployment play in constraining and reinforcing path-dependency. According to a Minsky-Kaleckian SVAR approach, diverging and reinforcing factors are detected and discussed. Chapter IV emphasises the importance that financial reforms play in the aftermath of a financial crisis to stabilize the macroeconomic system. To this respect, an analysis and comparison of the major financial regulations at the European and international level is provided. In conclusion, chapter V analyses the impact of the most important financial reform at the European Level - the Bank Recovery and Resolution Directive - which aims at breaking the two-way feedback process between the default risk of banks and sovereigns.

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INTRODUCTION

The current unstable macroeconomic environment in the Euro Area and European Union is undermining the achievement of a stable long-term sustainable growth. The growth potential has been weak compare to the stance of the US economy for a long period, and although the recovery is gaining pace, not everyone is benefiting equally from it. Growth and unemployment differentials are destabilizing the common currency, which is currently experiencing a clear divergence process. Northern countries - Austria, Belgium, Germany, and Netherlands - have grown much faster than the Mediterranean countries - France, Italy, Portugal and Spain - which still show, eight years after the Great Financial Crisis, a high level of unemployment. Moreover, the introduction of the common currency made the two core blocks of the Eurozone experience opposed growth strategies: the South, domestic-demand driven, while the North, foreign-profit led. This transformational change has direct implications for policy makers since the way both economies respond to domestic and external shocks is remarkably different. To this respect, the principle 'one-size-fit-all' policy implemented at the European level seems to be not effective and even counterproductive. No counter-balancing mechanism able to restore convergence was thought before the introduction of the common currency, and countries are left alone facing the restoration of the equilibrium without having proper tools: an own currency and a central bank. This new macroeconomic context requires policy makers understand the existing differences in growth strategies and tackle those endogenous mechanisms that tend to reinforce divergence. To this respect, Minsky's business cycle theory and the Kalecky's five determinants of profits have been used as interpretative tool to disentangle the sources of the divergence and provide practical policy implications. The thesis is divided into five chapters, as follows:

Chapter I - *Retracing The Great Financial Crisis: Policy Lessons from a Minsky-Kaleckian Approach* - presents and discusses the Minsky's business cycle theory and the role of the Kaleckian determinants of profits - private investments, budget deficit, balance of payments surplus, and savings out of wages - in light of the macroeconomic context that has led to the 2008 crisis. The aim of this chapter is to highlight the long-

run implications of Minsky's business cycle theory. This theory is certainly a useful roadmap to stabilize the macroeconomic system ex-post, in the aftermath of a financial crisis to avoid the 'Sky-Falling'. Nonetheless, from the accurate description of the dynamics of a capitalist system a set of macro guidelines can be defined to stabilize the system ex-ante. To this respect, by retracing the links between the deregulation of the 80s, the rising volume of credit and financial profits, the growing inequalities, the structural level of unemployment, and the falling aggregate demand during the run-up and the aftermath of the Great Financial Crisis, long-run policy implications have been outlined. Here, the main points of the analysis are useful guidelines for the investigation in the following chapters.

Chapter II - *Trade Imbalances within the Euro Area: Two Regions, Two Demand Regimes* - investigates the Euro Area economic heterogeneity. By dividing the Euro Area into two regions, the Northern-surplus region - Austria, Belgium, Germany, and the Netherlands - and the Southern-deficit region, France, Italy, Portugal and Spain, the paper tests with a VAR methodology the demand regime of each region. To this respect, the opposing wage dynamics - negative in the North and positive in the South - seem to play a crucial role in determining the intra-EA trade differentials, which are the result of opposing growth strategy. The estimates to a wage shock verify that the Southern region has a wage-led demand regime, while the Northern region a profit-led demand regime. Moreover, the wage restraint policies implemented in the Northern region majorly contributed to create trade imbalances vis-à-vis the Southern region. It follows that wage coordination is an essential macroeconomic tool but is insufficient to achieve trade and economic integration given the current state of divergence. Thus, a trade-based transfer mechanism is proposed to restore convergence in the Euro Area.

Chapter III - *Euro Area Growth Differentials: Diverging and Reinforcing Factors in a Minsky-Kaleckian SVAR Approach* - is built upon the results of chapter II, so as to investigate further the causes and consequences of divergence in the Euro Area. To this end, a SVAR methodology tries to capture the region's capability to respond to shocks. Hence, the empirical evidence disentangles diverging and reinforcing factors. The former set summarizes those shocks that produce opposed responses across the two blocks, while the latter set refers to those shocks that produce common responses. In this way, two clear feedback processes are highlighted as mutually reinforcing mechanisms able to impair and constrain growth: 1) the investment - growth feedback process, and 2) the unemployment - investment loop. The latter seems to have played an

important role in exacerbating the fall in the investments magnitude in the Southern region. On the contrary, the former seems to have contributed decisively to set in motion the virtuous mechanism of higher investments, higher exports, faster GDP growth in the Northern region. Finally, the analysis emphasizes the need to rethink the European macro mechanism and the implementation of a common and shared European macro strategy that goes beyond national political interests, and inclusively pursues the same objective: convergence.

Chapter IV - *The Emerging Regulatory Landscape: A New Normal* - discusses the financial and banking reforms implemented in the aftermath of the Financial Crisis at the European and global level. According to Minsky's theory an effective reform of the financial system is an essential step to restore a trustful business environment in the aftermath of a financial crisis. Hence, the relationship between banks' and sovereigns' default probabilities, the major source of instability during the post-crisis period, has been addressed by European policy makers with the implementation of the Bank Recovery and Resolution Directive. In this respect, the paper sheds light upon the growth prospects of the banking sector for the incoming years: lower structural profits but higher profit sustainability as well as lower probability of default but higher privatization of losses, the New Normal.

Chapter V - *End of the Sovereign-Bank Doom Loop in the European Union? The Bank Recovery and Resolution Directive* – according to the analysis developed in chapter IV assesses the effectiveness of the BRRD in breaking the risk-link between sovereigns and the banking system. To this end, by implementing a panel-econometric technique, empirical evidence shows that the regulation seems to be effective. Countries that have implemented the new resolution and recovery framework saw a strong decrease in the risk link between banks and governments. This indicates that market participants have assessed the banking system's loss absorbing capacity and the shift in responsibility to be sufficient to avoid state intervention in case of banks' default, thereby making the bail-in mechanism credible and effective. This outcome, in turn should have an economically positive impact on the cost of debt refinancing by banks and states. Nevertheless, this current change of direction may just be temporary, as it was before the Great Financial Crisis, and only an extreme event may definitely test its effectiveness.

CHAPTER I

Retracing The Great Financial Crisis
Policy Lessons from a Minsky-Kaleckian Approach

Abstract

The Minsky's financial instability hypothesis and the Kalecki's five determinants of profits are used in the paper as interpretative tools in order to disentangle the sources of the system's instability. Crises endogenously develop in our economic system, and they are not the consequence of exogenous shocks but the result of cumulative and structural changes happening at critical junctures. To this respect, the paper after having presented the Minsky's theoretical framework, through the collection and the discussion of major stylized facts, frames the macroeconomic context that allowed and eased the disaster to happen. A clear distinction between the proximate causes of the Great Financial Crisis and the underlying remote ones is then provided. In this way, the theoretical framework of business cycle fluctuations is integrated into a comprehensive analysis of practical interest for policy makers. Within this scope, short-term recovery tools and long-term structural policies are combined together so as to bring back the macroeconomic system on the path toward a sustainable and inclusive growth, that is, a wage-led full-employment growth model as alternative solution to the current profit-led system.

In order to examine these issues we need a theory of why our system is susceptible to threats of the sky falling and how particular policy interventions may be successful at one time and ineffective at others. (Hyman Minsky 2008, 75)

A program of reform that builds an economy oriented toward employment rather than toward growth should show benefits quickly. The primary aim is a humane economy as a first step toward a humane society. (Hyman Minsky 2008, 326)

1. Introduction

The link between capital, investments and economic growth began to work through the investment channel in a reliable way in the OECD countries only after the second World War, between the 1950s and 1960s (Minsky 1982, 15). Unfortunately nowadays this relationship has lost strength and reliability.

Many factors contributed to this breakdown, leading to the current era of low rate of investment and slower growth, which in turn constrains and impairs private and public investments, ultimately triggering a vicious mechanism.

On this line, the paper aims to disentangle the underlying remote causes from the proximate ones. It tries to retrace the sources driving the macroeconomic system to the current level of fragility. To this respect, the oil shocks of the seventies (the *stagflation*) and afterwards the process of financialization that grew rapidly during the 80s and 90s introduced a variety of new contradictions among the different spheres of economic activity. As a consequence, financial crises became recursive and the swings of the business cycle increasingly wider.

Many authors such as Galbraith (1954), Kindleberger (1978), and more recently Reinhart and Rogoff (2009) have investigated this structural change trying to learn lessons from experience. In light of the 2008 Great Financial Crisis (GFC), most of them started to stress the fact that the financial deregulation of the 1980s triggered the instability of the economic system. To shed light upon the overlapping causation forces, the Minsky's financial instability hypothesis (2009) and the Kalecki's five determinants of profits (2010) are used in the paper as an interpretative theoretical framework (Leijonhufvud 2009; Wray 2008; Bellofiore and Ferri 2001) capable of explaining the sources of the boom and bust cycles, and the subsequent period of stagnation. Retrace those factors creating fragility in a capitalism system, which is susceptible for its own nature to threats of the 'sky falling', is the most important lesson we can learn to prevent us from repeating policy-failures such as those leading to the 1929 Great Crash and the 2008 GFC.

To this respect, the paper synthetizes the Minsky-Kaleckian framework for then applies its approach to the most representative stylized facts for the period surrounding the 2008 GFC. On the one hand, by interpreting the theoretical relationship between investment, profits, and finance the paper clarifies the possible causation forces of business cycle fluctuations. On the other hand, after having framed the bearings, a nexus between theory and empirical findings can be defined.

As follow, section 2 examined the endogenous instability of a capitalist system in relationship with finance and the not neutral role of money. Section 3 covers the 'domino effect' among the different debt-units in the economy, that is, the path conducive to instability. Section 4 presents the Kaleckian profit equation and discusses the crucial role the five determinants of profits play in avoiding the 'sky falling'. Section 6 discusses the major trends in the post World-War II that allowed the disaster to happen, and clarifies the Minsky's position on current policy issues. Ultimately, the final section summarizes the main contributions of the paper.

2. The Minsky's Synthesis

Minsky argues that financial markets entail freedom without equilibrium, making our system more fragile. 'The time path of the economy depends upon the financial structure. As a result of cumulative changes financial relations became conducive to instability' (Minsky 1982, 15). Financial relations and financial products weaken and complicate the relationship between capital investment and the real economy, thereby creating a dualism between tangible (goods and real investments) and intangible richness (financial assets)[1]. An increase in the stock of capital does not necessarily pass through the previously necessary goods production, which was a central step of the value creation process. Capital or money can be invested through financial markets in order to produce new capital. Through this mechanism, capital accumulation is endogenous and can be generated or destroyed by financial markets.

The great advantage, which is even more valuable in an uncertain and unstable business environment, is the capability of financial markets to easily transform the investment at any point in time into liquidity. This is the *supreme skill* of financial markets. If the expected return from real investments is lower or equal than the expected return from financial investments, thanks to this feature, financial markets attract the majority of disposable capital in the system. Reasonably, banks will prefer to put the excess liquidity into financial markets instead of lending it to entrepreneurs who, contrary to banks, have a strong preference for investing directly in the real economy, thereby creating new

output capacity and employment. This great advantage, the so-called supreme skill turns into a real weakness for the investment-growth channel when the creation of new capital becomes the ultimate goal of financiers and banks.

To this respect, Minsky underlines that 'policies to control and guide the evolution of finance are necessary... in particular the maintenance of a robust financial structure is a precondition for effective anti-inflation and full employment policies without a need to hazard deep depressions' (Minsky 1982, 92).

The return from financial markets should mimic the return from real investment otherwise, if it is higher, it should be priced with a higher risk. The issue emerging from the GFC wasn't the higher return earned from financial products but the hidden risk embodied in those products created by financial innovation. 'These new financial products provided the basis for an illusion of low risk, a misconception that was amplified by the inaccurate analyses of the rating agencies' (Yellen 2009, 2). Financial regulation should prevent these price (risk-return) distortions, ensuring that to financial returns the true risk is attached so as to let the market participants decide between real and financial in a fair way. When the true trade-off between risk and return is lost, wrong incentives and expectations bring the economy on an unsustainable path which, thanks to the self reinforcing mechanism due to the speculative behaviours intrinsic in a capitalist economy, culminate in the burst of the asset bubble, and followed by a deep depression.

As Keynes as well as Minsky emphasizes, the issue arises when the majority of investors in the economy passes from being hedgers to speculative and Ponzi types[2] The sustainability of the growth path depends upon the share of investors belonging to these three groups. The mix of financial postures determines the overall robustness or fragility of an economy's financial structure, ranging from hedge finance, providing more resilience, to Ponzi finance providing more fragility. As Minsky affirms 'the mix of hedge, speculative and Ponzi finance in existence at any time reflects the history of the economy and the effect of his particular developments upon the state of long term expectations' (Minsky 1982, 106). It is easy to realize that an increasing number of speculative units in a financialized economy is a destabilizing factor for the system. To this respect, the first question to be addressed in order to understand why crises are recursive is: why, even if the system is experiencing a period of tranquillity, do hedgers become speculative units, and speculative units become Ponzi units? This issue was much less pivotal in an economy with a powerless and less systemic financial system as it was before the process of financialization took place. Given the evolution of finance and its

woven destiny with the investment decisions, Minsky suggests as a possible solution the simplification of the financial structure in order to achieve greater stability, even if he recognizes that 'the enforcement of simplicity in financial arrangements will be difficult' (Minsky 1982, 113). A possible answer to this question can be found in the role of money and the misunderstanding of its functioning.

Money is not neutral as monetarists believe. Money is not exogenously created. 'In our economy money is created as bankers acquire assets and is destroyed as debtors to banks fulfil their obligations' (Minsky 1982, 17). Money is endogenously created and affects both the price level of output as well as, contrary to neoclassical synthesis, the price level of capital assets[3]. As Minsky remarks, 'the latter depends upon current views of future profit flows and the current subjective value placed upon the insurance against uncertainty embodied in money or quick cash' - expectations about the long run development of the economy - while the former depends upon 'current views of near term demand conditions and current knowledge of money wage rates' - shorter run expectations (Minsky 1982, 94). Therefore a capitalist economy is characterized by two sets of relative prices: current output prices and capital asset prices and their alignment together with financing conditions determines investments. This is what usually has been called the 'endogenous incoherence' of a capitalist system (Minsky 2008, 74). When an economy is performing well, that is, current profits flows are sufficient to validate past debts, then expectations about future stream of profits are self-reinforcing, affecting asset values and liability structures. Such fulfilment of debt commitments, in turn, will affect the willingness to debt finance by bankers and their customers. In the end the value of insurance embodied in money decreases as the economy functions in a tranquil way. But as Minsky underlines 'stability - or tranquillity - in a world with cyclical past and capitalist institutions is destabilizing' (Minsky 1982, 101). Therefore the decrease of the value of insurance embodied in money leads to a rise in the price of capital assets and to a shift of portfolio preference. At this point, a larger amounts of speculative and Ponzi units will be accepted by bankers. This is what happened in the GFC as it was underlined by the president of the Federal Reserve of San Francisco at the Annual Minsky Conference: 'Investors tried to raise returns by increasing leverage and sacrificing liquidity through short-term - sometimes overnight - debt financing. Simultaneously, new and fancy methods of financial engineering allowed widespread and complex securitization of many types of assets, most famously in subprime lending. In addition, exotic derivatives, such as credit default swaps, were thought to dilute risk by spreading it widely.' (Yellen 2009,

2). As we see, preferences changed quickly and remarkably, nobody wanted to lose the opportunities offered by financial markets. Moreover financing conditions improved at the same time. The financial system endogenously created part of the finance needed for the increased investment demand. It follows naturally the rise in capital assets. Higher capital asset prices - higher house prices - allowed the banking system and shadow banks to enlarge their asset side, making loans to those who thought they were in the hedge category while, in reality, they were speculative and Ponzi units. Both lenders and borrowers were shocked when they discovered being a speculative unit. Financial instability hiding behind the gleaming expectations of a tranquil era prepares the primer for the bubble burst. To this respect, the second question that needs to be addressed is: what has been the factor triggering its sustainability?

3. The Road to The Great Crash

The likelihood of the burst is directly related to the amount of speculative and Ponzi units in the economy. The higher this amount is, the more sensitive the economy becomes to interest rate variations. Speculative and Ponzi units' expected cash flows arrive later than the payment commitments on their outstanding debts, therefore higher short-term interest rates strain the viability of their financial structure. At high enough short-term interest rates, former viable positions require larger cash flows than initially planned. Nevertheless the net present value of the investment, which is an inverse function of the long-term interest rate, remains positive. Only an increase in the long-term interest rate may rule out the positive return from the investment, while an increase in short term interest rate will only increase the short-term payment commitments, which will be reflected in a higher delivery price of the capital asset. In fact 'the delivery price of an investment good is a positive function of the short-term interest rate' (Minsky 1982, 107). Therefore the use of external finance is needed to comply with the unexpected higher payment commitments. If the supply curve of finance is infinitely elastic, then the rising demand for finance is always met. The cheap and abundant money on the supply side, together with the successful state of the economy and the increasing investment demand on the other, pave the way to the increased number of investments in the economy. This in turn leads to higher profits and, at a constant interest rate, to higher prices of capital assets. This mechanism, as we realize, is self-sustaining. Higher capital assets create incentives to new investments, new investments increase current and future profits and profits push up capital asset prices. A boom is the result of the normal functioning of our

economy, while current cash flows reassure ourselves about our past choices, and positive expectations about the current prosperity.

However a boom may not last forever. Unfortunately it is not a never-ending story. In fact the issue triggering the sustainability of this path comes from the availability of finance. The former infinitely elastic supply curve, little by little, may become less elastic for two main reasons:

1) The boom in investments boosted by the accommodative stance of the central bank leads to an overheating of the economy and therefore to increasing inflationary pressure. To this signal central bankers react by increasing short-term interest rates. Thus, the access to credit becomes more expensive.

2) The amount lent by banks to businessmen is proportional to the face value of the capital asset. Therefore if the price of capital assets keeps on increasing, the insurance embodied in the face value of the asset would allow banks to rollover the debts and increase the quantity lent. But when the price of capital assets is close to the bubble's peak-price, the speed of growth of the capital asset price is much lower than when the boom started; therefore banks will be more cautious to lend money if the value of their insurance is expected to grow more slowly. This implies that the banks' willingness to lend (at the previous rate) decreases as long as the speed of growth of the capital asset prices reduces. This makes evaporate at least part of the previously existing easy money[4]. As a conclusion the short-term interest rate increases, making the supply price of investment output increases. Moreover, given that short-term and long-term interest rates co-move, the former pulls the latter[5]. In this way, the downward spiral begins.

The present value of gross profits after taxes a capital asset is expected to earn falls, thereby reducing both supply and demand for investments. A fall in investments reduces current and near-term expected profits. Lower profits expectations reduce the price of capital assets. According to the liability side, hedgers may become speculative units, and some speculative units, Ponzi units. With higher short-term interest rate, the initial short run cash flow deficit of Ponzi units becomes permanent, and with the rising long-term interest rate also the net present value may become negative.

Next, as Minsky describes Ponzi units try to sell out their positions in assets to meet payments commitments, but unfortunately they discover that 'their assets cannot be sold at a price that even comes near to covering debts. Once the selling out of positions rather than refinancing becomes prevalent, asset prices can and do fall below their cost of production as an investment good' (Minsky 1982, 108)[6]. At this stage a full-fledged

financial crisis can be avoided only if ponzi and speculative finance received a prompt refinancing in order to avoid panics and strong selling pressures. The timing of the lender of last resort is crucial for the effectiveness of its actions. The central bank by injecting liquidity softens the impact of the financial crisis on the real economy by impeding temporarily the complete collapse of the capital asset prices, and therefore of investments and profits. Nevertheless the vicious cycle doesn't end so easily. The risk premia associated with new investment projects rise, and businessmen together with bankers reduce their liability sides avoiding speculative finance. A larger volume of previously positive net present value investments earns back negative returns as long as investments keep on falling together with profits. The shortfall of profits relative to the payment commitments on inherited debt together with a possible decrease in money wages make things even worse.

According to Minsky the only way to counteract a possible deep depression has to deal with the long run expectations of bankers, businessmen and asset holders about the future developments of the economy. The unfavourable experience of the financial crisis dramatically changes these expectations: 'profits are the critical link to time in a capitalist economy with a past, a present and a future' (Minsky 1982, 104). In order to avoid that a manageable recession becomes a deep depression, gross profits have to be sustained so that debt structure and past investments are validated. This, in turn, re-assures the system that the existing size and the structure of aggregate demand is enough to sustain present investments and financing decisions. Future profits need to validate current investment decisions. In order to stop the downward spiral, the lender of last resort must intervene by injecting liquidity, while the government has to sustain the decrease of profits by deficit spending. The deep depression will be escaped only if profits are sustained for such enough time to allow investments to recover to pre-crisis level.

This is the hard core of what - after the 2007-8 GFC - is definitely known as the 'Minsky moment'. For those who had forgotten, the best empirical description of this moment is given by the former U.S. Secretary of the Treasury Geithner in his book of memories:

There was nothing modest about our crisis. It began with a colossal financial shock, a loss of household wealth five times worse than the shock that precipitated the Depression. Bond spreads rose about twice as sharply in the Lehman panic as in the panic of 1929. Serious investors were buying gold in bulk and talking about burying it in their yards. Stock markets dropped to more than 50 percent below their 2007 highs (14)... The financial crisis really was a stress test for the men and the women in the middle of it. We lived by moments of terror. We endured seemingly endless stretches when global finance was on the edge of collapse, when we had to make monumental decisions in a fog of uncertainty, when our options all looked dismal but we still had to choose (2014, 19).

In similar circumstances, once again, the timing and the magnitude of government interventions are crucial. If it comes late and with not enough strength, not only Ponzi units will not succeed in fulfilling their outstanding debt payment commitments, but 'even initially hedge financing arrangements will not be forthcoming' (Minsky 1982, 108). Therefore an investigation into the determinants of profits is necessary to really understand the intrinsic evolution of the business cycles in a capitalist system. A useful tool to investigate these determinants is the Kalecki model.

4. The Kalecki's Five Determinants of Profits

Rather than the standard approach used in the neo-classical synthesis, where profits are determined by technology through the production function, Kalecki tries to address the question of how the volume of profits is determined in the economy deriving it from the national accounting identities as follow (Kalecki 2010, 49):

$$\pi = I + DF + BPS + C\pi - SW \tag{1}$$

Gross profits net of taxes - the left hand side of the equation - are equal to gross private investment (I), plus budget deficit (DF), the balance of payments surplus (BPS), consumption out of profits ($C\pi$), minus savings out of wages (SW).

According to Kalecki any change in the investment magnitude unequivocally affects actual profits by the same amount, and expected profits the current investment magnitude.

Within this framework, the level of perceived uncertainty and the availability of finance play a crucial role in shifting the risk appetite of bankers and entrepreneurs, which in turn determine the stance of the economy (Minsky 1975).

Among the five determinants, investment is the only one that increases the productive capacity of the economy, that is, the potential welfare. As we have previously sketched, in the aftermath of a financial crisis, both the business confidence and the financing conditions sharply deteriorate, so that investments together with profits experience a sharp fall. At this stage the business cycle begins its downward path. The only way to counteract the fall in investments is by an increase in the other four determinants, among which, the budget deficit is the only source of profits which is completely under the government's control, and for this reason it represents the ad-hoc policy instrument for controlling the level of profits and in turn the posture of the economy.

Nevertheless, the budget deficit in the short run requires to be financed, and its outcome may depend, not only by the way it is invested, but also upon the combination of the financing method employed and the monetary policy strategy implemented. If the budget

deficit is financed by the central bank, which maintains an accommodative policy, i.e., interest rates do not rise, no place for an adverse effect on the other determinants of profits exists[7]. While, if the central bank lends money to the government and at the same time increases the interest rate to compensate the enlargement of the money base, investments will fall as well as profits because they are interest sensitive. Therefore the result will be ambiguous. However another source to finance the budget deficit that is commonly used by governments is to borrow from the public. The issue concerning this way of financing is twofold. On the one hand, if the government is not reliable and moreover it has an already high public debt, the interest rate may be high and increasing due to the perceived risk. As Minsky underlines 'government units are often speculative financing units which operate by rolling over short term debt' (Minsky 1982, 33). High enough interest rates can make government units into Ponzi units. This is what took place during the European sovereign debt crisis two years after the burst of the subprime bubble. Most of the countries in the Eurozone - especially the Mediterranean countries - weren't able to rollover their debts. The increasing perceived risk in the financial markets concerning the sustainability of their debt levels pushed up the cost of borrowing and only the intervention of the lender of last resort avoided their default. In this way, the deficit spending benefits less than proportional profits, and the deleveraging process exacerbated the fall in investments in a self-reinforcing mechanism. On the other hand, since the sustainability of the government deficit is tied to revenue expectations, as Minsky underlines, shortfalls of revenue due to changes in global and local economic conditions exacerbate debt problems and may even trigger the domino effect across public debt units (Minsky 1986, 253).

Aside the financing issues, the government deficit affects current profits by the way it is used, and this represents a really important insight into the problem of sustaining profits. Profits sustained by an increased deficit increase for sure in monetary terms, but to create the conditions for a trend reversal, a rise in real values must take place[8]. If the stimulus is not sufficient and effective in recovering the investment magnitude, the economy would face permanently a lower level of employment and economic activity[9]. The hysteresis and path dependency here ground their roots. Given these cumulative forces, understanding what are the best usages of government spending to sustain profits is crucial[10]. To this respect, is it better to run government deficit by tax reduction or by an increase in government spending?

Private sector would certainly prefer the tax-cuts, but, if this issue is analysed by the perspective of the Kalecki's identity, government spending would be highly preferred. In fact, a lower level of taxes is not equal to a higher level of consumption (out of wages) because part of these tax-cuts will be transformed into current savings, which enter negatively into the Kalecki's identity[11].

As Minsky definites it: 'big governments virtually ensure that a great depression can not happen again' albeit the continuation of the inflation-recession-inflation scenario is the natural consequence (Minsky 1982, xxiv). He clearly underlines that 'the current policy problem of inflation and declining rates of growth of labour productivity are not causally related but rather they are the result of a common cause, the generation of profits by means of government deficits where the government deficits do not result from spending that leads to useful output…Big government is a shield that protects an inefficient industrial structure' (Minsky 1982, 56). This is summarized by Minsky with the expression: 'doctrine of salvation through investment'. Once this idea is 'deeply ingrained into our political and economic system the constraints on foolish investments are relaxed…. the inefficiency of the chosen techniques is reflected by the unemployment that accompanies inflation: stagflation is a symptom of an underlying inept set of capital assets' (Minsky 1982, 113).

Nevertheless according to Minsky 'big governments remain necessary to prevent a shortfall of investments from triggering an interactive debt-deflation process, but they can be considerably smaller and different' (Minsky 1982, 201). According to Minsky 'government must be at least the same order of magnitude as investments' (Minsky 1986, 332). Moreover governments should be different.

Regarding this point, Minsky advocates that: 'the emphasis on investment and economic growth rather than on employment (through consumption production) as a policy objective is a mistake. A full-employment economy is bound to expand, whereas an economy that aims at accelerating growth through devices that induce capital-intensive private investment not only may not grow, but may be increasingly inequitable in its income distribution, inefficient in its choices of techniques, and unstable in its overall performance' (Minsky 1986, 325). Therefore the usages of government spending - as they are currently implemented - validate private decisions even if they are detrimental to efficiency and equity.

To this respect, government should engage in the resource creation and development belonging to the public domain thereby boosting the efficiency of private investments

(Mazzucato and Jacobs 2016). Moreover, government spending should avoid demand management through transfer payments because 'when government transfers income to people, there is no direct effect on employment and output…the impact on GDP of a dollar spent to hire leaf rakers in the public parks is greater than a dollar given in welfare or unemployment benefits' (Minsky 1986, 25). A two-sided transaction is better than one that does not provide inputs into the production process.

Nevertheless, since private investments can be destabilizing, 'the policy emphasis should shift from the encouragement of growth through investment to the achievement of full employment through consumption production' (Misnky 1982, 113). Within this context, to achieve a stable and sustainable growth the focus has to be set upon the intermediate horizon of ten to fifteen years (Minsky 1982, 258). This is of great practical interest for policy makers, and is the key to understand why Minsky incentivize public investments rather than public consumption, while private consumption over private investments.

The short run and the long run are two different faces of the same coin, and are strongly linked. Hysteresis is the principle linking variables' movement in the long run to a short run change. Public investments in those fields providing social benefits and requiring a high capital intensity - railroads, energy plants, communications, research and knowledge development - are necessary and government should take care of them[12]. As Mazzucato recently emphasizes, 'innovations that would not have come about had we waited for the 'market' and business to do it alone - or government to simply stand aside and provide the basic' (Mazzucato 2013, 3)[13]. They enhance the aptness of private investments and therefore the level of productivity in the economy - the long run trend developments. On the other hand, consumption production through lower capital intensity activities implies a higher level of employment, which in turn, constraints the downward swings of profits in the economy - the short run developments. A higher profits floor reduces the instability intrinsic in a capitalist economy. Contrary, pushing private investments through government consumption without having created a source of stable profits would only overheat the system and increase its fragility[14]. Incentivizing consumption by increasing employment in order to sustain profits is a safer policy tool than increasing private investments in the short run. It is the quality of private investments and not the quantity that roots a stable and sustainable growth path within a capitalist system. It is the quality of investments - the real knowledge - that improves productivity. According to Misnky, 'the utilization of knowledge by competitive industries guarantees that such knowledge becomes the basis of widespread well-being,

not the rent-producing assets of a few' (Minsky 1986, 366). This is the essence of a policy aiming at stabilizing an economic system, which for its own nature is unstable, and that at the same time strives for efficiency and equity, i.e., growth and full employment. Nevertheless, not only private investments and the government deficit, but also the other determinants of profits have a non-negligible impact on the investment rate - although of smaller magnitude - and therefore on the stance of the economy.

To this respect, an increase in the export volumes increases current profits by the same amount, if and only if, all the other determinants of profits remain unchanged. For example, if an export oriented sector experiences an increase in its export volumes and this excess of cash flows is neither invested nor consumed, whereas is sterilized by a higher level of savings, current profits will not increase. Contrary, whether these export revenues are invested to enlarge the productive capacity or are used to buy consumption goods on the domestic market, current profits will increase more than proportionally through the positive effect of the multiplier, common to all the variables in the Kalecki's identity. Therefore the profit function has a multiplicative behaviour of degree one or higher depending upon the usages to which these export revenues are devoted[15]. According to Kalecki 'the value of an increment in the production of the export sector will be accounted for by the increase in profits and wages of that sector. The wages, however, will be spent on consumption goods. Thus, production of consumption goods for workers will be expanded up to the point where profits out of this production will increase by the amount of additional wages in the export sector' (Kalecki 2010, 51). Nevertheless, if the productive capacity of those sectors producing consumption goods can't be expanded, i.e., it is already at its capacity level, the increasing demand will only push up prices, leaving the multiplier inoperative. In fact, Kalecki underlines that 'if the production of consumption goods for workers is at capacity level, prices of these goods will rise up to a point where profits out of this production will increase by the amount of additional wages in the export sector' (Kalecki 2010, 51). If the productive capacity is available to expand, prices may rise as well, and thereby offsetting partially the multiplier effect. As long as prices increase, the multiplier tends to converge to 1. On the other hand, an excess of imports i.e. a trade deficit, will have a similar opposite effect on the multiplier than an equal increase in the trade surplus. Overall, the trade balance represents the 'autonomous component of demand', that is, the demand emanating from outside the region. To this respect, Kaldor emphasizes that the growth in the autonomous demand-

factor governs the rate of growth of the economy as a whole, that is, the rate of growth of investments and consumption' (1970, 342).

Upon this view the mercantilist perception rooted its policy prescriptions in the sixteen century. A trade surplus was a prerequisite in order to increase the wealth of a nation. The inflows of gold had to exceed the corresponding outflows. It is important to stress that this is a zero-sum game, and therefore a persistent trade surplus weakens foreign countries by draining out resources. In fact a persistent current account deficit is likely to increase private and public indebtedness. Not only current profits, but also expectations about future profits are likely to be affected in this way. This, in turn, will decrease the amount of available resources in the domestic market, and therefore its level of output and employment. For this reason, a mercantilist perspective suggests currency devaluation, import tariffs and export subsidies as remedies to counteract a persistent trade deficit. Despite the presumable negative effect, and conversely positive effect of a persistent trade surplus, the overall success and sustainability of a negative (positive) trade balance depends respectively upon the characteristics of the goods imported (exported), and their related usages. Moreover, also a country constantly facing a trade deficit may be pursuing a sustainable growth path. In fact, if the productive capacity is growing at a sufficiently fast pace, the long run sustainability won't be in any jeopardy. According to Minsky, the creation of a trade surplus in the aftermath of a financial crisis may prevent the economy to fall into a deep depression. Therefore a trade surplus plays a crucial role similarly to government deficit in sustaining profits. This was the reason why austerity measures in the Euro Area had remarkably different effects across its members, and why some of them recovered the pre-crisis output trend, while others not (Covi 2017). To the same extent, Kalecki emphasizes that:

> The capitalists of a country which manages to capture foreign markets from other countries are able to increase their profits at the expense of the capitalists of the other countries…. The counterpart of the export surplus is an increase in the indebted-ness of the foreign countries towards the country considered…. The counterpart of the budget deficit is an increase in the indebtedness of the government towards the private sector…. The above shows clearly the significance of 'external' markets (including those created by budget deficits) for a capitalist economy…. It is the export surplus and the budget deficit which enable the capitalists to make profits over and above their own purchases of goods and services (Kalecki 2010, 51).

Therefore, policies aiming at setting in place a recovery need to feed profits internally through government spending, and at the same time promotes exports so as to alleviate the internal burden and make it self-sustainable.

To this respect, also the fourth determinant of profits - savings out of wages - plays its key role in time of crises. Given the fact that it enters negatively into the Kalecki's

identity, it may sterilize part of the foreign profit flows. This negative effect on current profits is also quite intuitive because a higher saving rate implies a lower level of current consumption and investments. Especially, in the aftermath of a financial crisis, when current profits are low due to the collapse of investments, a positive shock to the saving rate may pull back the economy into recession although contemporaneous massive interventions from the government and the central bank. This phenomenon has been called the paradox of deleveraging.

When asset prices start to fall, and the financial crisis starts to erode the value of capital assets and real wages, agents start to consume and invest less given the current adverse and expected business conditions. As clearly confirmed by Yellen in the aftermath of the GFC:

Consumers are pulling back on purchases, especially on durable goods, to build their savings. Businesses are cancelling planned investments and laying-off workers to preserve cash. And, financial institutions are shrinking assets to bolster capital and improve their chances of weathering the current storm' (Yellen 2013, 3).

On the positive side of the cycle building up savings is a successful countercyclical policy advise, so that, when the 'black swan' suddenly arrives, the economy is well prepared. While, if these good behaviours take place on the negative side of the cycle, they may only contribute to magnify the distress of the economy as a whole. Moreover, a reduction of the saving rate may also boost the investments directly or through a higher consumption rate, as happened in the GFC, leading to an overheating of the economy. In fact, due to the softening of lending standards and the competitive pressure in the banking system, especially in the US and UK, the level of indebtedness in the economy sharply increased. In turn, this phenomenon transformed the low, but positive, saving rate into a positive determinant of profits in the Kalecki's equation. 'The personal saving rate, which had been falling for over a decade, hovered only slightly above zero from mid-2005 to mid-2007. A good deal of this leverage came in the form of mortgage debt' (Yellen 2013, 2). To this end, and to smooth the business cycle's fluctuations Minsky suggests 'a balance sheet conservatism' and 'the control of banking - money - and the control of the liability structures available to units' (Minsky 1982, 86).

Ultimately, the last determinant of profits - consumption out of profits - depends upon the corporate sector dividends' policy. The higher is the amount of dividends distributed to shareholders, and the lower is the saving rate on dividends, the higher will be the impact on gross profits. The impact of this variable is relatively small, and loses importance as long as its economic structure is weakly based on the stock market to invest and

refinance. Moreover, firms' profits are added to the stock of liquidity in the form of retained earnings, and therefore they are only partially and occasionally distributed to the shareholders. On top of that, households investing in financial products such as stocks experience a saving rate higher than an average household with a wage-based consumption behaviour. This, in turn, reduces even more the total amount of consumption out of profits. According to Minsky, an analysis aiming at going to the origins of business cycle needs to take into account all the five determinants. He emphasizes that the role of the fifth determinant - consumption out of profits - depends to large extent upon interpreting 'the allocation of profits to salaries, research, advertising, and 'business style' expenditures…the allocation of profits to consumption follows from the building of a bureaucratic business style, which, like inherited debt, may lead to current period 'uncontrolled' expenditures' (Minsky 1982, 44).

As we have emphasized, the business cycle depends upon the swings of investments in the economy, which, in turn, are driven by the amount of gross profits and profit expectations. All the five determinants impact gross profits in different ways and with different magnitudes. They endogenously evolve over time together with the economic structures, the 'animal spirits', and financial postures. A full understanding of their relationships, therefore, is a precondition, if central banks, governments and policy makers aim at 'stabilizing an unstable economy' and achieve a sustainable growth path.

5. The Macroeconomic Context of Great Financial Crisis

As Minsky sums up his analysis: 'The causation runs from investments to profits' (1982, 103). According to this perspective, uncertainty and volatility of profits are determined by the fluctuations of investments, which, in turn, lead to huge swings of the business cycle. The financial sector, and especially the banking system play a crucial role in the creation of money and the pricing of capital assets, that is, in determining the level of investment in the economy. The evolution of financial markets, and therefore of financial innovations is the accelerating element to the upward instability.

To this respect, after having presented the Minsky's theory, the paper doesn't aim at comparing it with the extensive literature on business cycles (Schumpeter 1939; Samuelson 1939; Hicks 1950; Fisher 1952), which was the object of a detailed analysis in the first two chapters of the Minsky's thesis *Induced Investment and Business Cycles* (2004).

Rather closer to our interest it is trying to assess the practical implications of the Minsky/Kalecky analysis in light of the GFC of 2007-08. It has been clarified in the last

section that given the critical role profits play in keeping the business cycle out of a downward spiral, all the government's policy measures should be designed to sustain investments by maintaining the volume of gross profits unchanged. But, this is true only in the short run in a Minskian framework. It really works as a painkiller, to borrow a medical term: a panacea against the rising panic, to avoid a bank-run and the 'sky falling'. This kind of measures that use public spending, tax-cuts or monetary operations to support the business cycle can prevent the economic 'meltdown', but do not cure the disease. To this respect, the policy so-called Quantitative Easing, adopted promptly in December 2008 by the Federal Reserve, can be assessed as the biggest economic stimulus in history: a bond-buying program of almost $ 4.5 trillion (at the end of 2015) holding at same time interest rates to zero or near-zero, figure 1.

Insert About Here **Figure 1**
Total Assets: Federal Reserve and European Central Bank

It's for sure a very successful story in monetary policy management that brought American economy in just two years out of the recession. But the rapidity of the success can't hide the appalling level of fragility showed by the economic system. And cannot wipe out, in any case, the enormous costs in term of destruction of millions people's prosperity. In terms of forgone output, the GFC is as costly as wars, as observed by Haldane (2012). It is not the aim of the paper to cope with the already enormous literature on the causes of the biggest economic depression since 1929.

The object of the following investigation is to draw a simple distinction: for an event of such dimension the proximate causes must be separated from the underlying remote ones. The proximate events are the subprime mortgages, the debts accumulated to finance the speculative bubble in the housing market, the abnormal growth of the securitization process in the financial sector and, at the end, the Lehman Brother bankruptcy. If they are easily recognized as cause of the crisis, we cannot ignore that this happen in a macroeconomic context that allowed and eased such an economic disaster to happen. In this respect, although the Minsky-Kaleckian approach has undoubtedly important policy implications in the short-run - to avoid the 'sky-falling' - similarly, it has an important lesson to be learned regarding the long-term stabilization process of a capitalist system. It is on this precise interpretative point that the contribution of this paper stands. The illustrated mechanics of business cycle can be so applied to policies aimed at stabilizing the system ex-ante, instead of ex-post. This is clear in Minsky's writings (2008), although policy makers clearly prefer the latter option to the former one. By knowing how

instability endogenously arises from within the system, the flaws and fragilities of the system can be reduced by implementing ad-hoc macro-policy responses. The generalized fall into a 'Ponzi' trap is not due to an exogenous shock such as the Leman bankruptcy, it is due to the endogenous cumulative forces and the structural fragility of a capitalist system. An instability that should have been tackled, through time, with the instruments of political economy, financial reforms, and a more sustainable growth-model. From this point of view, the GFC is the offspring of a flawed growth-model. In this respect, the investigation of the period and policy-events preceding the GFC sheds light upon which policies and reforms allowed and conduced to the 2008 instability.

To simplify the argument - and following a Keynes/Minsky/Kalecki theoretical framework - the patterns of growth can be divided in two types: wage-led and profit-led. The importance of the distinction rests on the fact that workers and capitalists have different propensity to save so that functional income distribution has important effects on aggregate demand and hence on the rate of growth and on the resilience of the economic system (Bhaduri and Marglin 1990; Bleker 2002; Hein et al. 2011; Palley 2012a).

The influence of long-term brewing factors usually is difficult to be detected and admitted. It's also rather neglected by economists. Nevertheless, the period post World-War II to the late seventies is referred to as the Golden Age of capitalism in industrial-advanced economies (Marglin 1990). For thirty years the common growth model was wage-led. The high growth rates, for that long period, was attained through rising wages in accordance with the productivity increases, and full employment. At the end of the war the Keynesian revolution spread its effects in America and in Europe, and the fears of governments and ordinary people to return to the calamity of mass unemployment post-1929 did the rest. The model established a virtuous-circle of growing salaries that supported a strong aggregate demand, which in turn stabilize the invest rate, leading to the creation of productivity gains that allowed wages to rise in a framework of full employment.

It's also well known that this growth-model ended in the eighties defeated by the counterrevolution of neoliberal economics, and under the blows of the Washington Consensus policies (Wlliamson 2004). Many are the new factors and the new players: the liberalization of capital movements and of international trade paved the way to offshoring and outsourcing of jobs in developing countries where labour costs were a tiny fraction of the industrial countries wages. The stable floor of aggregate demand, usually fuelled by a

wage bill increasing with productivity, began to shrink and the workforce to take back[16]. Assets price inflation and strong increases in the debt-to-GDP ratio of households, corporates and states became the new tools searching for stimulate investments and hence directly profits. Full employment disappears as the principal target of public policies. Only *flexibility* of the labour market - wages downward adjusted - is admitted to be able to bring the economic system *near* to full employment; not anymore to 'full employment', since the introduction of Milton Friedman's concept of a 'natural rate of unemployment' was established (1968), and which was made later operational by neo-classical economics under the acronym NAIRU - non accelerating inflation rate of unemployment (Gordon 1997; Palley 2012, 40). The historic trend of unemployment from post-WW II until today (see Figure 2, based on OECD data) could not be more impressive in reporting this paradigm shift.

Insert About Here **Figure 2**
The trend of unemployment in US and Eurozone (1956-2014)

In the terms of the new economic setting the abandonment of the employment-targeting policy takes place in high-wage economies with long-lasting trends that will be hard to change. We highlight here three of the main trends.

5.1 Wages lag behind
In the Golden Age, in the period from 1947 to 1973 in the U.S., productivity and median wages rose together for more than 100 percent, and labour's share on GDP rose rapidly (Levy and Temin 2007). Although established on technological advantages, the American Golden Age was strongly promoted by the institutions built up in the years of the New Deal (also before the publication of the Keynes' *General Theory*) and consolidated during the post-WW II through labour-business arrangements where government played strongly pro-labour with the target of bringing the economy back to full employment. It sounds quite similar to the words of Minsky in his quote at the beginning of this paper: 'an economy oriented toward employment rather than toward growth'[17]. This line of policy was fully confirmed at the end of the war. Also if later amended by the Congress, under Truman presidency, in January 22nd 1945, the U.S Senate passed the law S.380, 'The Full Employment Act'. Its declaration of policy had a symbolic impact that went beyond the economic relevance:

To establish a national policy and program for assuring continuing full employment in a free competitive economy, through the concerted efforts of industry, agriculture, labor, State and local governments, and the Federal Government .... all Americans able to work and seeking work have the right to useful, remunerative, regular and full-employment and it is the policy of the United States to assure the existence at all times of sufficient employment opportunities to enable all Americans who have finished their schooling and do not have full-time housekeeping responsibilities freely to exercise this right (Bailey 1950, 243).

We focus on this legislation because it makes clear two important aspects of the policy of the Golden Age. The first is that the growth-model that followed is definitely wage-led in the i of the Minsky's priority of employment over the rate of growth. The second, likely more important, is that to be successful, a strategy of economic development of this type can't be made-up simply by the same groups of economic advisors of a President, but it's a long-lasting political work of institutions building and making of social norms. Later, in the sixties, under the Kennedy administration, the chairman of the Council of Economic Advisors Walter Heller, in 1966, made technically perfect this socio-economic architecture inventing a set procedure of *price-wages guideposts* so as to fix how productivity gains should be distributed between profits and wages. With his own words:

In *business*, the guideposts have contributed, first, to a growing recognition that rising wages are not synonymous with rising costs *per unit* of output. As long as the pay for an hour's work does not rise faster than the product of an hour's work, rising wages are consistent with stable or falling unit-labor costs (Heller 1967, 44).

As we have said at the beginning of the paragraph, this reassuring and seemingly stable economic landscape begin to collapse during the critical seventies, and under the shocks of what Acemoglu and Robinson (2012) call 'critical junctures': in this case, the break-down of the dollar-anchor-to-gold (1973), the first oil shock (1973), the surge of stagflation, and the second oil shock (1979)[18]. Since then, the productivity growth was disconnected from wages.

This is a long lasting trend common to nearly all advanced countries, but mostly in U.S. Kalecki provides two complementary explanations on what would happen. In a short article of 1945, he shows that to reach and maintain full employment by relying only on private investment would prove to be a nearly impossible task. On the one hand, the ordinary policy stimuli to foster profit-led growth - 'cheap money', reduction of income tax, subsidies to investing firms - have to be applied not once for all, but cumulatively: 'that means that the rate of interest must *continuously* fall; the income tax must be *continuously* reduced; or the subsidies to investment must *continuously* rise' (Kalecki, 1945, 83). On the other hand, the difficulty to reach and maintain a long time full

employment is related to political reasons. As Kalecki writes about what he calls the 'economic doctrine of full employment':

It should be first stated that although most economists are now agreed that full employment may be achieved by Government spending, this was by no means the case even in the recent past... There exists a political background in the opposition to the full employment doctrine even though the arguments advanced are economic... Every widening of the State activity is looked upon by 'business' with suspicion, but the creation of employment by the Government spending has a special aspect which makes the opposition particularly intense. Under a *laissez-faire* system the level of employment depends to a great extent on the so-called state of confidence. If this deteriorates, private investment declines which results in a fall of output and employment. This gives to the capitalists a powerful indirect control over Government policy: everything which may shake the state of confidence must be carefully avoided because it would cause an economic crisis (1943, 324-325).

Based on this argument, Kalecki concludes that, in a capitalist regime, there is always the threat of a 'political business cycle', of the emergence of a block between big business and *rentiers* pressing 'to return to the orthodox policy' (1943, 330). In fact, this sounds today like an exact prediction of what would have happened next - forty years later - with the return of the neoliberal economics era, symbolized by the election of Margaret Thatcher (1979) and Ronald Reagan (1980)[19].

5.2 The growing income inequalities

If the first effect of the Golden Age collapse was the disconnection of a growth-model where productivity and wages were linked together, a second implied effect was the explosion of income inequalities. Furthermore, the wages stagnating for a long time created problems to the aggregate demand. If you add that the economic recoveries were jobless-type, as was in the 1990s, a typical downward spiral - as described by Minsky - inevitably begins.

The increase of inequality from the 1980s, especially in U. S., has been documented by many researches (Atkinson 1997; Piketty and Saez 2003; OECD 2008; Fiorentini 2011; Stockhammer 2013). It is a real turning point, the 'Inequality Turn' as baptized by Atkinson (2015, 3). For example, as shown in Figure 3, the top 10% in U.S. received in 2015 about half of the gross national total income, 15 percentage points more than in 1980 (Piketty and Saez 2006).

Insert About Here **Figure 3**
The U.S. Top Decile Income Share

The problem with inequality is not only economic but social, it tends to worsen poverty. Alarming is the case of Eurozone. With an unemployment rate of 10% in Q3-2016, more

than double of U.S. (see Figure 2), the EA-19 experienced an acceleration of the people at-risk-of-poverty. During the period 2008-2014 there have been an increase of 6.7 million people living in poverty or social exclusion bringing in EU-28 the total people in poverty to 124.2 million, nearly 1 to 4 Europeans (EU 2014, 7).

One wonders why the public policy has not set-up an objective for the reduction of unemployment while the rate of inflation is so precisely targeted at 2% by all central banks. It could be because the labour market is something complex, strongly influenced by technological innovations and globalization. But why not, in any case, stating the 'rate-of-unemployment' as a public and explicit objective?[20] As with inflation?

A second big question arises looking at the post-2008 unemployment trend in the U.S in comparison with the Eurozone. They are radically 'unequal' or, better, opposed if we look at the second circle on the right hand side of figure 2. How to explain such a different behaviour? And inside Eurozone, what has been wrong with the regional 'inequalities' and the impact of the GFC between core countries (Germany and Northern Europe) and Europe's peripheral countries (Greece, Portugal, Spain, Italy) that are sinking into chronic unemployment (Storm and Naastepad 2015; Simonazzi, Ginsburg and Nocella 2013; Stockhammer et al. 2009)?

Is it credible that the European heritage is due only to the austerity policy adopted? (Blyth 2013). Or to a monetary easing-money policy adopted too late by the ECB? It's tragically true that, the Euro-partners came to the decision of starting a program of Quantitative Easing too late, in March 2015 (7 years after 2008); while the Fed started its mortgage back securities and bond-buying program (QE) already in November 2008. The intensity and the endurance of the slump in the Eurozone prompt a deeper investigation of the structural causes, in line with the lessons learned through the Minsky/Keleckian framework of the previous paragraphs, and before surrendering to a diagnosis of 'Japonization' (Krugman 2014; Ito 2016). There must be a more fundamentally flawed growth-model behind the performance of the economies of the Eurozone that is worthwhile to investigate. The rationale for policies comes after and accordingly.

5.3 The Financial Deepening

After rising unemployment and rising inequality there is a third dimension of the GFC and recession that comes up, in a vicious cumulative circle, with the first two. It's the 'financialization' of the high-income economies. Not in the form of the contingent financial instruments that brought the US economy in the verge of the 'sky falling' - in the words of Minsky - (sub-prime mortgages, toxic bonds and derivatives). But in a more

structural meaning: of a growth-model tuned by financiers, i.e., finance-led. We do not enter here the recent very extended literature on financialization[21]. But this new latest profit-led modality of neo-liberalism raises important questions on its long-run effects on wages, full employment and equality.

After the Golden Age, there is in US not only an income polarization, as shown in figure 3, but also the income of the top 10% became closely linked to the explosion of the financial markets, as figure 4 shows.

Insert About Here **Figure 4**
Income share of the top 10% and value of financial assets as % of GDP in US

During this historical juncture income inequality sky-rocked pointing out a second research indication: the profit-led growth turns into a rent-seeking growth. Here it should not seem too imaginary assuming that we went beyond Minsky's words: 'the causation runs from investments to profit'. Here it seems that the correlation is between *financial* investment and profits: the growth-model became rent-seeker in a system where the first rule of the game is that the 'winner-takes-all'. As observed by Palma (2009, 851): 'What happened to investment during the neo-liberal period challenges *all* available economic theories of investment'.

But there is a second important issue connected with financialization. We could say a double issue. The first refers to the impact of the financial cycles on the real business cycles. Recently a growing literature has addressed the link between the two cycles (Goodhart and Hoffman 2008; Schularick and Taylor 2009; Borio et al. 2012). Tough strictly interrelated, the financial cycle has assumed since the 1980s a distinct trend with a length and an amplitude much more marked than usual business cycles.

Figure 5 is rather worrying because it discloses the fact that the Great Financial Crisis is far from finished. The financial crises have medium-term length. If policies do not take into account this dimension, and are short sighted, the risk is to incur in larger recessions unexpectedly during the recovery process. Is the so-called 'unfinished recession' phenomenon (Borio et al. 2012, 2).

Insert About Here **Figure 5**
The financial cycle is longer than the business cycle (US example)

For the Eurozone the economic indicators of the recession, as the rate of growth and the rate of unemployment, speak for themselves regarding the fact that the slump is not yet

over. But even the US cannot claim victory. For the US - and just because the real economy's indicators turn positive - this financial 'hidden side' should be better investigated to detect the effects of years of 'unconventional' monetary policy, through the QE (from 2009 and running until October 2014) and by holding interest rates near zero (Stiglitz 2016). In fact, in the on-going lively debate on the topic, not few are the critical positions against this policy accused of sowing bubbles and financial instability for years to come (Feldstein 2016). Not to speak of the European officials that embraced the fiscal austerity and were since the beginning against the shy unconventional ECB's experiment of assets purchases (see figure 1)[22].

In fact, monetary and state authorities have a daunting task in these circumstances. As already enlightened by Minsky: in the short run, to avert the catastrophe 'big governments remain *necessary'* on the expenditure side. But it's clear that, right after, the state must radically change its set of primary goals: from an increasing accommodating financial regime put in place from the 1980s, it must begin a transition toward a resizing of the financial sector, a major overhaul of the rules of the game over the long run to avoid macroeconomic disruptions that could happen again. The emergence from the financial crisis seems to be, this time, a task much more difficult in the current environment, at least in Europe. It is rather disheartening what reminds us the IMF:

Past financial crises have been resolved to a considerable extent by resumption of strong growth, often external, that drove down debt ratios and enabled affected countries to emerge from austerity programs before austerity fatigue had set in too heavily. Thus, 1984 was an *annus mirabilis* as the 'Reagan boom' and paralleled growth elsewhere started lifting Latin America economies out of their crisis-level indebtedness... In addition, the widespread growth spurt of the early years of this century enabled Asian countries, which had recently been in deep financial crisis, to growth at rates of 6 percent or more; this growth rapidly brought down high debt ratios and enabled the countries to wind down their emergency infrastructures and arrangements (Enoch 2014, 465).

The missing point in this judgment is that, few years later *annus mirabilis* 1984, there was the *Black Monday* of October 1987 (see Figure 5) when the Dow Jones plunges 508 points, a drop of 22.6 percent in one day, the biggest in history. The causation should be inverted: it is the system through its economic structure and banking/financial organization that should have the capacity to promote growth and not vice versa, hoping in a 'providential' growth to soften up the failures of the financial sector. But, as we know from Minsky and Kalecki, capitalism is intrinsically unstable and so the problem is to link the system to reforms and policies capable of triggering growth again.

The finance-growth nexus has been examined by a growing literature demonstrating a positive correlation between financial development and economic growth, as admirably

synthesized, for example, in King and Levine (1993, that remind us the classic positive view of Schumpeter on finance enhancing innovations) and in Levine's review (1997). But the GFC has stimulated a new generation of empirical researches. The new findings underscore that the crude rule of thumb 'more finance, more growth' should be replaced by a range of possibilities in which flawed financial systems can lead to an array of negative effects: from depressing savings to rising unemployment and from enhancing speculation to underinvestment.

For example, Cecchetti and Kharrubi (2012) show that a faster growth of the financial sector is associated with a slower growth of the other sectors of the economy. This happens because, in the competition with others sectors, a booming financial sector subtract resources to the others. The explanation is perfectly in line with the crowding-out effect played by the 'natural resource' sector in the theory of 'Dutch Disease' (Corden 1984), and renewed by Palma (2008; 2009) in the context of financialization. An empirical study on 87 developed and developing countries, by using an innovative dynamic panel threshold technique, Law and Singh recently confirmed and specified the contours of this nexus:

The relationship between finance and growth is a non-linear one or, more specifically an inverted U-shaped, where there is a turning-point in the effect of financial development ... For financial development below the threshold finance will exert a positive effect on economic growth. This implies that economic growth will be increased when financial development improves. On the other hand, if the financial development exceeds the threshold, the impact of finance on growth will turn negative suggesting then further financial development will not translate into higher economic growth (2014, 36, 43).

This conclusion is confirmed by Arcand et al. (2012) in a cross-section and panel data study on more than 100 developed and developing countries (1960-2010) and clarifies that in high-income countries finance turns to have a negative effect on growth.

5.4 Toward a 'New Normal' in the Banking and Financial Sector?
Given the above, to make the macroeconomy more stable we would need a structural change in the financial system. In this direction, a revised Basel Accord, Basel III, was reached in 2010. Though non-statutory, these international accords are usually transposed at the national level. In the same year, the most important American response to the crisis was the Dodd-Frank act. Similar in substance the EU response that converted Basel III in a legislative package was the Capital Requirement Directive (CRD-IV) covering capital and leverage requirements, crisis management, new rules for counterparty risk, deposit guarantees and other macroprudential standards. It will be fully loaded within 2019. The first new resolution and new recovery regime - the so-called Bank Recovery and

Resolution Directive (BRRD) was implemented across the European states starting from January 2015. A comparison between the US and EU new resolution regimes show that they diverge remarkably. Whilst EU directive applies to all credit institutions and investment firms, in US the new regulations regard only the big banks, entities with more than $ 50 bn. A coordination mechanism has been later set in place to cope with the strong negative cross-border externalities of financial institutions. For initiative of G20 leaders and the Financial Stability Board (FSB) a new common standard resolution regime has been set in place for the so-called Global Systematically Important Financial Institutions (G-SIFIs)[23]. For this group of thirty global biggest banks the upward constraints - in term of capital and leverage - have been set much higher than the all other banks considering the large damages they can potentially cause.

Is this set of new regulatory requirements sufficient? A kind of 'New Normal' for banking and financial industry able to stabilize the economy? The rules of the game, as described above, now in place, surely can soften instability setting upward constraints to the banking system's performance so as to achieve a lower but stable profit growth. Nevertheless this will not prevent the system from being unstable, from being profit and rent seeker, and from escaping the next financial crisis. For a variety of reasons.

Decades of deregulation, rapid, unrestrained financial innovations and a brakeless moral hazard had brought banks' stock prices at strong heights, likewise happened in 1928-9. Five years after the crisis, the price-to-book ratio of these global banks are much less than parity - less than 0.5 in the Eurozone - a performance worse than in 1929-1933 (figure 6). If this surely can be seen as an healthy correction from the previous 'exuberance', we can't know whether it is a positive signal toward a structure of lower but more stable level of profits, that is, a lower probability of default coupled with an augmented resilience of the sector. There are too many questions let unsolved in this effort to rule a 'New Normal' for the banking/financial sector.

*Insert About Here **Figure 6***

Evolution of bank stock price to book ratios, historical and present day (a)(b)

The first flaw comes out from the fact that despite passing the principle of 'bail-out' in favour of the new rule of 'bail-in', in case of default the losses can be much larger than the amount of shareholders and senior/junior debt-holders capital. A principle of unlimited (or proportioned) responsibility for the ex-post losses is not provided by the new regulations. That means that bank's incentives toward a profit-seeking business

strategy are not changed. This could push someone of the banking/financial sector to resume gambling in the markets to recover the loosed profit margins.

The second flaw comes out from the fact that the new regulatory response has been inside the standard logic of reducing the risks inside the system setting new capital requirements and new leverage levels. No sign, neither in US nor in EU (and in Basel), of some prohibitions or limitations: of some simple 'not-to-do'. After the great 1929 financial crisis, the way out was found in 1933 with the Glass-Steagall Act, which separated commercial banks from investment banks. For 65 years it has prevented the American business at least from the damages of many potential interest conflicts. Glass-Steagall Act was repealed in November 1999 by the American Congress. The new Dodd-Frank Act of July 2010 has been carefully synthetized to avoid the reintroduction of size or type limits in the banking operations. Few know that last unpublished paper of Minsky, a year before his death in 1996, was just on the *Repeal of the Glass-Steagall Act,* for a hearing in a US Congress Commission. Here his position in favour of introducing a new limit looking forward for the 21st century:

Given the evolution of institutions over the past decades I would like to suggest that those institutions which manage money and are in a fiduciary relation with household be separated from institutions whose primary focus is upon trading and investing for the benefit of the owners of the firm's capital and their staff whose compensation is based upon performance. Universality may well exclude pension and mutual funds. Thus even as the wall between investment and commercial banking that found expression in the Glass Steagall separation in the 1930's we may need a new separatism as the 21st century approaches, one that separates investment banking and the managing of mutual and pension funds. The personnel of a broad post Glass Steagall 'Bank' are guided by profit maximizing and own income. The fiduciary and the merchant banker-trader are different personality types and have quite different objectives. Thus a Bank holding company may well be forced to choose between having an investment bank or a mutually fund management affiliate (Minsky 1995, 24).

His suggestions sound really prophetic because few years later, in 1998, the financial markets was shaken by the failure of Long-Term Capital Management (LTCM), a hedge fund that needed the bail-out of the Fed. But not even such a catastrophe of trillion-dollar-dimension induced to some type of derivative finance regulation, which was let become in the 2000s so toxic to bring the world economy to the 'sky falling' that Minsky feared[24].

These are the main arguments that induce to be sceptical on the effectiveness of this New Normal so needed according to Minsky to restore a stable functioning of the economic system in the aftermath of the crisis. Although seriously risk-fighting, it doesn't represent a true structural turning-point for the banking/financial sector in both side of the Atlantic. The economic deregulation philosophy of the last decades is not inverted. One fact remains: the shock to the global financial sector has been a sufficient condition for a

creeping depression in the US and a still open depression in EU; surely for a negative 'financial cycle' which still buries the global economy.

The international capital flow in 2015 was still two third below his 2007 peak when its dimension was at the heady summit of 150% of the US GDP (figure, 7). The core of the problem is that the EU accounts for almost 70% of the fall with the central banks responsible for more than 50% of the flows inside the region. The completion of the on-going regulatory-banking-reform seems to be crucial in determining the next historic course of financial globalization toward a more resilient international capital market.

Insert About Here **Figure 7**
Global cross-border capital flows (1946-2015)

6. Concluding Remarks

Macroeconomic policy has a very important role in securing and maintaining a stable growth of inclusive welfare. But, to be effective, it must found its strategy and its tools on a correct and realistic vision of the functioning of the capitalist system. In light of the GFC of 2008 it's commonly - though may be too late - now recognized that the vision of Minsky, his 'financial instability hypothesis', was correct[25]: unfortunately almost prophetic.

In the first part, the paper has analysed the mechanics by which a business cycle develops, as described by Minsky through his different writings, concluding with his doctoral dissertation (supervisors Schumpeter and then Leontieff). The basic Minskian perspective is that financial markets become conducive to instability if left free of self-regulating. The sequence goes from a majority of hedge financial positions (market temporary tranquillity) that shifts to speculative positions and then to the so-called 'Ponzi' finance, a situation characterized by borrowers that can't repay neither interests nor the principal, and rely entirely on gambling on rising asset prices. This is a structural tendency of financial markets - the *supreme skill* - so as they attract the majority of disposable capital when the expected return from real investment is lower than the expected return from financial investment. Even government can transform itself into a speculative agent, a special kind of 'Ponzi' unit, when it rollovers short term debt. This is exactly what occurred in the Eurozone during the sovereign debt crisis two years after the burst of the subprime bubble in 2010-2012. When such wrong incentives are built into the economy, expectations will, *à la Keynes,* bring the economy in an unsustainable path ending up with the burst of the assets bubble.

The second part of the paper, refines the macrodynamics, as above described by Minsky, introducing the Kaleckian profits equation. The five national accounting determinants of the level of profits and investments are the on-off key to increase the productive capacity of the economy and hence the potential welfare. In the post-Keynesian perspective this is a central issue at least from the influential model of Bhaduri and Marglin (1990) that originated a large - still on-going - debate. The strategic question here is: do we prefer a 'profit-led' or a 'wage-led' expansion?

Here the objective was to enlighten what was the position of Minsky on this issue. We must also consider that his interest in addressing the problem is specific: it's in the framework of business cycles, a medium term economic phenomenon. And the intellectual interest was to find policies that decrease the level of structural instability of a capitalist economy. That said, the paper investigated the different ways and the different weights the five Kaleckian determinants impact gross profits. Synthetically the main findings are the following:

1. If we accept the economic system as now it is - going on with blows of booms and busts and ever-increasing wage polarization - 'big government capitalism' is all we need. Subsidizing a shortfall of investments with government spending. This is the main street to what Minsky calls 'the doctrine of salvation through investment'. However, the main hazard of this profit-led growth-model is to build a 'shield' to an inefficient economy and to what he calls 'foolish investment' (Section 4). The characteristics and the path that brought to the Great Financial Crisis of 2008 could be a textbook example (see Section 5).

2. A second crucial role in sustaining profits can be played by an export-led growth whereby a permanent trade surplus has a crucial role in sustaining profits similarly to a fiscal deficit. In the aftermath of a financial crisis such a strategy may prevent a fall into a deep depression, as highlighted by Minsky. The problem with this strategy is the mercantilist outcome. In fact, it's impossible to achieve an export surplus for all countries at the same time, as observed by Kalecki (Section 4). This simple observation can acquire substantial significance - and become a good 'research hypothesis' - if analysed from a Keynesian balance of payments perspective[26], and applied to the current macroeconomic exit-strategy from the depression Eurozone is currently following; a strategy that enforces a common economic policy rule for very different group of countries (Germany and northern countries) export-led and southern countries (Portugal, Spain, Italy, Greece) more inward-looking.

3. Finally, putting together and weighing the two options, the Minsky/Kaleckian recommended solution emerges clearly if the aim is 'stabilizing an unstable economy'. The first best policy is targeting full employment through consumption production. A profit-led economic growth, and its emphasis on private investment is a 'mistake', it enhances a fake growth because unstable in its overall performance and inequitable. Increasing consumption by increasing employment that in turn sustains profits, is a safer policy. The strategy of the 'big government' can be effective in the short run - when under the threats of the 'sky falling' - though at the highest cost of validating all kind of private decisions, included the most inefficient and inequitable.

In the third part (Section 5) the paper extends the Minsky-Kaleckian interpretative device to the Great Financial crisis of 2007/8, as a sort of case-study apt to test the practical relevance of their approach. The paper doesn't enter the proximate causes of the crisis, but the macroeconomic context that allowed and eased the disaster to happen - following the main lesson of our authors that crisis comes out from within the system (*structurally unstable*). This part is illustrated by charts chosen with the criterion that they are representative of the stylized facts described. The stylized facts headings are the followings:

a) It's true that 'big government' intervention works, in the short run. The *Quantitative Easing* promptly adopted, in December 2008, by the American Federal Reserve has been the biggest economic stimulus in history (figure 1) and saved U.S. from the financial/economic meltdown. Eurozone that adopted the same measure seven years later has not yet recovered.

b) The period post-World-War II to the late seventies - the so-called Golden Age of capitalism - had a wage-led growth-model. It put a stable floor to aggregate demand through wages rising with productivity and full employment. Figure 2 depicts dramatically, especially for Eurozone, the abandonment of the employment-targeting policy defeated in the eighties by the counterrevolution of neo-liberal economics. That period translates quite well the Minsky's prescription enclosed in the quote at the beginning of this paper: 'an economy oriented toward employment rather than toward growth'.

c) Section 6.1 reports how this Minsky policy conclusion matches the Kalecki's position on what he calls 'the economic doctrine of full employment'. He agrees with Minsky on the fact that the attainment of full employment is almost impossible under

a profit-led-growth regime. But also a wage-led regime will not be a bed of roses. In a famous 1943 short paper he alerts on the existence of a 'political business cycle': big business and *rentiers* always push 'to return to the orthodox policy'. Saying this, he predicted what would have happened forty years later.

d) The second trend opened by the collapse of the Golden Age is a real turning point, the 'Inequality Turn', as baptized by Atkinson (Section 6.2). The most alarming case is Eurozone still with an unemployment rate of 10% in Q3-2016, more than double of U.S. There must be a fundamentally flawed growth-model behind the performance of the core countries and the peripheral countries of Europe. A growth-model that is worthwhile to further investigate.

e) After the rising unemployment and the rising inequality the third dimension of the GFC is the 'financialization' of the system. The profit-led growth model turned into a finance-led (rent-seeking) model. Here a double issue emerges. The identification and the impact of the 'financial cycles' on the traditional business cycles (figure 5). If the structural medium-term stabilizers of the economy are overlooked, the risk of an 'unfinished recession' increases. The second issue, well-knitted in a Minsky-Kalechian framework, is that the rule of thumb 'more finance, more growth' is no more sustainable. There is growing evidence from econometric and empirical studies that financial development seems to follow an inverted U-shaped curve: the impact of a growing financial sector on growth turns negative after some threshold of development.

f) The last section brows, very briefly, the new banking/financial regulations that the authorities of the two side of the Atlantic have begun to implement: from Dodd-Frank Act to Basel III Accord and from the Capital Requirement Directive (CRD IV) of the EU to the G-SIFIs. All these are intended to shape a 'New Normal' for banking/financial institutions. The question to be addressed is: are they a sufficient level of reform, being able to stabilize the global economy? Though introducing upward and more rigid constraints to the banking and financial industry, section 5.4 reviews the major hindrances to this goal. Global cross-border capital flows are still 2/3 lower (2015) than their 2007 peak - uncertain between a further retreat or a fake reset. From a Minsky-Kalechian perspective all this seems to have nowise modified bank's incentives. Primarily it seems that all this new regulations are too complex to be effective. Above all they have not inverted the economic deregulation philosophy of the last decades.

In light of the Minsky's interpretative framework, it is clear that structural reforms able to restore a Golden Age of capitalism are far from being implemented and agreed upon. On both side of the Atlantic policy makers are still trying to fix this crisis-prone system instead of developing a new one: more efficient and equitable, i.e., more structurally stable. Debt is the link to time in a capitalist economy with a past, a present and a future: if not considered, past mistakes will not only affect today's generations' prosperity, but remarkably the path towards a human economy and the achievement of a human society.

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Footnotes

[1] According to Grantham 'the absolutely worst part of this belief set was that it led to a chronic underestimation of the dangers of asset bubbles breaking' (Nocera 2009, 1).

[2] Minsky identified three types of financial postures that contribute to the accumulation of insolvent debt: (1) hedge finance: borrowers can meet all debt payments (interest and principle); (2) speculative finance: borrowers can meet their interest payments, but must roll over their debt to pay back the original loan; (3) Ponzi finance: borrowers can neither repay the interest nor the original debt, and rely entirely on rising asset prices to refinance their debt (Minsky 1980, 215).

[3] According to Bank of England 'whenever a bank makes a loan, it simultaneously creates a matching deposit in the borrower's bank account, thereby creating new money….rather than banks receiving deposits when households save and then lending them out, bank lending creates deposits' (BoE 2014, 14).

[4] The value of liquidity rises faster if some units fail to meet financial obligations.

[5] Investors in a financial boom feel a sense of safety, and therefore they will demand little compensation for risk. Long-term interest rates are kept endogenously low by investors' expectations about positive financial and economic conditions. Therefore in a booming period long-term interest rates are lower than what they should be.

[6] This has been also called the paradox of deleveraging: 'precautions that may be smart for individuals and firms - and indeed essential to return the economy to a normal state - nevertheless magnify the distress of the economy as a whole' (Yellen 2009, 3). See also: Eggerstone and Krugman 2012; Fischer 1933.

[7] In this case the public debt does not rise because the central bank is owned by the state. The supply of money increases and finances public expenditure. Of course an inflationary pressure will take place. This is what Keynes has advocated for the 1929 Great Depression.

[8] Running a budget deficit during a recession is capble to sustain profits in real terms, while when it is close to full-employment it may only overheat the economy. This is also remarked by the literature that the fiscal multiplier has two different magnitudes according to whether the economy is in recession or in expansion. Especially when monetary policy is at the zero lower

bound, empirical evidences show that the fiscal multiplier is larger than one (Woodford 2011; Christiano et al. 2011; Auerbach and Gorodnichenko 2012).

[9] According to Minsky 'whether such a situation fully develops and if it does, how long it lasts, depends upon the government's involvement in the economy, how promptly the government intervenes, and how effective the intervention' (Minsky 1982, 110).

[10] For a precise analysis regarding the way the state should sustain the profit cycle through a policy of strategic investments see Mazzucato (2013).

[11] This was first shown clearly in Haavelmo (1945), 'Multiplier Effects of a Balanced Budget'. Haavelmo showed that because government expenditure expands total spending more than an equal-size tax reduction contracts it, a balanced budget is not neutral but expansionary and becomes more so as its size increases.

[12] In fact Minsky emphasizes that 'paradoxically, perhaps, private ownership capitalism doesn't work well for industries of extreme capital intensity' (Minsky 1982, 201).

[13] She specified that 'Most of the radical, revolutionary innovations that have fuelled the dynamic of capitalism - from railroads to the Internet, to modern-day nanotechnology and pharmaceuticals - trace the most courageous, early and capital- intensive 'entrepreneurial' investments back to the State ... It is the visible hand of the State which made these innovations happen' (Mazzucato 2013, 3).

[14] As Minsky underlines 'The general economic tone since the mid-sixties has been conducive to short-run speculation rather than to the long-run capital development of the economy' (Minsky 1982, 57).

[15] The same holds for investments, government spending, savings out of wages, and consumption out of profits.

[16] Given the creation of the European Monetary Union (EMU) scheduled for January 1999, the only policy envisaged by the IMF is the adjustments in wages and labour mobility: 'It is in the area of labour markets that the euro area faces its greatest policy challenge. High labour costs and entitlement systems that hamper incentives for job search have depressed employment creation. The flexibility of European labour markets needs to be enhanced through structural reform measures across a wide front to safeguard the key principles and objectives of European welfare systems and at the same time lessen distortions and strengthen incentives to work and create jobs' (IMF 1998, 15).

[17] We must remember that in 1933, the year in which Delano Roosevelt was elected president, the unemployment in the U.S. was still around 25%. A short list of the pro-labour institutions created includes the followings. The first and more important of the New Deal law was the National Industry Recovery Act (NIRA) of 1933 on a series of issues concerning labour (included the first minimum wage set at $ 0.25 cent per hour) and collective bargaining. In 1935 the Congress pass the National Labour Relations Act (NLRA) in support of workers rights and to limit the employers fighting practices. At the same time, in the 1936, Roosevelt brought the highest bracket tax rate to 79%. In the post-war period the industrials-workers relations were not dismantled: only partially corrected but strengthen by the 'Full Employment Act' of 1945 and the 'Taft-Hartley Act' of 1947 that encoded the administrative practices allowed to constrain unions.

[18] For a retrospective of the international economic shocks of the 1970s see Covi (2015).

[19] It is not by chance that both made their ruling debut with a famous attack on workers and unions: Margaret Thatcher against the year-long coal-miners' strike in 1984/1985 ended with 25 mines closed in one shot and Ronald Reagan against the air traffic controllers.

[20] For a strong call for 'full employment' as the first policy target see Palley (2007).

[21] See for example: Stockhammer (2004), Palley (2008), Van Treeck (2009), and for a systematic review of the topic see Hein and van Treeck (2010).

[22] 'Mr. Draghi & Co. need to do whatever they can to try to turn things around, but given the political and institutional constraints they face, Europe will arguably be lucky if all it experiences is one lost decade' (Krugman, 2014).

[23] See Financial Stability Board (2011). For an in-debt analysis of this new regulatory architecture of the financial system and its effects, see Covi (2016).

[24] Failure to regulate the hedge funds in the 1990s, brought them overtime to adopt more and more aggressive strategies. A last emblematic example is reported in Guzman and Stiglitz (2016).

[25] Recently it has been proved also the internal coherence of the Minsky's financial dynamics, as expressed by a macro model (Charles 2016).

[26] To this respect, Keynes proposed in the Post-War II period an international Clearing Union able to control inward and outward capital movements, as well as disequilibria of the balance of payments (Keynes, 1980).

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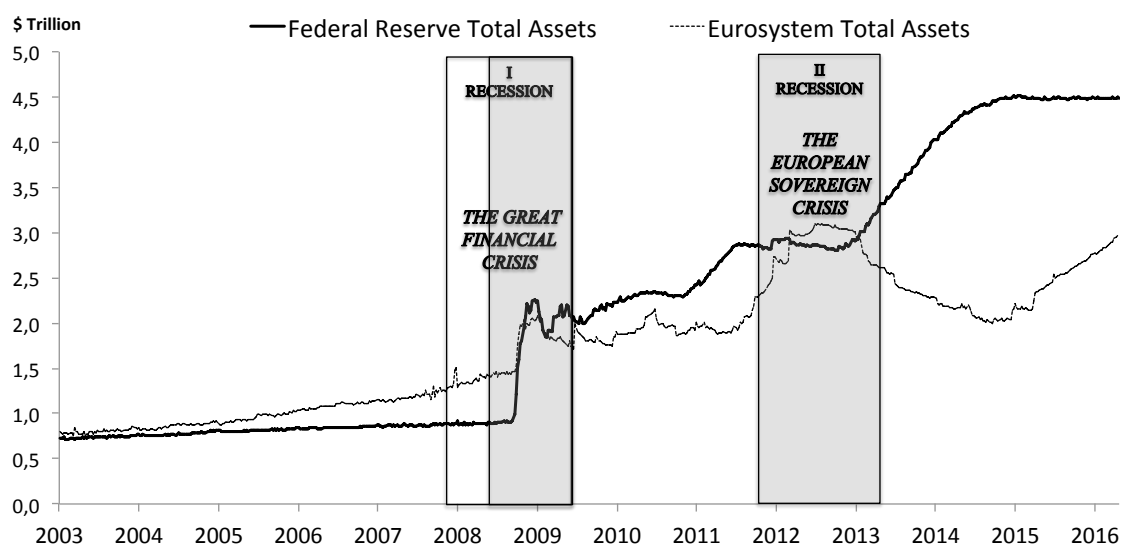
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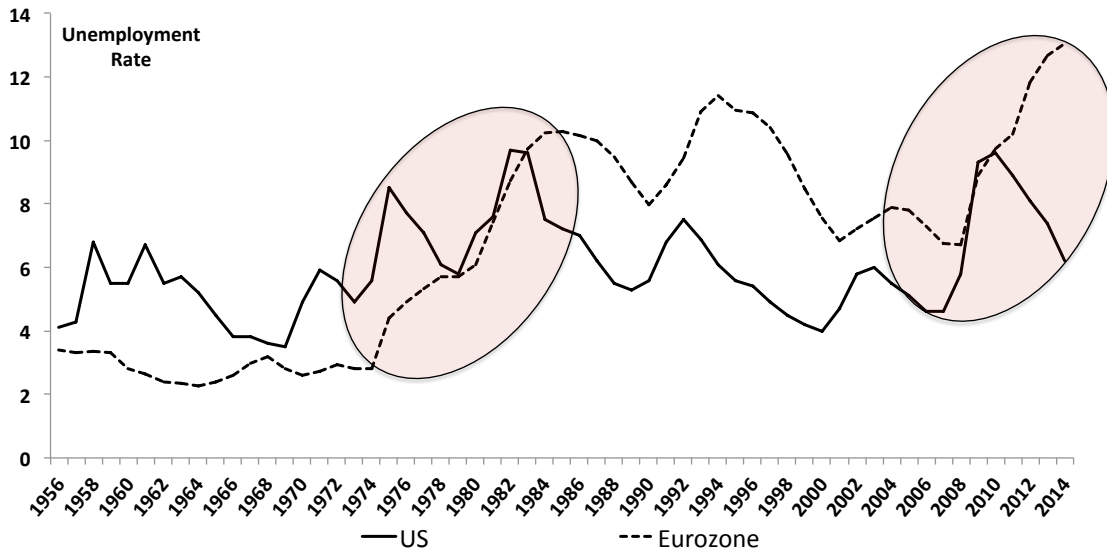
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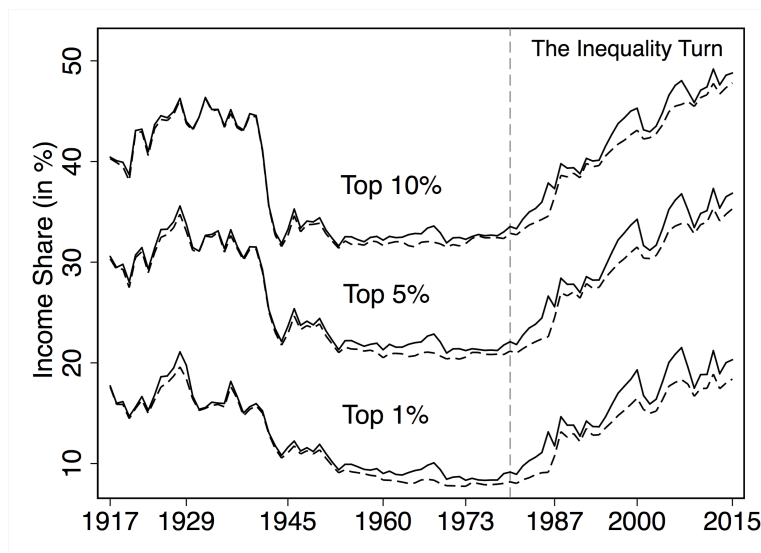
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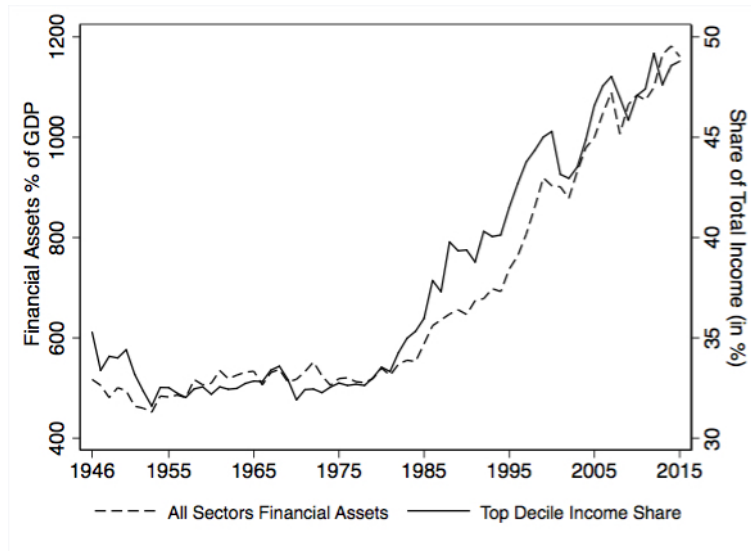
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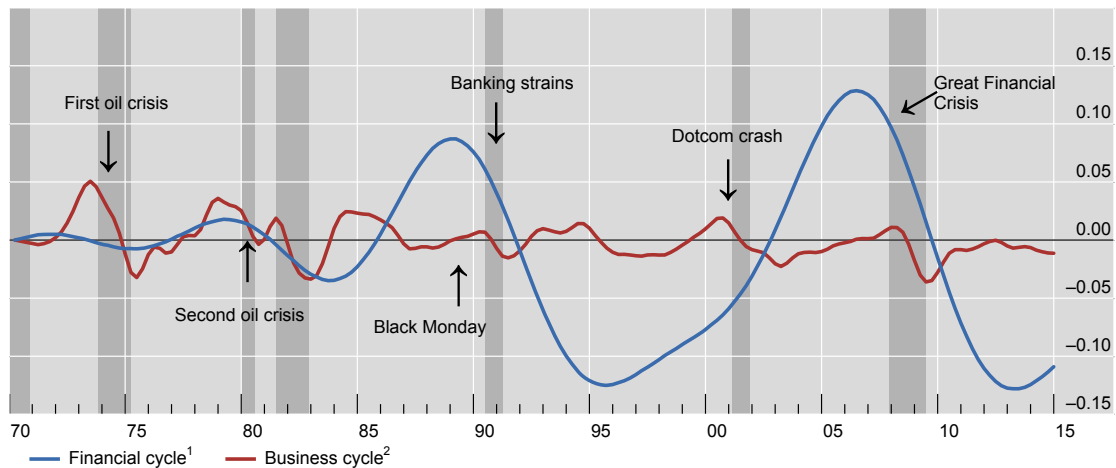
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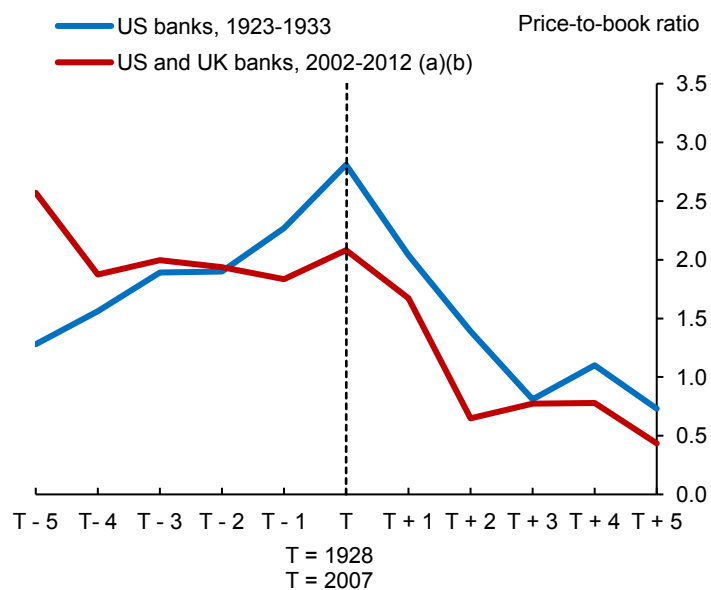
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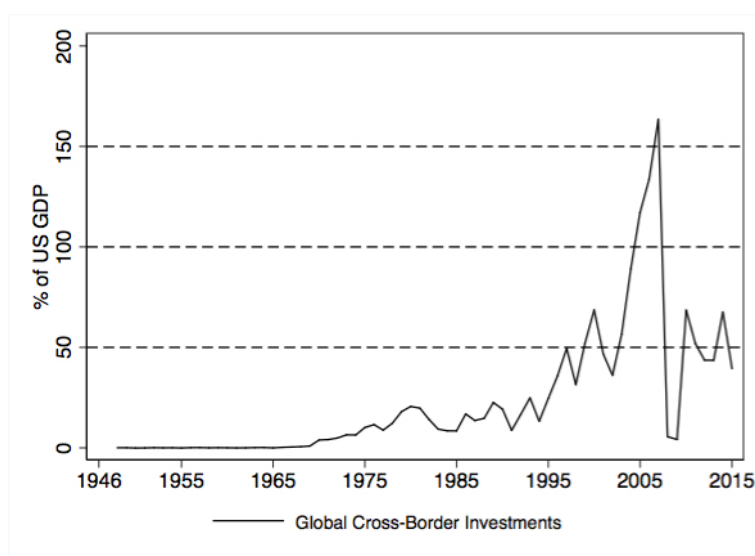
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CHAPTER II

Trade Imbalances Within the Euro Area Two Regions, Two Demand Regimes

Abstract

Greater trade integration, convergence in economic performance and a high level of employment among member states: this was why the Euro Area was created. In this respect, the paper analyses the sources of trade imbalances within the Euro Area, focusing on the direct trade relationship - intra-EA trade - between surplus and deficit countries. The econometric evidence based on a VAR/SVAR methodology suggests that asymmetric wage shocks determine asymmetric gains from intra-EA trade, resulting from opposing growth strategies. In addition, the empirical evidence shows that the Euro Area is divided into two economic regions representing different demand regimes: a northern region which is profit-led and a southern region, which is wage-led. The paper suggests that wage coordination is an essential macroeconomic tool but is insufficient to achieve trade and economic integration given the current state of divergence. Thus, a trade-based transfer mechanism is proposed to restore convergence in the Euro Area.

The Community shall have as its task… to promote throughout the Community a harmonious and balanced development of economic activities, sustainable and non-inflationary growth respecting the environment, a high degree of convergence of economic performance, a high level of employment and of social protection, the raising of the standard of living and quality of life, and economic and social cohesion and solidarity among Member States. (Maastricht Treaty, Title II - Art. G2, 7 February 1992)

1. Introduction

Twenty-five years have gone by and the process of convergence has yet to take place. On the contrary, the principles at the very basis of the creation of the community have been left behind, and economic divergence has inexorably spread among founder members of the Euro Area (EA). The first important test the Euro Area faced - the Financial Crisis of 2008 - clearly revealed the flaws in the European architecture, unable to cope cohesively with any of the three crises: economic, sovereign and banking crisis. Ultimately the three became one: a political crisis. Rising inequalities across countries brought a wind of change, but not as desired. Instead of establishing the basis for a new European Union (EU), i.e. by creating mechanisms able to achieve deeper economic integration and social cohesion, national interests prevailed, leading to a counter-revolution: more independence and inward-looking policies. The United Kingdom voting to leave the EU is the most striking example.

Since political tensions are the natural outcome of economic fragilities, in order to restore the common cohesive growth path established by the Treaty of Maastricht, it is necessary to tackle the sources of economic divergence between Euro Area members. By fixing the core of European problems - the currency area - the European Union will be able once more to attract, to retain and integrate countries within the economic community and monetary union. Hence this paper aims to investigate the flaws in the European architecture by analysing the internal dimension of the diverging EA path, focusing on the dynamics of demand and trade flows between surplus (Austria, Belgium, Germany, and the Netherlands) and deficit countries (France, Italy, Spain, and Portugal)[1].

Since the mercantilism view, it has been debated about the importance of acquiring foreign markets as a tool to sustain capital accumulation without hindering the growth rate of domestic demand (Kalecki, 2010). Although, pre-crisis, trade integration was promoted as a win-win strategy by the WTO and IMF, and trade imbalances were thought to be temporary and negligible, after the crisis things changed. Trade patterns started to be seen as structural, leading countries and institutions to implement policies to achieve trade surpluses, which became the solution for fighting the economic downturn and

achieving long-lasting growth. The classification initially developed by Badhuri and Marglin (1990) concerning wage-led and profit-led growth, was adapted for a new dichotomy: debt-led and an export-led growth (Stockhammer, 2015). According to this view, imbalances are the outcome of opposing growth strategies, where export-led economies benefit from the increasing indebtedness of deficit countries. The outcome is a diverging path and possible path-dependency due to hysteresis: lower actual and potential production capacity combined with higher structural unemployment (Ginzburg et al. 2013). In this macroeconomic context, given their wage-led nature, deficit countries, by implementing wage restraint policies, may improve their export competitiveness to the detriment of damaging their manufacturing base (Naastepad and Storm, 2015). The differentials in the cumulative growth and unemployment rates in the two regions, eight years after the crisis, are clear proof of the long-lasting effects of negative demand shocks in wage-based economies (Stockhammer, 2011a).

In this respect, the paper shows that although an extra-EA trade surplus was achieved after 2014 by deficit countries[2], the intra-EA trade balance between deficit and surplus countries is far from being restored. The persistence in trade differentials within the Euro Area is counterintuitive if analysed through the mainstream lens of the 'consensus view' (Blanchard and Giavazzi, 2015). The reversal in capital flows from core to periphery and deflationary adjustments would have restored the intra-EA trade balance together with the rebalancing of the external position if they had been the key factors at work. This may suggest a latent process of hysteresis, in which current market shares are pre-determined by past factors. Hence, intra-EA trade imbalances can be interpreted in line with Myrdal's cumulative and causation forces (1957): an institutional-structural change as the driving force behind persistence in the asymmetric gains from trade.

If, on the one hand, one branch of research has attributed this structural change to wages rising in excess of productivity in deficit countries, thereby driving up unit labour costs, in turn harming export performance and the trade balance, on the other, extensive literature has focused on the complementary role played by German wage moderation through relative price (deeper market penetration) and income effects (lower import demand) in building up trade surpluses with southern Europe and non-EU countries (Ginzburg et al. 2013; Naastepad and Storm, 2015; Stockhammer, 2011).

This paper contributes to the debate by studying the effects of wage variations on demand and trade linkages within a monetary union. In this respect, evidence is brought to support the latter research, emphasing how wage adjustments in the northern countries,

not only in Germany, contributed decisively to the accumulation of trade imbalances in the Euro Area. A VAR methodology shows that the two blocks have opposing growth strategies, profit-led in the northern region, and wage-led in the south - table 2. Moreover, a set of stylized facts and empirical evidence suggests that the southern and northern regions also match the categorization of debt-led and export-led economies, as defined by Stockhammer (2015) and Stockhammer and Wildauer (2016). The results show that a 1% wage decrease in the northern region (negative wage shock) increases the intra-EA trade surplus with the southern region far more than a 1% wage increase in the southern region (positive wage shock), respectively by 10.63% and 3.99% in a 5-year horizon - table 4, panel (a). Results are robust when the intra-EA trade balance is broken down into exports and imports, allowing the price and income effects of wage adjustments to be disentangled. On the one hand, in a 5-year period the cumulative price effect of a negative 1% wage shock in the northern region increases northern exports to the southern region by 2.08% compared to the cumulative income effect of a positive wage shock in the southern region, which increases them by 1.45%. On the other hand, the cumulative income effect of a negative wage shock in the northern region decreases southern exports by 0.59% on impact and by 0.15% within five years, while the cumulative price effect of a positive wage shock in the southern region decreases them by 0.53% on impact and by 0.19% within a 5-year period. This evidence corroborates the analysis of Ginzburg et al. (2013) who point out that an expansion of the northern region's aggregate demand through rising wages may not be sufficient to stimulate exports from the southern region, which lacks a flourishing and dynamic industrial sector. Moreover, results show how wage restraint policies have helped northern exports penetrate the southern market, since the negative price effect of an increase in northern wages is the most important factor affecting trade imbalances between the two regions. Nevertheless, a coordinated policy of raising wages in both regions may be able to rebalance part of the current trade gap by restoring virtuous inter-linkages between demand and supply factors so as to restart the process of trade integration. Moreover, wage coordination is suggested in order to reduce the likelihood of asymmetric shocks within a monetary union.

In the end, the paper argues that a clear understanding of the demand regime experienced by a country/region can contribute considerably to policy effectiveness at the European level. Given the lack of automatic stabilizers at the national level and the Euro Area mandate to achieve homogeneous and balanced trade integration between its members,

the paper concludes by proposing an intra-EA trade-based transfer mechanism to restore trade and economic convergence in the Euro Area.

The rest of the paper is organized as follows: section 2 discusses the European divergence in the light of Badhuri and Marglin's theoretical framework and a set of stylized facts. Section 3 discusses the econometric method and presents the empirical results. Section 4 discusses the findings and provides policy implications. Section 5 concludes.

2. The European Divergence: Theory and Evidence

2.1 The original flaws of a currency area

Before the creation of the Euro, it was already known that asymmetric shocks would be the main source of fragility in the Euro Area. Clear warnings were made by Meade (1957), Scitovsky (1958), Mundell (1961) and lastly by Obstfeld (1997) concerning the single currency and the process of European economic integration[3]. As pointed out by Mundell (1961, p.664):

…an increase in foreign demand for the products of one of the regions would cause an appreciation of the exchange rate and therefore increased unemployment in the remaining regions, a process which could be corrected by a monetary policy which aggravated inflationary pressures in the first region; every change in demand for the products in one region is likely to induce opposite changes in other regions which cannot be entirely modified by national stabilization policies.

This is still the essence of the Euro problem. If higher inflationary pressures are not accommodated within the currency area, "this means that a potentially deficit member of the free-trade area such as France might have to make an undue share of the adjustment by a domestic deflation of its money incomes, prices and costs" (Meade, 1957, p.385). Given the clear mandate of the European Central Bank - price stability - the latter option was the one implemented, endogenously driving the Euro Area towards the current outcome: divergence. This was the reason why Meade argued for 'national currency areas' as a first step towards the single currency; the only way to deal with European balance of payments disequilibria without preventing free trade or destroying full employment (ivi., p.396). In this respect, European policy makers restricted themselves to facilitating free trade, delegating the full-employment objective to individual nations[4]. Ironically, Meade's proposal was made in the conviction that "full employment is more important than free trade for Europe" (ivi. p.394)[5]. This belief was based on the fact that governments at the time were "so wedded (and, in my opinion, rightly so wedded) to the idea that it is one of their duties to preserve full employment that the probable outcome of this solution would in fact be the breakdown of the free-trade-area

arrangements" (ivi. p.385). Astonishingly, nowadays European governments seem to have lost track of their primary duties, or even more worrisome, believe that free trade and unrestricted capital mobility are more important than full employment. Meade's theoretical explanation is further corroborated by the pragmatic proposal made by Keynes for an 'International Clearing Union' in the post-World-War II period. As was clear to Keynes, balance of payments disequilibria, and imbalances in international trade and capital movements are major sources of instability (Keynes, 1980). This instability at the macro-level cannot be solved endogenously within the system since cumulative past forces tend to reinforce structural differences, while only an exogenous restructuring of the system itself can reverse those forces from preserving the pattern of specialization. The fundamental reason for this path-dependency was explained clearly by Kaldor (1971, p.8):

…owing to the existence of increasing returns to scale in the manufacturing industries, any initial advantage in terms of export competitiveness tends to have a cumulative effect, since the country which is able to increase its manufactured exports faster than the others also tends to have a faster rate of growth in productivity in its export industries, which enhances its competitive advantage still further.

Hence, the primary focus of the analysis should be the so-called 'initial advantage' - asymmetric wage adjustments - which triggered asymmetric intra-EA trade flows, and the subsequent divergent process. Nevertheless, a second important point needs to be addressed: what could have been done to prevent Myrdal's (1957) circular and cumulative principle of cause and effect from taking place? As Kaldor says, fiscal union is the natural solution to trade imbalances in a political union: "a region which forms part of a political community, with a common scale of public services and a common basis of taxation, automatically gets 'aid' whenever its trading relations with the rest of the country deteriorates", the so-called built-in fiscal stabiliser (1970, p. 345)[6]. However, the Euro Area is only a monetary union, and it seems unreasonable now to imagine that the trade benefits acquired by surplus countries, low unemployment and faster growth, would be surrendered. Nevertheless, that is not the final statement on the Eurozone; a unified macroeconomic solution needs to be found, which goes beyond regional differences, and inclusively, aims to reinforce long-run growth potential. Keynes and Meade point in this direction: the need to set up the right macro system to allow micro behaviour by firms and households to work optimally within the system. Only with the right institutional set-up is it possible to achieve a high degree of convergence. Hence Meade's suggestion of 'national currency areas' for EA members and Keynes recommendation of an 'International Clearing Union' for the world economy. As we have

seen, the original flaws in European institutional design have led to impoverishment and social discontent in the Euro Area. If the European system cannot endogenously rectify the instability, given the current architectural design, divergence will lead to more divergence. If, on the other hand, we do not accept this outcome, and believe in the principles established by the Treaty of Maastricht, institutional arrangements need to be upgraded to enable the system to work for convergence and not against it. For this purpose, it is essential to shed light upon the current structural diversities the two core blocks of the Eurozone are facing, clarifying the particular features of both growth strategies, and seeking to understand what institutional set-up promotes convergence. This could pragmatically shape a long-term, sustainable project for inclusive-growth within the Euro Area and create the premise to extend the monetary union to the European Union as a whole. To boost further integration into the single currency, and make the benefits of joining outweigh the costs of a loss of flexibility when adjusting to shocks, it is crucial to set up a macro mechanism able to promote complementarities between members, to stabilize intra-EA imbalances, and ultimately reach full employment. Creating such a mechanism is of vital importance for the prosperity of the single currency and its member states as much as Keynes's proposal was of key factor in shaping the post-war period.

2.2 Profit-Led and Wage-Led Regime

The crisis of the Euro Area is analysed according to the theoretical profit-wage framework since it fully matches the stylized facts, and allows the current macroeconomic environment of the EA to be interpreted consistently, providing clear policy indications. Reference is made to business cycle theory, as developed by Badhuri and Marglin (1990) concerning profit-led and wage-led growth. The cornerstone of this theory is that investments may respond positively or negatively to a wage reduction depending on whether investors react strongly or weakly to an increase in the profit margin. In the former case, a decrease in wages may stimulate investments since the higher profit margin fully compensates the negative effect of a fall in consumption. The conceptual framework is that by increasing wages, enterprises face higher labour costs, which in turn reduce the profit margin per unit of output. However, the increase in wages increases consumption leading to an increase in corporate sales, and therefore boosts aggregate profits through an increase in the quantity of output sold. Depending on whether the former effect dominates the latter, the posture of the economy assumes a profit-led or a wage-led regime. Nevertheless, if this is true in a closed economy, i.e. the

right balance may exist between wages and profit margins, in an open economy additional dynamics may change the overall outcome. Indeed, in an open economy, the 'trade effect' may enable profit-led growth to be fully effective and sustainable. Although a decrease in wages increases the profit margin - as in a closed economy - with a positive effect on investments, the negative effect of falling domestic consumption is compensated by increased foreign sales. In a closed economy, a trade-off is in place between a decrease in the wage share and an increase in the profit margin through higher investments and lower consumption, but in an open economy the two positive effects clearly outweigh the negative.

Moreover, provided trade interdependence increases, the greater the share of corporate sales from foreign markets, the more sustainable and effective is wage restraint in producing growth. In this framework, "a wage-led expansion derived from the stagnationist logic may be given up in the pursuit of export surplus by following restrictive macroeconomic policies to keep down real wages (and inflation) for greater international price competitiveness" (Badhuri and Marglin, 1990, p. 388). Moreover, an export surplus cannot be achieved at the same time by all trading partners, thus trade imbalances and growth differentials develop endogenously, establishing winners and losers from trade.

Lastly, real-wage adjustments were initially thought of in this theoretical framework as a wage rate variation through the exogenous variation of the exchange rate. This would affect export prices, but also import prices such as raw materials, increasing aggregate profit through higher volumes of sales, and at the same time it would reduce the profit margin, with ambiguous effect. In the case of the Euro Area, no exchange rate divides the northern region from the southern region, and the wage-adjustment in the northern region was implemented by directly reducing the wage share. In this macroeconomic context, four headwinds play against the southern region's ability to respond to negative foreign wage shocks: I) without an exchange rate the southern region cannot devaluate to counterbalance the loss in competitiveness; II) given intrinsic wage-stickiness, wages tend to rise in the southern region, producing and even wider wage-gap between the two regions; III) curbing wages in the southern region may be counterproductive if its economic structure is in a wage-led regime; IV) the process induces divergence between the two regions, which becomes self-reinforcing given the lack of counterbalancing tools at the national and supranational level.

2.3 Two Regions, Two Interconnected Economic Regimes

The first and crucial point the paper highlights is that a structural downward adjustment of the wage share (WS) took place not only in Germany, as focused on in the literature, but also in the Netherlands, Austria and Belgium[7].

As is clear from table 1, the adjustment took place between 1996 and 2007 in all northern countries: the wage share in Austria decreased by 3.7% of GDP, in Belgium by 1.3%, in Germany and the Netherlands by 4.5%. Overall the northern region experienced a reduction in the wage share between 1996 and 2007 of 4.2%. During the same period, the southern region experienced a smooth increase in the wage-share of almost 0.8% over GDP[8]. The *first stylized fact* refers to the asymmetric and opposite-sign variation in the wage share. After the crisis, a positive adjustment took place in the northern region, which did not offset the initial reduction.

This structural change in wage policy in the northern region, in conjunction with multiple factors during the creation of the common currency, directly impacted on the trade balance with the rest of the world (TB), whose surplus increased by 5.5% over GDP between 1996 and 2007 - table 1. On the contrary, the southern region shifted from a trade surplus to a trade deficit, with a deterioration in its trade balance by 3.9% of GDP.

This opposing trade pattern is explained in the literature as the result of the interaction of multiple dimensions: the effects of eastward enlargement and the impoverishment of the production matrix in peripheral countries (Ginzburg et al., 2013); the strong trade relationships of Germany with fast-growing countries, and regionalized production in the export sector (Danninger and Joutz, 2008); the strong non-EA demand for German products, and gains in competitiveness following German labour market reforms (Kollemann et al., 2015); growing debt levels in deficit countries boosting aggregate demand in the rest of the Euro Area and, in turn, import demand (Belke and Dreger, 2013).

Overall, the focus in the literature was on Germany, southern Europe and the trade relationships between Germany and non-EU countries. Table 1 aims to complement the state of the literature by showing that in 2007 two-thirds of the northern surplus (4.2% of GDP) came from intra-EA trade with the southern region, and two-fifths directly with France, a country outside southern Europe but which perfectly mirrors the wage, trade and debt patterns of the so-called European periphery. All the more so, France in 2016 was the country with the largest trade deficit with non-EA countries, the northern region and other countries in the southern region.

Table 1. *Wage Share, Trade Balance, Intra Trade Balance, and Debt Level as Share of GDP in the Northern and Southern Region*

	TIME	AT	BE	DE	NL	NORTH	IT	FR	ES	PT	SOUTH
WS	1996	41.1%	37.1%	43.0%	42.2%	42.2%	26.9%	36.9%	37.8%	38.2%	33.4%
	2007	37.4%	35.8%	38.5%	37.7%	38.0%	28.0%	37.2%	37.9%	36.2%	34.2%
	2016	39.6%	36.2%	41.7%	38.7%	40.5%	29.3%	38.1%	37.5%	34.2%	35.0%
TB	1996	-3.2%	-0.3%	0.2%	6.8%	0.9%	3.1%	1.2%	1.1%	-4.6%	1.7%
	2007	3.6%	2.9%	6.7%	8.4%	6.4%	-0.4%	-1.1%	-6.0%	-7.1%	-2.2%
	2016	3.9%	2.5%	6.5%	11.6%	6.8%	2.2%	-2.9%	4.1%	-1.2%	0.3%
INTRA TB	1996	-0.4%	5.3%	0.5%	3.8%	0.8%	-0.6%	-1.6%	-1.4%	-1.1%	-0.6%
	2007	1.8%	9.0%	3.1%	7.1%	4.2%	-2.5%	-3.4%	-4.0%	-4.0%	-3.3%
	2016	0.7%	7.6%	1.8%	7.3%	2.9%	-1.6%	-3.9%	-2.1%	-2.7%	-2.5%
DEBT	1999	187%	261%	183%	257%	203%	193%	190%	172%	126%	187%
	2007	210%	258%	183%	278%	208%	218%	217%	240%	193%	224%
	2016	244%	352%	185%	309%	226%	275%	299%	284%	192%	289%

Source: Eurostat, OECD, BIS. Note: WS, TB, Intra TB and DEBT refer respectively to the wage share, trade balance with the rest of the world, the trade balance with the other region, and the debt of the non-financial (private and public) sector. Data for the debt level is at market value.

The network charts in figure 1 summarize net export flows between the two regions and countries in the same region. Before the monetary union was created in 1999 (fig. 1a), the export surpluses between regions were smaller (thickness of the arrow) and more diversified between countries than after the Euro (fig. 1b). In fact, net export flows especially from Germany and the Netherlands increased in their region and outside the northern region. Italy and Spain became net importers from the northern region, while France became the hub of export surpluses from both regions. After the crisis hit and capital flows were reversed, intra-EA trade imbalances remained strong, and in some cases, such as France in relation to Germany, the Netherlands and Belgium deteriorated further. The *second stylized fact* refers to the drastic shift of barycentre in trade relationships in the EA, resulting in clear winners and losers from trade.

Insert About Here **Figure 1**
Intra Euro Area Net Export Flows between Deficit and Surplus Countries

The change in trade relationships is increasingly structural given that 80% of the value of intra-EA trade flows comprises manufactured goods classified in the Standard International Trade Classification (SITC) as chemicals (section 5), machinery and transport equipment (section 7), and other manufactured goods (sections 6 and 8). The key interpretation to assess the stylized facts presented necessarily reflects Kaldor's summary of the role of increasing returns to scale: "success breeds further success and failure begets more failure" (1981, p. 596). The initial advantage in terms of export competitiveness derived from wage restraint policies has a cumulative effect. The

existence of increasing returns to scale in manufacturing industries has allowed the export sector to achieve productivity gains, which further strengthened the initial competitive advantage. In this way, "free trade in the field of manufactured goods leads to a concentration of manufacturing production in certain areas - to a *polarisation process*" which inhibits the growth of such activities in some areas and concentrates them in others" (ibid.). The thickness of the arrows - exports surpluses - in figure 1, their trend and persistence even after deflationary pressures hit deficit countries, indicates the production polarisation process within the EA.

Furthermore, a decrease in domestic wages not only improves net exports through lower unit labour costs, but negatively affects imports, i.e. the exports of foreign countries, due to a shrinking domestic aggregate demand. In this macroeconomic context, without supranational mechanisms - exchange rate adjustments, fiscal transfers, and any automatic counterbalancing stabilisers - the southern region became a chronic debtor to the northern region and the rest of the world. This represents the original flaw in Euro Area architecture: deficit countries underwent the effects of wage-policy adjustments in the northern region without any domestic policy tool to counteract the negative trade spiral. Kalecki describes the dynamics of the macro mechanism at work (2010, p. 51):

> The capitalists of a country which manages to capture foreign markets from other countries are able to increase their profits at the expense of the capitalists of the other countries…. The counterpart of the export surplus is an increase in the indebtedness of the foreign countries towards the country considered…. The counterpart of the budget deficit is an increase in the indebtedness of the government towards the private sector…. The above shows clearly the significance of 'external' markets (including those created by budget deficits) for a capitalist economy…. It is the export surplus and the budget deficit which enable the capitalists to make profits over and above their own purchases of goods and services.

Therefore, the interaction between wage adjustments and net export flows within a monetary union does not work in isolation, but impacts on a third dimension, the level of private and public debt. According to table 1, the debt level of the non-financial sector (private and public) in the northern region increased between 1999 and 2016 by 23% over GDP, compared to a steady increase of 102% in the southern region[9]. The third dimension is the financial linkage between the two regions, and the continuity of its smooth functioning assures the viability of both the export- and debt-led growth models (Stockhammer, 2015; 2011a)[10]. Moreover, in this regard there is a substantial difference between the two regions: the debt overhang in the northern region is mainly the outcome of private debt decisions, while in the southern region, the public sector is an important driver of the country's total debt[11]. This difference also exists in the private dimension with regard to household and non-financial corporation debt. The *third stylized*

fact refers to the asymmetric dynamics of private and public debt levels in the two regions.

This reflects not only a structural weakness and an unsustainable process in the EA macro-mechanism, but also a potential economic and political constraint to restore convergence. Hence, it produces sticky path-dependency by impairing current growth as well as by constraining future growth. In this way, the existence of economic divergence becomes a chronic feature of the monetary union, and the economic costs of joining outweigh its benefits, while the political costs of leaving are smaller than would be the case under a harmonious and balanced development of economic activities.

In the next section, the empirical analysis assesses the impact of wage adjustments on economic activity defining the demand regime in both regions, as well as their effects on the trade balance between the two regions.

3. Empirical Approach

The aim of the empirical investigation is twofold: to test the aggregate demand regime in both regions - the wage-led and profit-led hypothesis - and to evaluate the impact of wage variations on the trade balance between the two regions. In this respect, two different model specifications are used. A VAR model tests the demand regime and a SVAR quantifies the causes of the intra-EA trade surplus/deficit. The analysis focuses on short-term business cycle fluctuations, i.e. in a period of 2 to 5 years. No assumptions are made on long-term equilibrium, which would require a VEC model and cointegration analysis.

A VAR system approach is implemented following the specification of Stockhammer and Onaram (2004), and Jump and Mendieta-Munoz (2017) so as to treat functional income distribution as endogenous, avoiding any endogeneity bias[12]. The analysis is performed in first differences since unit roots tests suggest that variables are integrated of order one[13]. Furthermore, the standard specification of Badhuri and Marglin (1990) is augmented by including financial controls, which, according to the most recent literature (Stockhammer, 2017), have important effects on demand dynamics and may help to overcome the omitted variable bias from which the results in the literature suffer.

4.1 Data and Methodology

The data are quarterly ranging from q1-1996 to q4-2016, totalling 84 observations. The data are aggregated at regional level weighted by the share of each country's GDP. The variables used for the analysis are: 1) gross fixed capital formation $[I]$; 2) private consumption expenditure $[C]$; 3) exports and imports vis-à-vis the rest of the world

$[X, M]$; 4) unemployment rate $[U]$; 5) unit labour cost $[ulc]$; 6) wages $[W]$; 7) private-non financial sector debt $[PD]$; 8) the real effective exchange rate - narrow index $[reer]$; 9) long-term interest rate $[irl]$; 10) intra-EA exports and imports in goods between the two regions $[INT\_X\ INT\_M]$. Variables from (1) to (3) were downloaded from OECD' Main Economic Indicators (MEI) database and (4) to (6) from OECD's Economic Outlook No 100, while (7) to (8) from Bank of International Settlements (BIS) database, and (9) to (10) from Eurostat. Definitions and data sources are provided in table A1 in the appendix.

Given the above, the price deflator provided from the OECD database concerning variables (1) to (3) is applied to W, PD, and INT_X and INT_M, which are at current prices. Ultimately INT_X and INT_M, unadjusted data, are seasonally adjusted by regressing the original series on a set of quarterly dummies. Therefore, the overall dataset is at constant prices (base year 2010) and is seasonally adjusted.

The VAR was estimated with four lags and seasonal dummies[14]. This lag structure was used for the following reasons: I) in a small sample the Akaike Information Criterion (AIC) selects the correct specification more often (Lütkepohl, 2005); II) to get rid of any serial correlation in the residuals in each specification, which is verified by an LM test[15]; III) economic variables such as gross fixed capital formation may take longer than one or two quarters to respond to changes in economic conditions[16].

A summary of the model specifications and LM tests is provided in table A2 in the appendix. The overall analysis is carried out on 79 data points, since 1 observation is lost on first-differences and 4 for the lag structure.

4.2 Model Specification

4.2.1 Aggregate Demand Regime

Model one is set up to assess the impact of a wage share shock on the demand regime. The variables are entered into the vector $[WS, I, C, TB, U]$ and identification is based on a lower-triangular Choleski decomposition according to this particular ordering. The underlying economic intuition for this selection is that a reduction (increase) in the wage share has two opposite effects: it increases (decreases) corporate profits, which in turn boost (impair) investments, GDP and so exports over imports; on the contrary, it decreases (increases) aggregate domestic demand through falling (rising) disposable income, which in turn negatively (positively) affects investment decisions and therefore

aggregate demand. Depending on whether the former effect predominates the latter, the demand regime is profit- or wage-led (Badhuri and Marglin, 1990).

In this context, a shock to the wage share [WS] affects all variables simultaneously. This implies that wages do not react to GDP components or unemployment within a quarter. This assumption, though not always satisfied, is consistent with the literature on wage-led aggregate demand (Druant et al., 2012; Mendieta-Munoz, 2017)[17]. Observe that, since the focus is on the impulse responses to a wage share shock only, the ordering of the variables after the wage share does not affect the impulse responses (Christiano et al., 1999).

To sum up, the baseline model is a five-variable VAR, which is increased gradually to an eight-variable VAR by controlling for the real effective exchange rate [$reer$], long term interest rate [irl] and private non-financial sector debt [PD][18].

4.2.2 Intra-EA Trade Balance

Model two is fine-tuned to assess the impact of wage variations on net exports between the northern and southern region. All the variables are transformed into growth rates by taking the natural logarithm and then the first differences. This differs from model one because wages and net exports are not treated as a share of GDP. The advantage is the good fit of the model, which better captures the effects of domestic and foreign wage variations on net export flows between the two regions[19]. The identification scheme is based on the lower-triangular Cholesky decomposition, and the vector of endogenous variables become: [W^*, W, I, C, INT_NX, ULC], where W^* and W represent respectively wages in the foreign and home region, and INT_NX the net exports between the home and the foreign region[20].

Given that throughout it is assumed that W does not simultaneously react to [I, C, INT_NX, ULC] it seems reasonable also to assume that it does not simultaneously react to W^*. This is achieved by imposing a zero restriction on the response of W to W^*[21]. Moreover, it also reasonable to think that the effects of foreign wage variations are transmitted to the domestic market through the export and import channel, i.e. through a change in net exports. Accordingly, a zero restriction on the response of [I, C, ULC] to W^* is imposed. Therefore W^* is allowed to have a simultaneous relationship only with [INT_NX]. Thus, a structural over-identified VAR (SVAR) is estimated.

Furthermore, since the model aims to explain trade flows which are not subject to exchange rate variations - intra EA - the real effective exchange rate is dropped from the

model and replaced with the unit labour cost[22]. In addition, to avoid making the SVAR too large and so run out of degrees of freedom, the debt ratio and interest rate are also dropped. To sum up, the baseline model is a six-variable SVAR, which becomes a seven-variable VAR by separating the trade balance into its components, exports [INT_X] and imports [INT_M]. This helps to trace the sources of intra-trade imbalance movements, and to interpret the income and price effects of wage variations[23].

4.3 Empirical Results

4.3.1 Impulse Response Function Analysis: Aggregate Demand Regime

Figure 2 shows the baseline cumulative orthogonalized impulse responses to a unit standard deviation wage share shock and 90% confidence bands, respectively for the northern region (left panel) and the southern region (right panel).

  It is evident that a positive shock to the wage share has remarkably different effects in the two regions. First, investments tend to fall in both regions within one year, but more sharply and with greater persistence in the northern region than in the south. Overall, after 20 quarters, an increase in the wage share increases investments in the southern region and decreases them in the northern region. Consistently, consumption tends to fall in the northern region and rises in the southern region, while the trade balance falls in both regions. Remarkably, the effect on the trade balance in the northern region is much stronger than in the southern region, with a sharp effect on impact. Lastly, the unemployment rate, which can be interpreted as a proxy for the overall economic activity and labour share, increases in the northern region and decreases after one year in the southern region. All in all, the northern region demand regime can be classified as profit-led, while the southern region is in a wage-led regime.

This result underlines the role played by functional income distribution on aggregate demand, i.e. the relationship between output - investment, consumption, trade balance - and unemployment. The sequence of causal relationships among endogenous variables can be divided into three steps: I) the positive shock on the wage share decreases investments on impact and the trade balance, causing investments to fall further; II) the fall in investments increases unemployment, which in turn offsets the positive effect on consumption of the initial increase in the wage share; III) falling consumption negatively affects investments giving rise to a vicious circle.

On the first point, Stockhammer et al. (2008) emphasize that the degree of openness is crucial in determining the overall regime. The sharper fall in the trade balance on impact

in the northern region is consistent with the difference in the degree of openness between the two regions: in 2016, the sum of exports and imports in the northern region amounted to 113% of GDP, compared to 63% in the southern region. To be precise, as a share of GDP exports and consumption account respectively for 60% and 52% in the northern region, against 32% and 57% in the southern region.

Insert About Here **Figure 2**
Cumulative Orthogonalized Impulse Response Functions to a Wage Share Shock

Clearly exports weigh more than consumption in the northern region, therefore the shocks affecting the international competitiveness of products tend to have more negative effects on output than shocks affecting domestic demand. Conversely, domestic shocks have a stronger negative effect on output in the southern region, since consumption is undoubtedly the most important component of aggregate demand. This difference underlines the transmission channel through which a wage share shock propagates within the economy, and the nature of the demand regime.

Moreover, a fall in investments, given they are the key variable explaining aggregate unemployment across countries and over time (Stockhammer, 2011b), affects the current and future level of unemployment. Indeed, the unemployment rate increases faster in the northern region than in the southern region consistently with a sharper fall in the investment rate. This amplifies the negative effects of a positive wage share shock in the northern region, resulting in a lower level of consumption, which in turn negatively affects investments, and thus creates a vicious circle of unemployment and low investments. On the contrary, the rise in consumption expenditure in the southern region - the engine of a wage-led regime - is able to counterbalance the fall in the trade balance, pulling investments out of the negative after 6 quarters. Unemployment decreases after 8 quarters, consumption further increases, as do investments.

Table 2 summarizes at specific moments after the shock the results of the baseline responses - panel (a) - to an increase of 1% of the wage share in the two regions. For the real effective exchange rate, private non-financial sector debt and the long-term interest rate the impulse responses are qualitatively and quantitatively similar to those reported in panel (a). Furthermore, the results for the aggregate demand regime, i.e. the wage-led hypothesis for the southern region and the profit-led hypothesis for the northern region are confirmed. In addition, the results of the baseline model are also quantitatively consistent with the stylized facts specified in the previous section. As shown in table 1, a

decrease in the wage share of 4.2% of GDP in the northern region led between 1996 and 2007 to a surplus in the trade balance of 5.5% of GDP. According to the baseline estimates - panel (a) - a decrease in the wage share of 4.2% of GDP would increase the trade balance in the northern region by 5.9% of GDP[24]. Results for unemployment, investment and consumption are also consistent with the stylized facts, though not as precisely as for the trade balance.

Lastly, it is important to stress that if the results vary little in the northern region for different model specifications, i.e. the control variables neither qualitatively or quantitatively affect the impulse responses, in the southern region the introduction of the private non-financial sector debt - panel (c) - quantitatively produces an amplification effect compared to panel (b). Moreover, this amplification effect is exacerbated when the private non-financial sector debt interacts with the long-term interest rate - panel (d).

Table 2. *Robustness: Responses to a Wage Share Shock Increase of 1% of GDP*

Shock: Wage Share	Impact Effect		After one year		After three years		After five years	
a) Baseline	North	South	North	South	North	South	North	South
Wage Share / GDP	1.0	1.0	0.96	1.00	0.48	0.94	0.52	0.88
Investments	-2.00	-0.56	-4.82	-0.94	-3.33	1.25	-2.59	1.88
Consumption	-0.33	0.06	-0.48	0.63	-0.41	1.63	-0.30	1.94
Trade Balance / GDP	-0.67	-0.31	-0.85	-0.50	-0.74	-0.81	-0.74	-0.94
Unemployment	0.11	0.00	0.67	0.13	0.82	-0.13	0.67	-0.25
b) Baseline plus Reer	North	South	North	South	North	South	North	South
Wage share / GDP	1.0	1.0	0.96	1.07	0.50	0.87	0.58	0.87
Investments	-1.89	-0.47	-4.24	-0.53	-2.00	0.80	-2.00	0.33
Consumption	-0.31	0.13	-0.35	0.80	-0.12	1.27	-0.04	1.00
Trade balance / GDP	-0.73	-0.33	-0.92	-0.47	-0.77	-0.47	-0.77	-0.40
Unemployment	0.12	-0.60	0.58	-0.73	0.62	-2.93	0.46	-0.12
Real eff. exchange rate	-0.04	-0.20	0.04	-1.20	-0.42	-1.73	-0.62	-1.60
c) Baseline plus Reer and PD	North	South	North	South	North	South	North	South
Wage share / GDP	1.0	1.0	0.89	0.93	0.35	0.87	0.46	0.87
Investments	-2.19	-0.33	-5.01	0.13	-2.31	1.33	-2.19	0.93
Consumption	-0.31	0.13	-0.42	0.93	-0.31	1.47	-0.15	1.40
Trade balance / GDP	-0.77	-0.33	-0.92	-0.53	-0.81	-0.60	-0.81	-0.60
Unemployment	0.15	-0.07	0.69	-0.20	0.73	-0.53	0.54	-0.40
Private debt / GDP	0.89	0.60	3.08	1.47	1.81	2.20	2.08	2.67
Real eff. exchange rate	-0.15	-0.27	0.00	-1.53	-0.35	-2.00	-0.54	-2.00
d) Baseline plus Reer, PD, Irl	North	South	North	South	North	South	North	South
Wage share / GDP	1.0	1.0	1.00	0.94	0.38	1.00	0.50	1.19
Investments	-2.17	-0.63	-5.00	2.13	-2.04	8.13	-2.29	8.31
Consumption	-0.29	-0.06	-0.38	0.38	-0.25	3.75	-0.08	4.06
Trade balance / GDP	-0.75	-0.13	-0.96	-0.50	-0.83	-1.19	-0.83	-1.31
Unemployment	0.13	-0.06	0.71	-0.19	0.71	-1.31	0.58	-1.31
Private debt / GDP	0.92	1.06	2.83	2.94	1.21	6.88	1.75	11.25
Real eff. exchange rate	0.21	-0.38	0.54	-0.31	0.25	0.25	-0.17	0.81
Long-run interest rate	-0.13	-0.25	-0.42	-0.75	-0.46	-0.38	-0.38	0.06

Note: The cumulative orthogonalized impulse responses are expressed as a percentage of the underlying variable, except for the long-run interest rate and unemployment rate, which are in basis points, and the wage share, trade balance and private debt, which are shown as percentages of GDP.

Although in both regions a positive shock in the wage share has a positive effect on the debt level as a share of GDP, this effect is six times larger in the southern region. Faced with a reduction in the long-term interest rate on impact, an economy with a wage-led aggregate demand experiences strong positive spillovers. Although investments fall on impact probably due to higher labour costs, they recover within a year due to the simultaneous fall in interest rates, easier access to debt-financing, and increased consumption expenditure. This initial shock sets in motion an even more complex set of interactions à la Minsky (1982), in which financial effects work as an amplifier of business cycle fluctuations. In fact, if unemployment is the key variable reinforcing the consumption pattern and hence the investment rate in a wage-led regime - as previously described - private debt and the interest rate are the variables which directly influence the size of investments and thus the unemployment rate. Therefore, financial variables have a stronger amplification effect in a wage-led than in a profit-led regime.

This result provides additional evidence of the role played by private debt as the key driver of aggregate demand (Stockhammer and Wildhauer, 2016) and new insights into the relationships between debt-led and export-led economies within the EMU (Stockhammer, 2015).

4.3.2 Impulse Response Function Analysis: Intra-EA Trade Imbalances

The impulse response analysis of the second model is based on a 1% shock to the growth rate of wages, and not a shock of 1% of GDP to the wage share. Table 3 shows the results for the previous model specification for a 1% wage shock increase[25].

  As we can see, the demand regime is unchanged. Investments and consumption respond negatively to a wage shock in the northern region and positively in the southern region. Moreover, intra net-exports respond negatively in both regions. In line with the previous results, the inclusion of private non-financial sector debt and interest rates in the set of endogenous variables produces financial amplification effects in the southern region. These variables have negligible effects in the northern region.

After showing the consistency of the baseline results for both model specifications, the focus now moves to the impact of wage variations on net exports between the northern and southern region. This second part of the investigation aims to test whether intra trade imbalances are the result of different growth models so as to clarify their origin and causes. Moreover, the advantage of focusing on the intra trade balance is twofold: net exports between the two regions are the outcome of interaction between a narrower set of factors internal to the monetary union, and do not depend directly on supply and demand

factors outside the Euro Area. This gives the model a better performance in terms of goodness of fit and therefore increases the reliability and comparability of the results between the two regions.

A 1% wage shock in the northern region has a much stronger negative impact on net exports to the southern region than a 1% wage increase in the southern region. This result is qualitatively and almost quantitatively unchanged when the model is augmented with debt and interest rates and by taking into consideration the relative magnitude of the wage shock - column 'as if 1%'[26]. From this first insight, wage restraint policies implemented in the northern region seem to be the key factor triggering trade imbalances within the Euro Area.

Table 3. *Responses to 1% Wage Shock Increase*

Shock: Domestic Wage (W)	Impact Effect		After one year		After three years		After five years		As if 1% After 5 years	
a) Baseline	North	South	North	South	North	South	North	South	North	South
Domestic wage	1.0	1.0	1.10	0.90	0.68	0.60	0.60	0.50	1.00	1.00
Investments	0.91	0.40	0.37	0.60	-0.83	0.38	-0.71	0.33	-1.19	0.67
Consumption	0.02	0.13	0.03	0.23	-0.21	0.15	-0.24	0.13	-0.41	0.25
Intra net exports	-0.44	-2.17	-5.91	-3.25	-7.55	-2.04	-8.18	-1.77	-13.65	-3.54
b) Baseline plus PD and Irl	North	South	North	South	North	South	North	South	North	South
Domestic wage	1.0	1.0	1.4	0.9	0.9	1.1	0.7	1.2	1.00	1.00
Investments	0.95	0.44	0.47	0.98	-1.17	1.68	-0.91	1.79	-1.26	1.51
Consumption	0.02	0.09	0.11	0.40	-0.17	0.72	-0.22	0.82	-0.31	0.69
Intra net exports	-1.15	-2.42	-5.90	-3.47	-9.02	-4.94	-9.90	-5.10	-13.64	-4.29

Note: The cumulative orthogonalized impulse responses are expressed in percentage of the underlying variable.

Nevertheless, the baseline model (a) and the augmented baseline (b) work in isolation; there is no interaction between the northern and southern region, and intra net-exports are the result of the interplay of solely domestic variables and domestic shocks. Obviously, this is not the case. In this respect, wages of the opposite region [W^*] are added to the set of endogenous variables as the most exogenous variable - first in Cholesky ordering. This allows us to overcome an omitted variable bias and to improve the overall fit of the intra net exports equation. By including foreign wages in the model, simultaneous relationships must also be modelled. This is achieved - as previously discussed - by imposing a set of zero restrictions on the response of [W, I, C, ULC] to W^*. This implies that an over-identified SVAR is estimated.

Table 4 reports the results of the cumulative structural impulse responses of intra net exports [INT_NX] to a 1% increase in foreign wages [W^*] - panel (a) - and domestic wages [W] - panel (b). A shock to foreign wages [W^*] in the 'South column' represents the effect of a 1% increase in northern wages on intra net exports in the southern model.

This effect should be the mirror image of a 1% increase in domestic wages on intra net exports in the northern region.

A 1% shock to southern wages [W^*] increases northern intra net-exports to the southern region by 8.30%, while a 1% shock to northern wages increases southern intra-net exports to the northern region by 12.54%. This result consolidates the evidence shown in table 3 for the closed economy model. Results are even stronger if the relative size of the wage shock after 5 years is taken into consideration - column 'as if 1%'. Moreover, the result of a foreign wage shock [W^*] - panel (a) - is qualitatively similar to the results of a domestic wage shock [W] - panel (b). Quantitatively, impulse responses to a domestic wage shock [W] - panel (b) - are larger due to interaction with domestic variables. Overall, the results show the important contribution of wage adjustments in the northern region to the creation of trade imbalances with the southern region.

Table 4. *Intra Net Exports Cumulative Structural Responses to a 1% Increase in Foreign and Domestic Wages*

Shock: Foreign Wage (W*)	Impact Effect		After one year		After three years		After five years		As if 1% After five years	
Panel (a)	North	South	North	South	North	South	North	South	North	South
Foreign wage (W*)	1.0	1.0	1.41	1.67	1.82	1.24	2.08	1.18	1.00	1.00
Intra net exports (INT_NX)	0.44	-0.45	3.26	3.24	6.78	12.44	8.30	12.54	3.99	10.63

Shock: Domestic Wage (W)	Impact Effect		After one year		After three years		After five years		After five years	
Panel (b)	North	South	North	South	North	South	North	South	North	South
Domestic wage (W)	1.0	1.0	1.21	1.05	0.85	1.72	0.84	1.74	1.00	1.00
Intra net exports (INT_NX)	-0.03	-2.14	-6.42	-7.46	-10.89	-12.04	-12.96	-11.03	-15.51	-6.33

Note: The cumulative structural impulse responses are expressed as a percentage of the underlying variable.

Lastly, the specification by separating net exports into its export and import components enables the model to capture the income and price effects of wage variations. This further specification is important in light of the recent literature which asks whether the price or income effects of wage variations contributed most to the growing deficits in the euro area (Ginzburg et al., 2013, p. 662)[27]. To be precise, the impact of a 1% increase in foreign wages on exports reflects the income effect of stronger foreign demand, while the impact on imports reflects the price effect of higher unit labour costs. Vice versa, the impact of a 1% increase in domestic wages on exports reflects the price effect of higher unit labour costs, while the impact on imports reflects the income effects of stronger domestic demand.

Table 5, which maintains the same structure of table 4, reports the results of the cumulative structural impulse responses of intra exports [INT_X] and imports [INT_M]

to a 1% increase in foreign wages [W^*] - panel (a) - and domestic wages [W] - panel (b)[28]. The first important result to be noticed is that the price and income effects tend to be stronger in relation to northern exports (southern imports), than to southern exports (northern imports). More specifically, a 1% shock in southern wages increases northern exports after 5 years by 4.22% - income effect - and decreases northern imports by 0.56% - price effect; conversely a 1% shock in northern wages increases southern exports by 0.17% - income effect - and decreases northern exports by 2.41% - price effect. These empirical estimates back up Ginzburg et al., i.e, their main point that the export base in the southern region is too narrow to sustain development driven only by external demand (2013, p.662). This means that, even if northern import demand expands, exports from the southern region benefit only marginally.

A second important point that sheds light on the origin and persistence of intra-trade imbalances, is that wage restraint policies in the northern region played and still play a crucial role in terms of price competition and export penetration[29]. This is the most important factor if the relative magnitude of the wage shock after 5 years is taken into consideration. In fact, a 1% increase in northern wages in a 5-year period - column 'as if 1%' - reduces southern imports by 2.08%, against a 1% increase in southern wages which increases northern exports by 1.45%. This result is corroborated by the impulse response to the domestic wage shock shown in panel (b). In this case, both in absolute and relative terms, a 1% shock to domestic wages in the northern region has a stronger negative effect on northern exports than the positive effect of an equivalent increase in domestic wages in the southern region.

Furthermore, a positive shock to foreign wages in the northern region - panel (a) - has only a small negative price effect of 0.19% on northern imports, meaning that cost competitiveness is not crucial for southern export performance. Nevertheless, as is evident from panel (b) this estimate is not consistent with the effect of an increase in the domestic wages in the southern region. In fact, a 1% increase in domestic wages in the southern region tends to increase - not reduce - exports to the northern region by 2.03%. Although there are opposing effects, one interpretation is that the foreign wage shock interacts only with variables in the opposite region and is not affected by the positive spillovers that a wage shock may have on domestic investment and productivity. It mainly captures the negative price effect on domestic imports. Estimating the effect of a domestic wage shock on exports, the model is likely to capture positive interactions between wage, aggregate demand, investments, and productivity. This explanation and

result is consistent with the main argument of Storm and Naastepad (2015, p. 972) who underline how lower wage growth in the southern region is reflected in lower labour productivity growth and thus in weaker export performance[30].

Table 5. *Intra Exports and Imports Cumulative Structural Responses to a 1% Increase in Foreign and Domestic Wages*

Shock: Foreign Wage (W*)	Impact Effect		After one year		After three years		After five years		As if 1% After five years	
Panel (a)	North	South	North	South	North	South	North	South	North	South
Foreign Wage (W*)	1.0	1.0	1.38	1.25	2.24	1.18	2.92	1.16	1.00	1.00
Intra Exports (INT_X)	0.74	-0.59	0.75	0.09	2.96	0.14	4.22	0.17	1.45	0.15
Intra Imports (INT_M)	0.53	-0.26	-0.68	-0.73	-0.70	-1.94	-0.56	-2.41	-0.19	-2.08

Shock: Domestic Wage (W)	Impact Effect		After one year		After three years		After five years		After five years	
Panel (b)	North	South	North	South	North	South	North	South	North	South
Domestic Wage (W)	1.0	1.0	1.22	1.20	1.05	1.39	1.00	1.41	1.00	1.00
Intra Exports (INT_X)	-0.18	1.30	-0.80	3.44	-2.93	2.80	-3.91	2.86	-3.90	2.03
Intra Imports (INT_M)	-0.15	1.16	0.96	3.45	0.17	3.02	0.17	3.00	0.17	2.13

Note: The cumulative structural impulse responses are expressed as a percentage of the underlying variable.

4.3.3 Robustness

The robustness of the results was ensured by performing a series of tests throughout the empirical analysis. The first check was to see whether the results were sensitive to omitted variables, therefore additional controls such as the real effective exchange rate, private non-financial sector debt, and the long-term interest rate were included in both specifications, as suggested by Stockhammer (2017). Second, evidence was provided that results concerning the demand regimes are not sensitive to variable specification, i.e. a 1% shock to the wage share or 1% increase in wages. Moreover, the effects of a wage share shock are consistent with both the responses of the GDP components and the unemployment rate. Third, results are robust when the model is estimated for sub-periods[31]. Fourth, results are robust to a different selection of the lag-length. Four lags were chosen to tackle residual autocorrelations across the model specifications to avoid changing the lag-length here and there, and complicate the comparability of results. Fifth, results are region-specific, and each country may respond differently to internal and external shocks. In this analysis, it has been prioritized the opposition of the two regions by grouping the countries according to a common trade pattern. Wage and debt patterns are also consistent, although Portugal and

Belgium differ respectively in the wage share pattern - decreasing - and the debt pattern - increasing. Sixth, the results on intra-EA net exports are robust when they are estimated in isolation - solely domestic wage shocks - and when foreign shocks are added to the model. Moreover, the impulse responses do not change qualitatively and quantitatively when estimated for the northern or the southern region. Seventh, the results are also consistent when net exports are broken down into exports and imports[32]. The conclusion is that the results are robust to the time dimension, variable selection, model specification, region estimation, and in particular, they do not seem to be due to omitted variables or specific proxies.

4. Policy Implications

The analysis has revealed that the Euro Area, albeit with a wage-led demand regime as a whole (Ederer et al., 2009; Onaram and Obst, 2016), can be divided into two regions with clearly different wage, trade, and debt patterns. The specific patterns of each region proved to be the result of two opposing demand regimes: the wage-led southern region and profit-led northern region. It follows that wage restraint policies may be self-defeating if applied to the southern region. Structural reforms aimed at restoring price competitiveness through wage moderation or neoliberal policies only produce a painful internal devaluation, which tends to reinforce divergence, and increase deflationary pressures. In this macroeconomic context, "a current account deficit can look like a major asymmetric shock" (Obstfeld, 2012, p.17).

On the one hand, the analysis shows that this major asymmetric shock endogenously and silently developed within the Euro Area, has created trade imbalances and in turn an accumulation of debt for more than a decade. On the other hand, it has also been shown how the northern intra-EA trade balance was forced out of balance vis-à-vis the southern region, reaching a surplus of 4.2% of GDP in 2007. The exogenous wage adjustments in the northern region represent Kaldor's initial advantage. The structural change took place at the inception of the Euro Area, when the northern economies started to adjust their wage share downwards. In the context of the monetary union, the southern and northern regions faced a sharp asymmetric shock to their level of relative prices and wages. The cumulative results of price and income effects are reflected in the trade balance between the two regions. Intra-EA trade imbalances have become a chronic feature of the monetary union to the point of being perceived as the result of the normal functioning of efficient markets: the optimum allocation of capital and production of goods. Capital

flows, the illusory and temporary convergence in interest rates, and easy credit from the banking system gave the system apparent stability and prosperity (Borio and Disiyatat, 2015). Nevertheless, what guaranteed stability at first, later became the source of fragility. Debt-overhang became the major source of economic and financial instability, not because of the 2008 Financial Crisis, but due to negative spillovers between the sovereign, banking and economic systems, which impair and constrain current and future growth (Shambaugh, 2012). Thus, path dependency is the outcome of a cumulative process, in which current and future output is pre-determined by the initial conditions. Current deflationary forces have neither reduced southern import-dependency on northern countries, nor increased southern exports to the northern region. The clear outcome is a polarisation process in terms of trade flows, industrial production, growth rates, unemployment and the ability of a country to respond to shocks, which reflects the divergence between the two regions in their productive base (Ginzburg et al. 2013; Storm and Naastepad, 2015). The tragedy of the Euro Area consists in the lack of countercyclical tools at the national and supranational level able to tackle the endogenous source of instability. In the absence of fiscal transfers from surplus to deficit regions, the macro-mechanism of the Euro Area is naturally flawed and trapped into a divergent and politically self-destructive trajectory. By referring to Myrdal's cumulative causation theory, Blanckenburg et al. (2013, p.466) emphasize that dynamic elements of trade trigger backwash and spread effects, resulting in uneven economic development. Empirical analysis quantifies the negative effects of uncoordinated wage policy on trade relationships within the Euro Area, and explains how unemployment and the level of debt are both the outcome and amplifying factors of the initial shock, ultimately creating winners and losers from trade.

Given this empirical evidence, it seems clear that wage coordination should become a macroeconomic priority within a monetary union with fiscal and political independence (Stockhammer, 2008; 2011a; Laski and Podkaminer, 2012; Onaram and Obst, 2016). Furthermore, wage coordination by indexing wage growth to productivity growth may act as an automatic-countercyclical policy tool so that countries experiencing a boom may play the role of pullers by stimulating aggregate demand and aggregate exports from neighbour countries (Stockhammer, 2007). A supranational European institution in charge of supervising and coordinating the Euro Area macroeconomic strategy would be useful to prevent national policies, taken in aggregate, destabilizing the objective of the single currency: trade integration and economic convergence. In order to reach these two

objectives however, policymakers need to tackle the current divergence in a coordinated manner. From this perspective, wage coordination is just one ingredient in the policy mix, whose priority is to restore a process of convergence within the Euro Area. Because trade asymmetries are the outcome of a polarisation process between the southern and northern region, and unemployment differentials are the outcome of an investment gap, these factors being mutually reinforcing, the practical task is to rebalance the productive base. Moreover, since convergence cannot be achieved through endogenous forces, which tend to preserve the specialisation pattern, exogenous forces - an ad-hoc investment package - are needed to shock the current state of the system. The Stability and Growth pact does not give the necessary fiscal flexibility to counteract a debt-deflation process, and a deterioration of the fiscal stance may foster financial speculation over sovereign default, deeping recession due to growing uncertainty and a weakened fiscal position, forced to deploy the necessary stimuli. Overall, the institutional design of the EMU plays a key role in exacerbating pro-cyclical outcomes, leaving each individual country with the task of implementing policies to restore convergence, without the right to choose what to do. Moreover, political independence includes fiscal independence, so fiscal transfers can only be achieved on the basis of a political union.

Therefore, this paper proposes a transfer mechanism based on intra-EA trade, in order to overcome the political impasse and provide automatic countercyclical stabilisers within the EMU. In this respect, this mechanism should be able to relax fiscal policy constraints and provide an alternative to the austerity rules and deflationary prescriptions of the Berlin-Washington Consensus (Fitoussi and Saraceno, 2013). The mechanism should track trade imbalances among EA member states, so surplus countries contribute to building up a European fund for countercyclical investments. The mechanism should work as follows: each deficit country draws from the fund according to their deficit quota, incentivizing local public and private investments, which in turn attract foreign capital. This mechanism increases long-term productivity in deficit countries by rebuilding the productive base, necessary to rebalance trade asymmetries as well as for sustainable and inclusive convergence. This countercyclical investment package should act as supply side policy, while wage coordination plays the complementary role of demand side policy, in order to guarantee a rising level of consumption and imports in the EMU. Strategically, the fund can be integrated into the scope of the European Investment Bank to avoid the mismanagement of funds by local government. This proposal expands further the suggestion of Arestis et al. (2001) and Sawyer (2013) by giving a precise

countercyclical role to the EIB, which should seek to smooth asymmetric shocks and reduce persistent trade differentials through an active European industrial policy (Mazzucato, 2013; Ginzburg et al. 2013; Storm and Naastepad, 2015). The virtues of this mechanism comprise the following features: I) *Flexible*: it overcomes the loss in flexibility due to the lack of a national exchange rate system. II) *Attractive*: it creates new incentives to join the monetary union for countries in the common market; III) *Countercyclical*: it assures a direct (in the country of origin) countercyclical industrial policy at the Euro Area level - the macro stabilisers needed in a monetary union with political and fiscal autonomy; V) *Fair*: the countries that benefit most from EA trade need to contribute to the EA fund, while those that contribute most in terms of import demand should be rewarded; VI) *Inclusive*: sooner or later, each member state will be in surplus or deficit and hence he will be a net contributor or net receiver. Moreover, the fund would be of the on-off type, since a parity of the trade balance does not involve fiscal transfers.

5. Concluding Remarks

The original set-up of the Euro is the beginning, not the end, of a journey. The objectives were enshrined in article G2 of the Treaty of Maastricht. Those principles are the only reason the Euro Area exists. And we should refrain from confusing the rules adopted to implement those principles with the objectives themselves. Monetary and fiscal rules are not objectives per se, but are means to achieve agreed targets. The rules and current institutional set-up have not led to the desired results, and therefore require rethinking. The institutional set-up needs to be updated and adapted pragmatically to the unexpected challenges of the common currency. Institutional change is a cumulative process, requiring learning from experience before moving forward. The original flaw in the Euro Area - a monetary union with fiscal and political autonomy - has produced asymmetric benefits, which now reinforce inward-looking policies and the political and economic self-interest of the winners. As Obsfeld says (2012, p.1) "Policies motivated by purely national advantage may well be counterproductive if widely undertaken, which is why countries have sought to coordinate their trade and sometimes macroeconomic and financial policies". From this perspective, the true risk for the Euro Area is that by confusing a short-run remedy with the solution, a vicious circle may subvert the long-term path agreed. The suggestions put forward in this paper seek to tackle the problem of asymmetric gains from intra-EA trade between members. This is only one aspect of the flawed Euro Area architecture; many other problems need to be addressed. The principal

motivation for the creation of the Euro was to foster 'Pareto-efficient' gains from trade. The analysis shows that due to concurrent asymmetric shocks the common currency has produced asymmetric benefits lasting almost two decades. This mechanism has determined path dependency, and the lack of a mechanism able to cope with diverging forces has left countries without proper tools to combat a massive and vicious mechanism. Monetary union first and foremost implies social cohesion and solidarity among member states, as well as a humane economy as the first step towards a humane society.

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Footnotes

[1] This subdivision resembles one identified by Stockhammer and Wildauer (2016). Moreover, I wish to stress that, taken together, the northern and southern region represent more than 90% of total GDP in the Euro Area and have similar weight within the EA, 43% and 48% of GDP respectively.

[2] The extra-EA surplus is certainly driven by the nominal depreciation of the Euro that has led to a real depreciation of the effective exchange rate. The only exception is France, which faces a persistent trade deficit, the outcome of an expansionary fiscal stance.

[3] Meade favoured *national currency areas* since Europe lacked the necessary condition of high labour mobility between regions, whereas Scitovsky was in favour of a single European currency since he believed it would promote greater capital mobility. Nevertheless he recognised the problem of asymmetric shocks by emphasizing the need to render labour more mobile and to create a supranational institution to promote and coordinate employment policies.

[4] This was the misconception that free trade would bring higher living standards and lower unemployment in every sector and country through efficiency gains due to greater economic integration. Although there is evidence of aggregate gains, unsurprisingly, they have distributional consequences, producing winners and losers from trade (Autor et al. 2013).

[5] Clearly the best outcome would have been to maintain full employment without setting restrictions on intra-European trade, and this could have been achieved by sticking to the three main principles. See Meade's explanation for further details (ivi., 394).

[6] Arestis and Sawyer (2004, p.6) emphasize that I) a political union is a prerequisite for the survival of a monetary union; and II) in the absence of political union economic convergence is necessary for the survival of the monetary union.

[7] In particular by implementing the 'pact for work, education and competitiveness' in 1998, the Germany of Gerhard Schröder (Bonfinger, 2015) saw the wage share over GDP decrease for eight consecutive years.

[8] The only exception is Portugal, with a wage share reduction. However, this reduction was smaller than in three of the four countries in the northern region, thereby resulting in a loss of competitiveness compared to countries in the northern region. The outcome was the deterioration of the non and intra-EA trade balance.

[9] Looking at single countries, Belgium underwent a remarkable increase in its debt share over GDP, almost 90%. This is the only exception among northern countries, and is lower than the debt increase in Spain and France.

[10] This does not mean that adjustment on both sides is unnecessary; it is urgent in order to avoid future political and economic crisis in the EMU. Otherwise, given the crisis-prone system, when the instability of the mechanism develops once more, painful endogenous restructuring will take place, and social and political discontent will again undermine the benefits of monetary union, with harsher consequences than before.

[11] As explained by Borio and Disiyatat (2015, p.7) current accounts and hence trade imbalances represent net wealth transfers and not financial flows from surplus to deficit countries. Therefore domestic credit plays a crucial role in stimulating import demand, which can be financed entirely at home or abroad, regardless of the current account position.

[12] The alternative approach in the literature is the single equation approach. The advantage is that results are easier to interpret than in a VAR. On the negative side, results may include estimation bias arising from the fact that it treats functional income distribution as exogenous and does not consider investments, consumption and net exports as parts of GDP (Ederer et al. 2009, p. 145). For a detailed comparison of the methodologies, see Onarum and Obst (2016, p. 1526).

[13] This is standard practice in the literature (Jump and Mendieta-Munoz, 2017; Onaram and Obst 2016). Stationarity tests are available on request.

[14] Although seasonal dummies have little impact on the results, they are necessary to avoid autocorrelation in the residuals.

[15] Following standard practice in modern econometric modelling, a different lag specification was applied whenever there was evidence of residual autocorrelation. However, results are robust to alternative lag lengths.

[16] Stcokhammer and Onaram (2004) adopt a lag length of four on semi-annual data - two years - to capture the effects on investments.

[17] This is also consistent with the stylized facts. Wage adjustments in the northern countries were the result of the exogenous implementation of policy measures between 1996 and 2007. Similarly, structural reforms aiming to reduce labour costs and boost competitiveness were imposed in the aftermath of the sovereign debt crisis in the southern region.

[18] *WS TB, PD* are weighted by GDP, while *C, I* and *reer* are transformed in natural logarithm. Then first differences are taken for all the variables, i.e. WS, C, I, TB, U, irl, reer, pd.

[19] If in the first specification, working with the trade balance as a share of GDP is binding since the overall trade balance is both negative and positive during the sample period - hence growth rates cannot be computed - in the second specification net exports between the two regions are positive for the northern region throughout the entire sample. This allows the growth rate of net exports for the northern region to be computed. Since the growth rate of the net exports of the southern region is specular, we need only multiply by -1 the series obtained for the northern region.

[20] Precisely, positive net exports refer to an excess of exports over imports in the home region to and from the foreign region, i.e. a trade surplus.

[21] This approach was used by Beetsma and Giuliodori (2011) who assessed the impact of the foreign economic activity of thirteen EU countries on the domestic activity of one EU country. They analysed the potential gains from the coordination of fiscal expansion. As in this analysis, the focus is on the potential gains from wage coordination across EA countries, and the potential negative spillover if wage policies are settled independently.

[22] This is also consistent with the literature focusing on intra-EA trade imbalances. See for example Ginzburg et al. (2013) or more generally for trade imbalances see Storm and Naastepad (2015).

[23] The trade balance decomposition in a VAR approach is used by Beetsma et al. (2008) to assess the effects of a shock to public spending.

[24] Computations are based on the impulse response estimates of the baseline model for the 5-year period, since the wage share endogenously adjusts to the initial shock. Note that the estimates are a linear function of the shock, therefore a change in the magnitude of the shock has no effect on the estimates of the impulse responses.

[25] In this model, the trade balance is replaced by the trade balance between the two regions, which is defined as intra net-exports [*INT_NX*].

[26] Here I refer to the effects of debt and interest rate on wages. If we set the wage shock at 0.5% 'after five years' for model (b), the magnitude of the impulse responses is pretty closer to those of baseline model (a). Therefore, the amplification effect works by pushing wages higher, which in turn has a scale effect on the other endogenous variables in the model. It is important to keep this in mind when comparing results in the two regions.

[27] "Whilst disentangling the composition, price and income effects lying behind the growing deficits of the various peripheral eurozone countries would require further investigation, it seems

evident that their export base is at the moment too narrow to sustain development driven only by external demand" (Ibid.).

[28] Here too a set of zero restrictions is imposed on the response of $[W, I, C, ULC]$ to W^*.

[29] This effect may be more detrimental to those southern countries such as France and Italy, which have an industrial base that can compete with Germany.

[30] See Storm and Naastepad (2009, 2017).

[31] The first sub-period is from Q1-1999 to Q4-2016, and the second sub-period from Q1-1996 to Q-2008. Impulse responses do not change remarkably from the full period when estimated for both sub-periods.

[32] Although the price effect of higher domestic wages on southern exports is positive when estimated on the southern region and negative when estimated on the northern region as foreign wages, a possible explanation is provided.
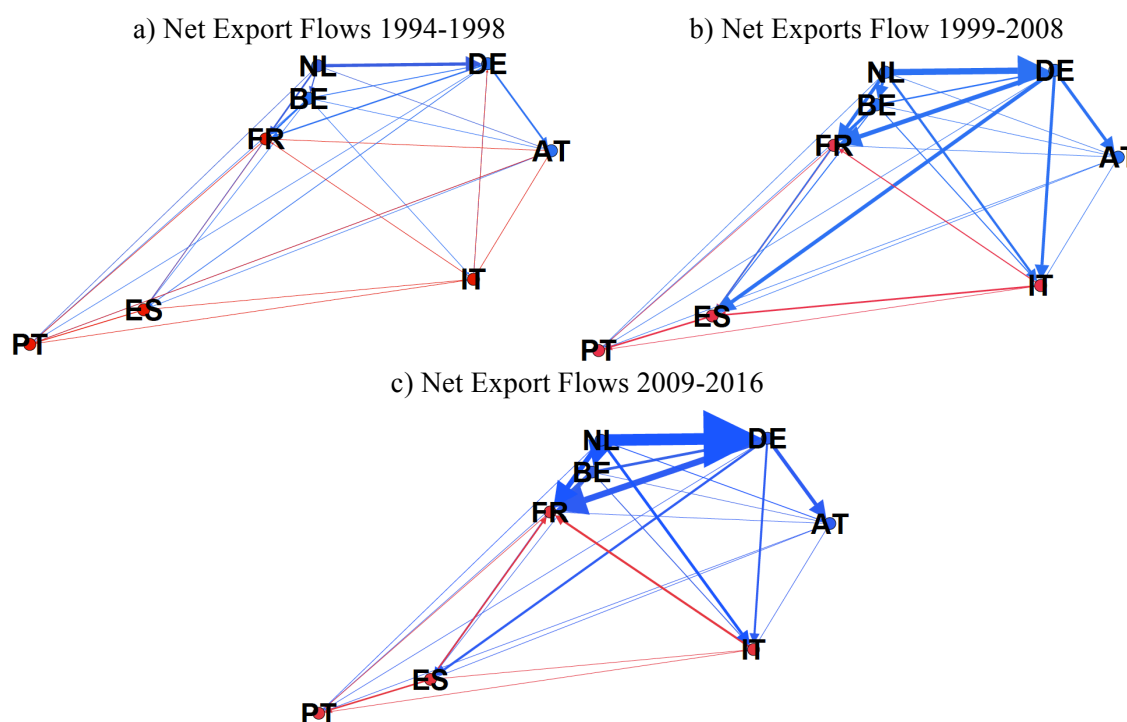
List of Figures

Figure 1. Intra Euro Area Net Export Flows between Deficit and Surplus Countries

Source: Eurostat. Note: Arrows show the average trade surplus for the selected countries in the specific time period. The amount of flow is represented by the thickness of the arrow. Countries are divided into two subsets: blue for Austria, Belgium, Germany and the Netherlands (surplus countries), and red for France, Italy, Portugal and Spain (deficit countries).
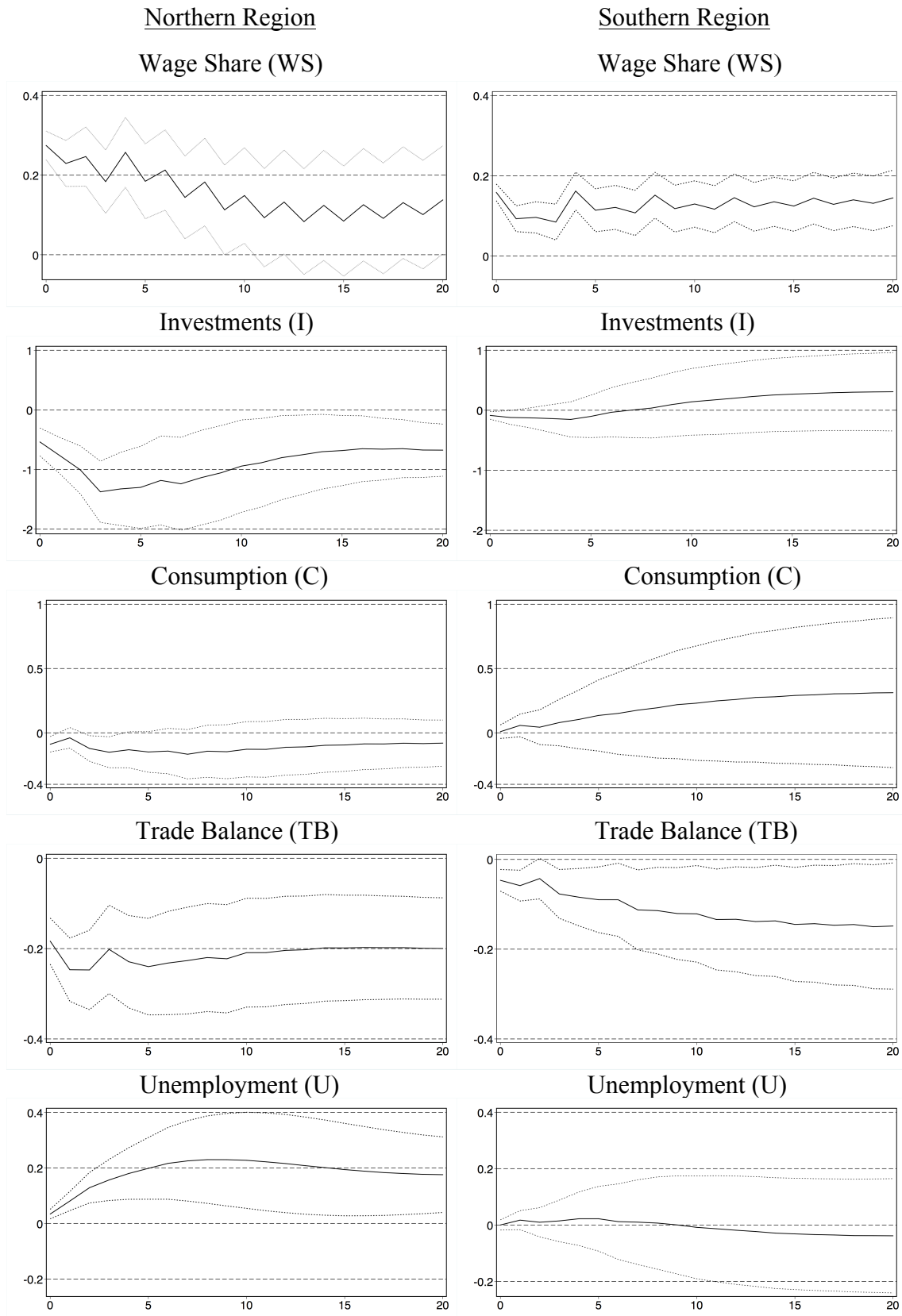
Northern Region | Southern Region

Wage Share (WS)

Investments (I)

Consumption (C)

Trade Balance (TB)

Unemployment (U)

Figure 2. Cumulative Orthogonalized Impulse Response Functions to a Wage Share Shock

Note: The Shock is the first in the Cholesky decomposition (unit standard deviation). The solid line refers to point estimates, dotted lines to 90% confidence region. The responses are expressed as a percentage of the underlying variable, except for the unemployment rate, which is in basis points, and the wage share and trade balance, which are shown as a percentage of GDP.

Appendix

Table A1. *Definitions and Data Sources*

Time Series Data	Variable	Definition	Source
Gross domestic product	GDP	Gross domestic product, at 2010 constant prices	OECD Main Economi Indicator - March 2017 Edition
Investments	I	Gross fixed capital formation, at 2010 constant prices	OECD Main Economi Indicator - March 2017 Edition
Consumption	C	Private consumption expenditure, at 2010 constant prices	OECD Main Economi Indicator - March 2017 Edition
Exports	X	Exports of goods and services, at 2010 costant prices	OECD Main Economi Indicator - March 2017 Edition
Imports	M	Imports of goods and services, at 2010 constant prices	OECD Main Economi Indicator - March 2017 Edition
Wages	W	Wages, values annual. Deflated with OECD implicit price deflator.	Economic Outlook No 100
Private non-financial sector debt	PD	Privare non-financial sector - all sectors - market value - perecntage of GDP	Bank of International Settlements
Real effective exchnage rate	Reer	Narrow Index	Bank of International Settlements
Long-term interest rate	Irl	Long-term interest rate for EMU convergence criterion bond yields	Eurostat
Unemployment rate	U	Unemployment rate, % of labour force	Economic Outlook No 100
Unit labour costs	ULC	Unit labour cost in total economy	Economic Outlook No 100
Intra exports	INT_X	Exports of goods	Eurostat
Intra imports	INT_M	Imports of goods	Eurostat
Wage share	WS	Wages as share of GDP	Computed
Trade balance	TB	Exports minus Imports (of goods and services)	Computed
Intra net exports	INT_NX	Intra Exports minus intra imports (of goods)	Computed
Price deflator	/	Price deflator	OECD Main Economi Indicator - March 2017 Edition

Table A2. *Model Specifications and LM tests*

MODEL		Lag	LR	FPE	AIC	HQIC	SBIC	LM Test	Selection	LR	FPE	AIC	HQIC	SBIC	LM Test	Selection
					Northern Region								Southern Region			
Table 2	Panel (a)	1	201.6	2.2E-20*	-31.06	-30.52*	-29.71*	0.181	/	179.73	5.6e-22*	-34.75	-34.21*	-33.40*	0.122	/
		2	40.5	2.6E-20	-30.94	-30.103	-28.84	0.267	/	37.73	6.60E-22	-34.60	-33.76	-32.50	0.087	/
		3	48.24	2.70E-20	-30.92	-29.78	-28.07	0.324	/	53.13	6.50E-22	-34.64	-33.50	-31.79	0.262	/
		4	59.29*	2.50E-20	-31.07*	-29.60	-27.44	0.247	4	51.506*	6.70E-22	-34.76*	-33.22	-31.06	0.140	4
Table 2	Panel (b)	1	226.23	2.4e-24*	-37.37*	-36.65*	-35.57*	0.351	/	212.37	3.4e-26*	-41.613	-40.89*	-39.81*	0.211	/
		2	48.643	3.3E-24	-37.07	-35.919	-34.19	0.306	/	73.27	3.50E-26	-41.63	-40.48	-38.75	0.211	/
		3	65.322	3.80E-24	-36.99	-35.40	-33.03	0.728	/	60.43	4.30E-26	-41.48	-39.90	-37.52	0.318	/
		4	82.452*	3.70E-24	-37.121	-35.10	-32.08	0.652	4	95.859*	3.50E-26	-41.78*	-39.766	-36.75	0.388	4
Table 2	Panel (c)	1	263.12	2.2e-24*	-34.62*	-33.77*	-32.51*	0.131	/	269.75	2.9E-26	-38.942	-38.01*	-36.61*	0.682	/
		2	89.976	2.5E-24	-34.52	-33.08	-30.92	0.128	/	110.81	2.6e-26*	-39.11	-37.58	-35.30	0.703	/
		3	84.336	3.30E-24	-34.34	-32.31	-29.27	0.226	/	91.031	3.20E-26	-39.02	-36.90	-33.73	0.917	/
		4	104.87*	3.60E-24	-34.432	-31.81	-27.88	0.127	4	109.51*	3.30E-26	-39.16*	-36.45	-32.40	0.186	4
Table 2	Panel (d)	1	294.53	1.7e-25*	-34.36	-33.19*	-31.46*	0.136	/	297.95	2.4e-27*	-38.61	-37.44*	-35.71*	0.601	/
		2	115.19	2.1E-25	-34.19	-32.26	-29.36	0.164	/	130.99	2.50E-27	-38.65	-36.71	-33.81	0.161	/
		3	96.366	3.80E-25	-33.79	-31.08	-27.02	0.480	/	121.69	3.20E-27	-38.57	-35.86	-31.80	0.326	/
		4	168.9*	3.20E-25	-34.4*	-30.83	-25.61	0.339	4	174.85*	2.50E-27	-39.1661*	-35.68	-30.46	0.546	4
Table 3	Panel (a)	1	140.85	6.00E-20	-30.07	-29.59*	-28.87*	0.197	/	174.31	4.9E-21	-32.58	-32.10*	-31.38*	0.872	/
		2	70.497	4.7E-20	-30.33	-29.547	-28.38	0.566	/	55.276	4.60E-21	-32.65	-31.87	-30.70	0.827	/
		3	40.187	5.50E-20	-30.20	-29.12	-27.50	0.387	/	82.055	3.2e-21*	-33.06	-31.97	-30.36	0.280	/
		4	84.331*	3.7e-20*	-30.64*	-29.26	-27.19	0.143	4	53.509*	3.20E-21	-33.09*	-31.72	-29.65	0.470	4
Table 3	Panel (b)	1	229.95	1.4e-25	-37.40	-36.47*	-35.08*	0.246	/	249.13	1.9E-26	-39.36	-38.52*	-37.25*	0.676	/
		2	132.28	9.2e-26*	-37.84*	-36.319	-34.04	0.076	/	123.27	1.40E-26	-39.69	-38.25	-36.09	0.468	/
		3	60.654	1.60E-25	-37.36	-35.23	-32.08	0.880	/	125.81	1.1e-26*	-40.05	-38.01	-34.97	0.631	/
		4	130.86*	1.30E-25	-37.786	-35.08	-31.02	0.214	4	108.12*	1.20E-26	-40.176*	-37.55	-33.62	0.088	4
Table 4		1	166.99	2.4e-24	-37.38	-36.74*	-35.76*	0.211	/	229.62	3.9E-25	-39.173	-38.525	-37.55*	0.638	/
		2	85.487	2E-24	-37.56	-36.474	-34.86	0.280	/	122.3	2.10E-25	-39.81	-38.73*	-37.11	0.287	/
		3	53.213	2.70E-24	-37.32	-35.80	-33.54	0.410	/	93.327	1.70E-25	-40.08	-38.57	-36.30	0.410	/
		4	127.93*	1.5e-24*	-38.03*	-36.08	-33.17	0.140	4	80.041*	1.7e-25*	-40.18*	-38.24	-35.32	0.636	4
Table 5		1	216.65	1.20E-28	-44.40	-43.56*	-42.30*	0.133	/	247.43	1.9E-29	-46.256	-45.331*	-43.9468*	0.368	/
		2	88.184	1.5E-28	-44.28	-42.847	-40.71	0.257	/	129.16	1.4e-29*	-46.65	-45.14	-42.87	0.351	/
		3	72.965	2.20E-28	-43.96	-41.94	-38.92	0.527	/	99.314	1.50E-29	-46.67	-44.56	-41.42	0.125	/
		4	164.44*	1.1e-28*	-44.80*	-42.19	-38.29	0.118	4	114.49*	1.50E-29	-46.876*	-44.18	-40.16	0.673	4

Notes: LR: sequential modified likelihood ratio statistic, Final Prediction Error (FPE), Akaike (AIC), Schwarz (SC) and Hannan & Quinn (HQ) criteria, LM: Lagrange multiplier tests.

CHAPTER III

Euro Area Growth Differentials

Diverging and Reinforcing Factors in a Minsky-Kaleckian SVAR Approach

Abstract

The aim of this paper is to disentangle the factors shaping and exacerbating growth differentials in the Euro Area between Southern and Northern countries. The Minsky business cycle theory and the Kaleckian five determinants of profits are used in the paper as the interpretative framework to disentangle the sources of divergence. According to a SVAR methodology, eight *diverging factors* and seven *reinforcing factors* were detected as the main drivers of the differentials. Hence, the two regions represent different economic structures and growth models, and this dichotomy, in turn, means that symmetric shocks have asymmetric effects, while asymmetric shocks reinforce the regional differences. An endogenous investment-growth feedback process and an investment-unemployment loop are mutually reinforcing mechanisms, which impair the production base and constrain future growth, so temporary shocks have long-lasting effects. Ultimately, the analysis emphasizes the need to rethink the European macro mechanism and the implementation of a common and shared European macro strategy that goes beyond national political interests, and inclusively pursues the same objective: convergence.

The problem of maintaining equilibrium in the balance of payments between countries has never been solved, since methods of barter gave way to the use of money and bills of exchange. During most of the period in which the modern world has been evolved and the autarky of the middle ages was gradually giving way to the international division of labour and the exploitation of new sources of supply by overseas enterprise, the failure to solve this problem has been a major cause of impoverishment and social discontent and even of wars and revolutions (J. M. Keynes, From a letter to Richard Kahn, 21 August 1941, 1980. p. 21).

1. Introduction

In a globalized world, trade imbalances are the very basis of recessions and expansions directly affecting corporate profits and thus business investments, and indirectly sustaining or reducing employment, i.e., household investment and consumption decisions.

It is then the country in the debtor position on the balance of payments, which is by hypothesis the weaker and above all the smaller in comparison with the rest of the world, that has to implement the restoration of equilibrium by changing its prices and wages. This compulsory adjustment consequently drives the debtor country to experience the negative side of the business cycle, resulting in higher level of unemployment, deflationary pressures, lower investments and weaker growth.

If this is not immediately counteracted by a means to sustain profits in the economy, such as government expenditure in the form of public investment and consumption, the outcome of the adjustment will not only be worse than expected but partially permanent, leading to a prolonged period of stagnation (Minsky, 1982) and giving rise to what is called the principle of hysteresis: current and future output is predetermined by previous economic conditions. According to Krugman "cumulative past output determines current productivity" (1987: 47). A locked-in path-dependent process is the unavoidable consequence.

This process is represented by the growth differentials the two regions of the Euro Area experienced in the aftermath of the 2008 Great Financial Crisis (GFC) until now. The Northern region - Germany, the Netherlands, Belgium, and Austria - enjoyed a strong recovery and low levels of unemployment, while the Southern region - France, Italy, Spain, and Portugal[1] - experienced double-digit unemployment rate, and slower growth. Although the creation of the common currency aimed at greater trade integration among Euro Area members, the benefits were mainly in one direction for

various reasons (Belke and Dreger 2013; Chen et al. 2012; Kollmann et al. 2015). After the crisis, the initial hope of the Euro triggering rapid economic convergence turned into widespread social and political discontent towards the rules and architecture of the common currency, thereby echoing Keynes's words.

Blanchard et al. (2015) showed that temporary shocks have long-lasting consequences on potential output, arguing for an active and quick response to detrimental shocks. DeLong and Summers (2012) and Fatàs and Summers (2015) investigated the impact of fiscal measures on the economic performance of the Southern region, suggesting that austerity policies are self-defeating tools, and that active countercyclical stabilizers are necessary to prevent the divergence widening. Other researchers (Eichengreen 2010; Lane and Milesi-Ferretti 2010; Stockhammer 2011a) studied the imbalances within the Euro Area by focusing on the virtuous Northern savings versus the over-indebtedness of the Southern region. Shambaugh (2012) analysed the interdependence of the growth, sovereign, and banking crisis, mutually reinforcing events. Ginzburg et al. (2013), and Naastepad and Storm (2015) recommended a European industrial policy to rebalance internal trade and enable Southern region productivity to catch up with the core. Recently, following the theoretical framework of Badhuri and Marglin (1990), Stockhammer (2011a; 2011b; 2015), Naastepad and Storm (2017), and Covi (2017) have investigated the role played by asymmetric wage shocks in a monetary union, and their effects on the demand and growth regime. The factors highlighted in the literature reflect different points of view and provide complementary explanations of the crisis and its consequences. Nevertheless, they are all connected to one topic: intra-EMU differentials are the outcome of an incomplete system (O'Rourke and Taylor 2014; Padoan 2015; Pasimeni 2014), whose flaws were made obvious by the 2008 GFC and subsequent European sovereign-debt crisis. The macro-system allowed and fostered the creation of opposing economic structures among Euro Area members: a deficit and a surplus region. Hence, Euro Area imbalances are the result of opposing growth strategies (Stockhammer 2015), which in turn reflect different economic structures. Surplus countries benefited from the growing indebtedness of deficit countries, which, with wage-led demand regimes (Covi 2017), experienced faster growth in investments and consumption during the pre-crisis period.

The paper contributes to this view by identifying and comparing the characteristics of both economic structures, by assessing a region's ability to respond to shocks, and, in light of empirical evidence, by discussing the processes that tend to exacerbate

divergence. Hence, the stylized facts underline that the two regions experienced remarkably different shocks to private investments in the aftermath of the crisis. This asymmetry was treated with the same remedy - austerity measures - leading to the opposite outcome in the two regions. In light of the four Kaleckian determinants of profit, this paper investigates the factors affecting Euro Area business cycle fluctuations, and how the economy responds to shocks from each of them. Although, it is well-known that asymmetric shocks within a currency area are important sources of economic fragility (Mundell 1961; Obstfeld 1997; De Grawue 2007), symmetric shocks may have a destabilizing outcome if the endogenous response of the economy differs between countries. For this purpose SVAR methodology estimates are compared in the two regions in order to categorize the asymmetric responses to common shocks. The results are then divided into two sets of factors - diverging and reinforcing. The former set refers to factors asymmetrically affecting the two regions, leading to divergence in the event of a common shock. The latter set refers to factors that produce common effects in the two regions, leading to divergence in the event of asymmetric shocks. Clearly, Euro Area members have undergone both asymmetric and symmetric shocks during the last decade, and the heterogeneity in their responses and lack of a common EU macro-strategy ended up reinforcing divergence.

The categorization of symmetric and asymmetric responses in Euro Area countries is the empirical contribution of the paper, and the interpretation of shocks as self-reinforcing/self-defeating mechanisms is the theoretical contribution. An investment-growth feedback process and an investment-unemployment loop work as amplifiers of the business cycle. The responses of corporate investments to an export shock shows the need for an automatic rebalancing mechanism able to offset trade imbalances and bring the two regions back to a convergence path. As persistent latent factors, these temporary shocks render divergence self-reinforcing, i.e., produce a larger gap in output between Northern and Southern Euro Area members, a lower level of capital formation, and ultimately, lower export volumes in the South. By impulse responses analysis, these factors can be mutually reinforcing, and are exacerbated by higher levels of unemployment, which in turn constrain growth (Blanchard and Summers 1986; Badhuri and Marglin 1990; Stadler 1990).

Clearly, the combination of shocks, differences in economic structure, and amplifying forces reinforce divergence, making the Southern region more inward-looking and domestic-demand driven, and the Northern region more reliant on the performance of

exports. Ultimately, the paper argues that the Southern region cannot rely exclusively on fiscal spending to overcome domestic demand crises, and that a deeper rethink of European macro-architecture is needed in light of the current divergence.

Section 2 presents the theoretical framework to interpret the stylized facts on which the empirical analysis is grounded. Section 3 presents the most important patterns of growth differentials. Section 4 describes the empirical methodology and discusses the results of the impulse response functions analysis. In light of the empirical evidence, section 5 sets out policy implications, and compares them with proposals in the literature. The last section concludes.

2. The Four Determinants of Profits

Rather than the standard approach used in the neo-classical synthesis, where profits are determined by technology through the production function, Kalecki tries to address the question of how the volume of profits is determined in the economy deriving it from national accounting identities, as follows (Kalecki 2010: 49):

$$\pi \equiv I + DF + BPS - SW + C\pi$$

Gross profits net of taxes - the left hand side of the equation - are equal to gross private investment (I), plus budget deficit (DF), plus the balance of payments surplus (BPS), minus savings out of wages (SW), plus consumption out of profits (Cπ)[2]. As we can see, two variables positively enter into the equation - private investment and budget deficit - one negatively - saving out of wages - and one may be positive or negative depending on the country's balance of payments. Theoretically the algebraic sum of these components determines the volume of profits in the economy. A volatile profit index leads to larger amplitude of the business cycle, and may trigger recession as well as expansion depending on its size and growth rate. According to Kalecki, any change in investments unequivocally affects profits by the same amount, and expected profits determine the current investment magnitude. Therefore the key variable driving the variation of the index and its volatility is private investment, which is also the only one able to increase the production capacity of the economy and to reduce the unemployment rate (Minsky 2008; Stockhammer 2011b).

On the other hand, the budget deficit is the only source of profits completely under government control. This is an essential feature in times of crisis since controlling the

level of profits can prevent a deep recession. By giving incentives to households and corporations, the investment volume may be sustained despite the discouraging unstable business conditions. As Minsky emphasizes, 'big governments' are *necessary* to prevent a shortfall of investments from triggering an interactive debt-deflation process (Minsky 1982: 201).

The third variable - a balance of payments surplus - increases current profits by the same amount, if and only if, all the other determinants of profits remain unchanged. For example, if an export-oriented sector undergoes an increase in export volumes and the excess of cash flow is neither invested nor consumed but is sterilized by a higher level of savings, current profits do not increase. On the contrary, if the export revenues are invested to enlarge the production base or are used to buy consumption goods in the domestic market, current profits increase more than proportionally through the positive multiplier effect, common to all the variables in the Kalecki identity[3]. It is important to note that an excess of imports over exports, i.e. a trade deficit, has a negative impact on the profit level and therefore on investments. During the sixteenth century the mercantile doctrine rooted its policy precisely on this principle. A trade deficit was seen as the main source of economic fragility since it decreases the amount of available resources in the domestic market, and therefore its level of output and employment, ultimately leading to an adjustment of living standards. For this reason, the mercantile approach uses currency devaluations, import tariffs and export subsidies as remedies to counteract a persistent trade deficit. As Minsky says, "whether a full-fledged financial crisis takes place depends upon…whether gross profits are sustained by an increase in the government deficit or changes in the balance of payments" (Minsky 1982: 108). According to him, the creation of a trade surplus in the aftermath of a financial crisis may prevent the economy from falling into a deep recession by sustained profits. Therefore, a trade surplus plays a crucial role similar to a budget deficit in sustaining profits. On this point, Kalecki states that:

The capitalists of a country which manages to capture foreign markets from other countries are able to increase their profits at the expense of the capitalists of the other countries…. The counterpart of the export surplus is an increase in the indebtedness of the foreign countries towards the country considered…. The counterpart of the budget deficit is an increase in the indebtedness of the government towards the private sector…. The above shows clearly the significance of 'external' markets (including those created by budget deficits) for a capitalist economy…. It is the export surplus and the budget deficit which enable the capitalists to make profits over and above their own purchases of goods and services (Kalecki 2010: 51).

Ultimately savings out of wages - the fourth determinant - may have a positive or a negative impact on the profit index depending on whether its growth rate is negative or positive. Building up savings is a successful strategy on the positive side of the cycle, so when the business cycle turns negative, the economy is well prepared. This may act as a perfect countercyclical tool to avoid the overheating of the economy. On the other hand, if this good behaviour takes place on the negative side of the cycle, it can simply magnify the distress in the economy and drag down the profit index, giving rise to what has been called the paradox of deleveraging. Together, the four determinants of profits determine the boom and bust cycles.

This business cycle theory concerns the path-dependent process that directly derives from the endogenous character of the investments cycle and the role of profits in shaping investment opportunities; this is the interpretative framework on which the empirical analysis below is grounded. In this respect, the paper aims to disentangle the feedback processes existing among the determinants of profits and the growth rate of the economy, and between investments and the unemployment rate, i.e., the region's capability to respond to shocks.

3. Stylized Facts

In order to construct the profit index the following proxies for the four determinants of profits are used[4]:

I: Gross Fixed Capital Formation

DF: Government Expenditure[5]

BPS: Current Accounts

SW: Gross Household Savings

As can be seen in figure 1, the profit index is quite volatile, ranging between 30% and 40% of GDP. The first consideration is that heterogeneous economic structures exist in each economy, and a country may have found its own balance although it differs remarkably at the level of profits as a share of GDP. The type of equilibrium depends upon the intrinsic features of the economy, and it can be divided into two types of growth model: a profit-led growth and a wage-led growth (Badhuri and Marglin 1990; Lavoie and Stockhammer 2013; Stockhammer and Onaran 2013).

Insert about here **Figure 1**

Profit Index at Country Level

What matters is not the absolute value of the index, but its growth above the growth rate of the economy, and how investments respond to an increase in the four determinants of profits. Consequently, this paper addresses the question by pooling together core Euro Area countries with common growth strategies. The analysis is based on the categorization developed in Stockhammer and Wildauer (2016) and further investigated by Covi (2017). In this conceptual framework, France, Italy, Spain, and Portugal comprise the Southern region with debt-led growth and a wage-led demand regime, whereas Germany, Netherlands, Belgium, and Austria comprise the Northern region characterized by export-led growth and a profit-led demand regime. These two sets were initially put forward given the opposing pattern of the trade balance - the third determinant of profit - for which the former group has a deficit and the latter a surplus. According to this definition, figure 2 shows the evolution of the profit index at the region level[6].

*Insert about here **Figure 2***

Figure 2: The Profit Index

As is clear, up to 2003, the Southern region outperformed the Northern region profit index by 2% of GDP. However, from 2003 on, the Northern outpaced the Southern region. During the boom period preceding the financial crisis the gap was 2-3 percentage points of GDP, whereas in 2016 and during the period 2009-2011, it reached 5%. Moreover, the real gap is even larger, since the increase of the profit index in the aftermath of the financial crisis in the Southern region was due to falling GDP, i.e., a decrease in the denominator.

In order to understand what drives the profit index, its determinants need to be looked at on the disaggregated level, as shown in figure 3. It is evident that investments in the Southern region underwent a boom period, increasing from 21.5% of GDP to a peak of 24% in Q4-2007. Nevertheless, as the crisis hit, investments fell sharply, reaching a level 2% of GDP lower than in 2000. Clearly, investments in the Southern region have yet to recover, while in the Northern region they grew at the same pace as GDP, remaining flat as a share of GDP over the entire period. According to Minsky's theory, government expenditure should have expanded as much as the fall in investments, but didn't, only increasing by 2% of GDP, not enough to counterbalance the 4% fall in investments. On the contrary, in the Northern region, government expenditure increased more than proportionally than the fall in investments. On top of that, the third

determinant of profit - current account - underwent an asymmetric pattern, working as an amplifier of the profit index in the North and as profit-drainer in the South. Only in 2016 did the current account of the South achieve an overall surplus, after fourteen years (2000-2013) of chronic deficit. Nonetheless the differential with the Northern region is still wide. Although it has decreased since the 2008 peak of 10% of GDP, it still stands at 7%. This is a key point for the analysis since it is the driving force of the large divergence in the profit index between the two regions. Moreover, given the fact that expected profits are the incentives needed to stimulate current investments, this may only further widen the gap in growth potential between the two regions, increasing the likelihood of self-reinforcing divergence.

Insert about here **Figure 3**

Evolution of the Four Determinants of Profits

Finally, savings out of wages decreased by 1-1.5% over GDP in the Southern region, sustaining the profit index but not enough to keep consumption stable after the crisis, with a decrease of 5% in its aftermath. In contrast, savings in the Northern region remained stable over GDP, and this is consistent with the growing pattern of private consumption, which did not undergo a fall after the crisis.

Figure 4 shows the causes of the collapse in investments by private non-financial corporations and households. First of all, corporate investments account for half of the overall investment volume, while household investments account for one-third[7]. For the former, the fall after the crisis was steeper in the South than in the North; moreover, in the Northern block corporate investments recovered faster than in the South, although both remained below the pre-crisis peak. In contrast, household investments had the opposite pattern: boom and bust in the South, flat in the North. Clearly, the inverse-U pattern in the South resembles the pattern in overall investments, suggesting that household investment was - à la Minsky - a non-negligible driver of the investment cycle.

Insert about here **Figure 4**

Investment Decomposition

The stylized facts presented here and the existing relationships between the four determinants of profits and business cycle fluctuations caused the large divergence in the capacity of the economy to produce and create employment. As figure 5 shows, the gap in GDP growth since the crisis kept on widening, reaching almost 7% in 2016.

Clearly, the Southern region has yet to recover the pre-crisis peak in output, while the North achieved this in just a few years. The second divergence is related to the unemployment level, which is 7.5% higher in the South than in the North. The point is not when the unemployment rate returns to the pre-crisis level, but whether, due to the loss in production capacity, it has become a structural feature of the Southern region, creating a new equilibrium (Ginzburg et al. 2013). Hence, the primary question is whether these two diverging patterns are self and mutually reinforcing, that is, current forces in place may work for divergence and not against it. Household investment in the Southern region seems to strongly depend on the state of the economy, and unemployment appears to be an amplifier of the business cycle, reinforcing the boom and exacerbating the bust. By analysing the structural differences between unemployment in Europe and USA, Blanchard and Summers argued that "long-run equilibrium depends on history…and that identifying the circumstances under which persistence is likely to arise is crucial" (1986: 71). For this purpose, in the following paragraph a SVAR methodology attempts to estimate these forces in order to compare them in the two regions and clarify the nature of the massive divergence.

Insert about here **Figure 5**
The Divergence

4. Empirical Analysis: Evidence from a SVAR Approach

This section presents two benchmark SVAR models to assess the impact of each of the four determinants of profits on GDP growth and the unemployment rate. Hence I quantify the different responses in the two regions to each determinant. The results of the empirical analysis   show whether the two blocks have significant structural differences in their economies, providing further evidence for an ineffective European 'one size fits all' growth strategy and macroeconomic policy. Additional variations to the benchmark models highlight specific traits, which may have triggered the divergence process discussed in the stylized facts. Finally the results are divided into two categories: *diverging factors* and *reinforcing factors* in order to identify the precise channels through which divergence commences, and subsequently self-reinforces. Albeit with different specifications, the model set-up resembles one proposed by Stockhammer and Onaran (2004; 2005). Furthermore, following critiques of Stockhammer (2017), the benchmark model has been enhanced with additional control variables which, according to the literature, may be important sources of omitted

variable bias. Robustness checks are performed in section 4.6.

4.1 Data

The sample period for analysis is from Q1-1999 to Q2-2015, with quarterly and seasonally adjusted data. The Southern region comprises France, Italy, Portugal, and Spain, and the Northern region Austria, Belgium, Germany and the Netherlands. Next, all the variables are in first differences to overcome the problem of non-stationary time series, since unit roots tests indicate that they are I(1). Table A in the statistical appendix summarizes the result of an augmented Dicky-Fuller test. I decompose the balance of trade into exports (EX) and imports (IM) following Beetsma et al. (2011), so as to better assess the responses of the four determinants of profits. Thus, the variables of interest for the benchmark model are investments, government expenditure, exports, imports, and savings out of wages. This set of variables represents the core specification of the two econometric models dealing with the determinants of business cycle fluctuations, GDP growth and the unemployment rate, respectively specification 1 and 2. Moreover, using alternative model specifications, investments are decomposed into corporate investments (CI), and household investments (HHI)[8]. Finally, Unit labour cost (ULC) is included as an endogenous variable in specification II. Table B in the statistical appendix shows summary statistics for all the variables.

4.2 Empirical Model

The benchmark specification investigating the business cycle - model 1A - is a four-variable SVAR which includes investments, exports, imports, and the gross domestic product as endogenous variables, while government expenditure is initially treated as an exogenous variable[9]. Additional specifications are then developed for this model:

• Model 1B further develops model 1A by adding savings out of wages to the set of endogenous variables.

• Model 1C further develops model 1A by adding the imports of the other region to the set of endogenous variables.

• Model 1D decomposes investments into the private non-financial sector and household investments.

The benchmark specification for the unemployment cycle - model 2A - is a four-variable SVAR. It includes unit labour costs, investments, exports, and the unemployment rate as endogenous variables, while government expenditure is treated initially as an exogenous variable[10]. An additional extension is as follows:

• Model 2B decomposes investments into the private non-financial sector and household investments.

Thus, the endogenous variables depend on current and past values and on the current value of the exogenous variable:

$$y_t = \mu' x_t + \sum_{i=1}^p A_i y_{t-1} + \varepsilon_t \qquad or \qquad A(L) y_t = \mu' x_t + \varepsilon_t \qquad (1)$$

where y_t and x_t are the vector of endogenous and exogenous variables, respectively. To this respect, $A_p \sim$ with i = 1,..., p is the coefficient matrix, and ε_t a vector of structural shocks with diagonal variance matrix $\sum_\varepsilon = E(\varepsilon_t \varepsilon'_t)$. A structural model assumes that the one-step-ahead prediction errors ε_t from a statistical model can be thought of as linear functions of the structural shocks u_t. The model referred to is the AB-model developed by Amisano-Giannini (1997).

$$\varepsilon_t = y_t - E(y_t | F_{t-1}) \qquad and \qquad A\varepsilon_t = B u_t \qquad (2)$$

The objects of estimation are the square matrices A and B - equation 2. Their estimation is carried out by maximum likelihood. The off-diagonal elements of the impact matrix A contain the contemporaneous effects of structural shocks on the endogenous variables.

Lags of the endogenous variables are included according to the Akaike Information Criterion (AIC) and Final Prediction Error (FPE) since in a small sample they more often select the correct specification and are designed to minimize forecast error variance (Lütkepohl 2005)[11].

4.3 Identification Strategy

For the estimation of the structural parameters, we need to define $C = A^{-1} B$ and impose some restrictions on matrices A and B in order to have a unique local maximum in the log-likelihood:

$$\mathcal{L} = const - \ln(C) - 0.5 * tr(\hat{\Sigma}(CC')^{-1} \qquad (3)$$

In this system, the number of unknown parameters is larger than the number of independent equations. We need additional information to identify the unknown parameters on the right-hand side. For this reason $2K^2 - \frac{K(K+1)}{2}$ restrictions have to be placed, where K is the number of equations in the system[12].

First, structural shocks are uncorrelated, i.e. the off-diagonal entries in B are zero. This assumption is standard in structural VAR modelling. Second, normalization restrictions

together with a Wold causal ordering (recursive structure), for matrix A, provide the $K(K+1)/2$ necessary restrictions to uniquely identify the structural shocks and impulse-responses as in the case of a just-identified SVAR. This set of restrictions also ensures just-identified IRFs, which are qualitatively the same as the orthogonalized IRFs based on a Cholesky decomposition of the variance-covariance matrix of the reduced form VAR disturbances[13].

Once estimation is completed, and after having checked for the stability of the VAR, $\hat{A}$ and $\hat{B}$ can be used to compute the structural VMA representation. If the matrix polynomial $A(L)$ in eq. (1) is invertible, then y_t can be written as[14]:

$$y_t = A(L)^{-1}\varepsilon_t = \Theta(L)\varepsilon_t + \Theta_1\varepsilon_{t-1} + \cdots \tag{4}$$

which is known as the VMA representation of the VAR.

Moreover, this strategy allows to place some additional short run constraints - in addition to the traditional recursive structure - to help improve the estimation of the structural impulse-response functions (SIRFs). The additional constraints imposed are tested as over-identifying restrictions by implementing a Likelihood Ratio (LR) tests.

4.4 Estimation Stage

The aim of this estimation stage is to specify an underlying VAR model containing all necessary right-hand side variables and as parsimonious as possible since the model quickly runs out of degrees of freedom (Stokhammer and Onaram 2004); a model which could also help us to improve the accuracy of the implied impulse-responses. For this purpose, the sequential elimination of regressors procedure as suggested by Brüggemann et al. (2003) and Lütkepohl (2005) is implemented. The procedure involves testing zero restrictions on individual coefficients (to eliminate lags of variables in the underlying VAR) in each of the model equations. At each step of the procedure a single regressor was sequentially eliminated in one equation if its corresponding P-value was higher than 0.1. This reduces the parameter space and thereby improves the estimation procedure.

Over-identifying restrictions on the matrix of contemporaneous effects A were determined following a procedure similar to the *sequential elimination of regressors*. These additional zero restrictions correspond to setting elements a_{ij} in the A matrix equal to 0. It is important to note that the sequential elimination procedure is implemented to improve the confidence bands of the impulse response analysis, to increase the significance of the remaining parameters, and to improve identification of

the relationships between the endogenous variables, given the small data sample[15].

4.5 Model 1 - Business Cycle

We start by analysing the simultaneous causal relationships between the endogenous variables for the benchmark model 1A. The order of the model is 1, and was chosen according to the results of the AIC and FPE shown in the statistical appendix - Table 2A. Then 4 and 9 insignificant regressors were eliminated in the model for the Northern and Southern block respectively. Next, a Jarque-Bera test is carried out to check the normality of the residuals, as well as a lagranger-multiplier test for auto-correlation at lag order 4, and the test for the eigenvalue stability condition, shown respectively in table 1B, 1C, and figure 1A in the statistical appendix. After having controlled for the residuals analysis, I estimate a just-identified structural VAR and subsequently an over-identified VAR if contemporaneous effects of matrix A are not statistically significant.

4.5.1 Identification Scheme

The Cholesky decomposition implicitly imposes specific restrictions on the contemporaneous responses of the endogenous variables to structural shocks. In particular, given the order of the endogenous variables, the identification scheme assumes that $[I]$ affects contemporaneously all variables $[EX\ IM\ GDP]$, $[EX]$ contemporaneously affects $[IM\ GDP]$, while $[IM]$ affects only the $[GDP]$.

The economic rationale for identification of the shocks comes from Minsky's business cycle theory, which states that causation 'runs from investment to profits'. Therefore, investment decisions affect in advance all the other decisions such as exporting and importing, and fluctuations of GDP are the outcome of this process. A more technical justification concerns the proxy used for investments. Gross fixed capital formation is an indicator that comes after the investment has been made, since capital formation is the outcome of the investment decision. Next, exports come before imports since higher profits may be offset by a higher consumption of foreign goods, i.e., higher imports[16]. GDP is last in the order since it is the response-variable of interest. In addition, it is important to note that, the ordering of the variables after $[I]$ does not affect the responses to an investment shock - the first variable in the Cholecky ordering - whereas it may affect the impulse responses of the remaining variables (Christiano et al. 1999)[17].

4.5.2 Impulse Responses and Discussion

The upper part of table 1D - statistical appendix - shows the estimated direct causal

effects of an identified SVAR to a structural shock of one standard deviation (in columns) on the endogenous variables (in rows), keeping all other variables constant. It summarizes the C matrix - the Cholesky - and the inverse A matrix[18]. The lower part of the table shows the overall causal effects of an over-identified SVAR[19]. For each region, figure 6 shows the estimated impulse response function for GDP to a one standard deviation shock to [I EX IM]. Each row represents the estimates for the Northern and Southern Models, respectively. The chosen time period is 8 quarters (2 years), i.e., short-term business cycle fluctuations according to the Misnky interpretive framework.

Regarding the relation between [EX] and GDP, as well as [I] and GDP, both the direct and the overall effects are positive in both regions. It is important to note that - as expected from the stylized facts analysis - a standard deviation shock to exports produces a positive effect on GDP twice as large as in the Northern region than in the Southern region. Precisely, a one standard deviation shock to exports has a direct contemporaneous impact on GDP growth of 0.4% in the Northern region and 0.2% in the Southern region. This can be called the *first diverging factor*.

The contemporaneous relationship between [IM] and GDP is negative in the Northern region, while neutral in the South. This partly confirms the idea that higher imports negatively affect profits and therefore GDP growth[20]. Another important fact that has to be highlighted from figure 6 is that a unit shock to investments increases GDP growth by 0.4% and 0.3% in the Northern and in the Southern region, respectively. This is the *first reinforcing factor*.

*Insert about here **Figure 6***

Model 1A - Orthogonalized and Structural Impulse Responses of GDP to an Export, Investment and Import Shock.

Figure 7 portrays a standard deviation shock to [EX], which increases [IM] by almost 1% in both regions. In contrast, a positive shock to[EX] has a completely different effect on [I] in the two blocks, respectively leading to a 0.6% increase in the Northern region and 0.2% in the South. This channel - higher exports, larger gross fixed capital formation - clearly reinforces the productive base of a country and its future growth potential, creating a source of path-dependence, and reinforces divergence. This is defined as the *second diverging factor*.

*Insert about here **Figure 7***

Model 1A - Orthogonalized and Structural Impulse Responses to an Export Shock.

Figure 8 shows SIRFs for a unit standard deviation shock to GDP. As can be seen, it affects investments and imports in both regions in the same manner, i.e., it leads to a 0.4% increase. This provides evidence for a feedback-process between investments, GDP growth and investments, that may lead to a self-reinforcing mechanism of boom and bust cycles as clearly described by Minsky. This is the *second reinforcing factor*.

*Insert about here **Figure 8***

Model 1A - Orthogonalized and Structural Impulse Responses to a GDP Shock.

By extending the benchmark model 1A to include savings out of wages, two additional structural characteristics can be assessed: the short-run negative impact on GDP growth and the retaining profit behaviour after an export shock.

Figure 9 shows the SIRFs for model 1B[21]. A positive shock to savings out of wages negatively affects GDP growth as stated by Minsky. It directly constrains private consumption expenditure. To be precise, a standard deviation shock to [Sw] decreases GDP by 0.05% in the North and by 0.08% in the South. Furthermore, a standard deviation shock to [EX] leads to a 3.5% increase in [Sw] in the Northern region, and a 1% increase in the South (figure 14). Both the magnitude and the persistence of the shock are stronger in the Northern block. This shows the retaining profit behaviour of Northern export-led economies, and is the *third diverging factor*.

*Insert about here **Figure 9***

Model 1B - Orthogonalized and Structural Impulse Responses of GDP to a Saving Shock (First Raw) and of Savings to an Export Shock (Second Raw).

Another extension that can be made is to see how a shock to imports in one region impacts GDP and exports in the other region[22]. Figure 10 shows the impulse responses of model 1C. As can be seen, a unit shock to the imports of the Southern region leads to a 0.3% GDP increase in the Northern region; vice versa a unit shock to imports of the Nordic region leads to a GDP increase by 0.1% in the Southern region. This is defined as the *fourth diverging factor*.

*Insert about here **Figure 10***

Figure 10: Model 1C - Orthogonalized and Structural Impulse Responses of GDP to Import Shock of the Opposite Block.

The last model specification developed is the decomposition of investments between corporate investments (CI) and household investments (HHI). Table 1E, 1F, 1G, 1H and figure 1E in the statistical appendix show respectively the selection order criteria, normality test, autocorrelation test, the estimated direct causal effects, and the

eigenvalue stability condition of the SVAR model as previously described for the benchmark model 1A.

For each region, figure 11 shows the estimated impulse response function of GDP to one standard deviation shock to [CI, EX, HHI , IM]. Each row represents the estimates for the Northern and Southern Model, respectively. As can be seen, a unit shock to CI leads to a 0.3% increase in GDP in the Northern region and a 0.1% increase in the Southern region. Moreover, a unit shock to household investments has a small positive impact on GDP in the Northern region, which dies out after the first quarter; in contrast, the response of the Southern block has a slightly larger but especially more persistent effect. These two effects are defined as the *fifth diverging factor*.

Insert about here **Figure 11**

Model 1D - Orthogonalized and Structural Impulse Responses of GDP to a Shock to Corporate Investments, Exports, Households' Investment and Imports.

In addition, figure 12 shows the responses of [CI] and [HHI] to a unit shock to [EX]. The effects are similar in the two regions, respectively 1.5% for [CI] and 0.5% for [HHI]. Vice versa, a unit shock to [CI] leads to an equal 0.7% increase in exports in both regions (figure 13). These effects together are defined as the *third reinforcing factor*. These estimates corroborate the findings of figure 7, and provide additional evidence in favour of Ginzburg et al. (2013), i.e., the rebalancing of trade flows between northern and southern countries can only take place with the strengthening of the Southern production base.

Insert about here **Figure 12**

Model 1D - Orthogonalized and Structural Impulse Responses to an Export Shock.

Insert about here **Figure 13**

Model 1D - Orthogonalized and Structural Impulse Responses to a Corporate Investment Shock.

A unit shock to GDP leads to a stronger and more persistent increase in corporate and household investments in the Southern block (figure 14). This reflects a more inward-looking domestic demand-driven posture in the Southern region than in the North. This result is consistent with the degree of openness in the two regions, the South relatively more closed than the North, as well as with their demand-regimes, respectively wage-led and profit-led (Covi, 2017). This is the *sixth diverging factor*.

Model 1D - Orthogonalized and Structural Impulse Responses to a GDP Shock.

4.6 Model 2 - Unemployment Cycle

The aim of this model specification is to assess whether unemployment works as an amplifier of the business cycle as already argued by Naastepad and Storm (2015) and Ginzburg et al. (2013). For this, as Blanchard and Summers say, a deep understanding of the circumstances of its (unemployment) creation and growth (1986: 71) is required. We start by analysing the contemporaneous causal relationships between the endogenous variables for the benchmark model 2A. The order of the model is 1. It was chosen according to the results of the AIC criteria set out in the statistical appendix - Table 2A. Insignificant regressors 4 and 7 were eliminated respectively in the model for the Northern and Southern region. A Jarque-Bera test was performed to check for normality of the residuals, followed by a lagranger-multiplier test for autocorrelation at lag order 4, and the test for the eigenvalue stability condition, shown respectively in tables 2B, 2C, and figure 2A in the statistical appendix. After controlling for the residuals analysis, I estimate a just-identified structural VAR and subsequently an over-identified SVAR if contemporaneous effects of matrix A are not statistically significant.

4.6.1 Identification Scheme

The Cholesky decomposition implicitly imposes specific restrictions on the contemporaneous responses of the endogenous variables to the structural shocks. In particular, given the order of the endogenous variables, the identification scheme assumes that $[I]$ contemporaneously affects $[ULC\ EX\ Ur]$, $[ULC]$ contemporaneously affects $[EX\ Ur]$, while $[EX]$ contemporaneously impacts $[Ur]$. The identification of the shocks is anchored to the rationale of model 1A. In addition, unit labour costs enter as the second variable in the Cholesky order since it is assumed that higher unit labour costs simultaneously reduce exports, while higher investments should increase productivity and therefore decrease unit labour costs[23].

4.6.2 Impulse Responses and Discussion

The upper part of Table 2D - statistical appendix - shows the estimated direct causal effects of a just-identified SVAR to a structural shock of one standard deviation (in columns) on the endogenous variables (in rows), keeping all other variables constant. It summarizes the C matrix - the Cholesky - and the inverse A matrix. The lower part of the table shows the overall causal effects of an over-identified SVAR[24]. As can be

seen in figure 15, a standard deviation shock to [*I*] decreases the growth rate of unemployment by 0.4% in the Northern region and by 1.1% in the South. Conversely, a unit shock to unemployment decreases the growth rate of [*I*] in both regions by 0.2%. Nevertheless, clearly both effects have a stronger persistence in the Southern region, since the SIRF returns to 0 only after 8 quarters and after 2 quarters in the Northern region. These effects can be defined respectively as the *seventh diverging factor* and the *fourth reinforcing factor.*

<center>*Insert about here* **Figure 15**</center>

Model 2A - Orthogonalized and Structural Impulse Responses of the Unemployment rate to Investments Shock (First Raw) and of Investments to an Unemployment Shock.

Another important fact that needs to be highlighted is the role played by unit labour costs. A unit shock to [*ULC*] increases the growth rate of unemployment by 0.7% and 0.9% in the Southern and Northern regions , and the growth rate of exports (figure 16) by 0.8% and 1.1% respectively.

<center>*Insert about here* **Figure 16**</center>

Model 2A - Orthogonalized and Structural Impulse Responses to a Unit Labour Cost Shock.

In the next and last model specification, [*I*] is decomposed into corporate investments (CI) and household investments (HHI). Table 1E, 1F, 1G, 1H and figure 1E - statistical appendix - respectively show the selection order criteria, normality test, autocorrelation test, the estimated direct causal effects, and the eigenvalue stability condition of the SVAR model as previously described for model 2A.

For each region, figure 17 shows the estimated impulse response function of unemployment to a [*CI*] and [*HHI*] unit standard deviation shock, and vice versa. Each column represents the estimates for the Northern and Southern model respectively. Clearly, a unit shock to corporate investments (CI) decreases the unemployment growth rate in both regions by almost 0.5%; vice versa a unit shock to the unemployment growth rate decreases corporate investments by 0.4% (figure 17). This is the *fifth reinforcing factor.*

<center>*Insert about here* **Figure 17**</center>

Model 2B - Orthogonalized and Structural Impulse Responses of the Unemployment rate to a Unit Corporate Investment Shock (First Raw) and of Corporate Investments to an Unemployment Shock (Second Raw).

In addition, a positive shock to household investments (HHI) does not have any effect

on unemployment in the Northern region and a negative effect of almost 0.2% in the Southern region; vice versa a unit shock to the unemployment growth rate decreases household investments by 0.5% in the Southern region, and has no effect in the Northern region (figure 18). In this case, the economic impact on the two regions is remarkably different, and is defined as the *eighth diverging factor.*

Insert about here **Figure 18**

Model 2B - Orthogonalized and Structural Impulse Responses of the Unemployment rate to a Unit Household Investment Shock (First Raw) and of Household Investments to an Unemployment Shock (Second Raw).

Finally, the focus shifts to the role of unit labour costs in affecting exports and the unemployment rate. A unit shock to [ULC] increases the growth rate of unemployment by 0.8% in both regions, and decreases the growth rate of exports respectively by 1,.2% and 0.9% in the Northern and Southern region (figure 19). This is the *sixth reinforcing factor.*

Insert about here **Figure 19**

Model 2B - Orthogonalized and Structural Impulse Responses to a Unit Labour Cost Shock.

4.7 Robustness Analysis

In this section, model specifications 1A and 2A are augmented by including in the set of endogenous variables: government expenditure [G], long-term interest rate [$LTIR$], and the real effective exchange rate [$REER$]. Furthermore, the estimates are provided for 12 quarters ahead, so as to better appraise the persistence of the impulse response functions. The ordering of the variables does not change from model 1A. Precisely, the Cholesky order is the following: [$I\ G\ EX$ IM GDP LTIR REER]. [I] has a contemporaneous effect on [$G\ EX$ IM GDP LTIR REER], and so on. Moreover, in line with the sequential elimination of regressors implemented in the previous models, over-identified SVAR structural impulse response functions are estimated by setting elements a_{ij} in the A matrix equal to 0 when the corresponding p-value is higher than 0.1. According to this, the simultaneous impact of [I] on [G], which is not statistically significant, is set at 0. Nevertheless, the estimates of the orthogonalized impulse responses - unconstrained by definition - match the estimates of the structural impulse responses. Both are shown in the statistical appendix - figure 3A, 3B, and 3C. Overall, the inclusion of these additional control variables does not change the previously obtained results. Concerning the augmented model 2A, the endogenous variables added

are: [G IM LTIR REER]. Moreover, as a robustness check, ULC now enters the set of endogenous variables first. This allows the robustness of the estimates to the variable ordering to be tested. Accordingly, the new set of contemporaneous effects is: [*ULC I G EX* IM Ur LTIR REER]. The results are consistent with the previous model specification and are shown in figures 3D and 3E in the statistical appendix.

Finally, since the second determinant of profits - government expenditure - now enters the equation system as an endogenous variable, we can assess the impact of a unit standard deviation shock to G on investments and gross domestic product. Figure 20 shows the cumulative impulse responses[25].

<div align="center">Insert about here Figure 20</div>

<div align="center">Model 1A - Cumulative Orthogonalized Impulse Responses to a Government Expenditure Shock.</div>

Clearly the effect of a government expenditure shock on both investments and GDP is similar in the two regions. To be precise, after 12 quarters they increase by 0.8% in the Southern region and by 0.7% in the Northern region. This can be defined as the *seventh reinforcing factor.*

The robustness of the estimates provided for the different model specifications was verified for the data sample preceding the crisis, i.e., between 1999q1 and 2008q1. The findings do not differ significantly from those reported and discussed. This strongly reinforces the contents of section 5 - policy implications[26].

The next paragraph sets out a comprehensive and critical assessment of the eight diverging factors and seven reinforcing factors.

4.8 Summary of the Results

This section discusses the results presented in sections 4.5 and 4.6 more comprehensively. The factors characterizing each region's economic structure and ability to respond to shocks are divided into two categories to capture the forces creating and exacerbating divergence.

Diverging factors (DF) are classified as shocks that have significantly different impacts on the two blocks. This categorization helps to highlight the structural differences, the reason why 'a one size fits all policy' may not be the right tool to create convergence in the Euro Area. The *reinforcing factors (RF)* are classified as the shocks that have similar responses in the two regions. This set draws attention to how asymmetric shocks may be a source of divergence in the two regions.

This classification is especially important for the post-crisis analysis of the drivers of the Euro Area divergence process, as pointed out in section 3 - stylized facts. The analysis collected evidence for eight diverging factors and seven reinforcing factors, which is shown in table 1. The importance exports played in the recovery in Northern countries by directly and indirectly (through the growth rate of investments, I.DF and II.DF) boosting GDP growth is clear. A negative shock to investments, as occurred after the crisis, was easily offset by an increase of the flow of profits through the export channel in the Northern region, but not to the same extent in the South.

A second feature of the analysis links the behaviour of the two regions. A shock to exports leads to a remarkable increase in the savings rate in the Northern region, four times larger than the effect in the Southern region. This provides evidence of retaining-profit behaviour of the Northern region (III.DF). Furthermore, a shock to imports in the Southern region boosts GDP growth in the Northern region within 8 quarters by 1% compared to only 0.2% in the Southern region (IV.DF). This indicates the reliance of the growth strategy of the Northern region on the import capacity of the South, and not vice versa. Thus, an under-performing Southern region may directly negatively affect the growth rate in Northern countries. This is an important point for policy-makers since the Euro Area relies on growth complementarity. It means that by stimulating recovery in the Southern region through the import channel, the Northern region may in turn enjoy larger export volumes to that destination. This may lead to a win-win strategy for Euro Area members. Nevertheless, these diverging factors - II.DF and III.DF - are also consistent with the Stockhammer (2015) hypothesis i.e., that the export-led model of the Northern region benefits from the increasing indebtedness of the Southern region, the result of strong import dependence and low export volumes.

Finally, disentangling investment drivers into corporate and household investments, shows that the Northern region relies much more on the former, while the Southern region relies equally on both (V.DF). This diversity reinforces two points made previously: first, the Southern region, which faced a drastic fall in HHI and CI in the post-crisis period - figure 4 - suffered considerable damage to its growth fundamentals. A massive injection of profits in the Southern region through government spending would have been necessary to sustain the drastic fall in investments. Second, the economy of the region is more inward-looking.

Table 1. Summary of the Impulse - Response Analysis

Results	Model	Impulses	Responses	Southern Block		Nothern Block		RESULTS
				SIRF	COIRF**	SIRF	COIRF**	
Diverging Factors								
I Diverging Factor	1A	EX	GDP	0,2%	0,5%	0,4%	0,9%	
II Diverging Factor	1A	EX	I	0,2%	0,5%	0,6%	1,3%	
III Diverging Factor	1B	EX	Sw	1,0%	2,6%	3,5%	9,1%	
IV Diverging Factor	1C	Foreign IM	GDP	0,1%	0,2%	0,3%	1,0%	Effects that strongly differ across the two blocks, leading to a divergence process in case of a similar shock.
V Diverging Factor	1D	CI	GDP	0,1%	0,2%	0,3%	0,6%	
		HHI	GDP	0,1%*	0,5%	/	0,1%	
VI Diverging Factor	1D	GDP	CI	1,0%*	2,8%	0,5%	0,3%	
		GDP	HHI	1,0%*	3,5%	0,5%	0,3%	
VII Diverging Factor	2A	I	Ur	-1,1%	-5,9%	-0,4%	-0,7%	
VIII Diverging Factor	2B	HHI	Ur	-0,2%	-0,6%	/	/	
		Ur	HHI	-0,5%	-1,8%	/	/	
Reinforcing Factors								
I Reinforcing Factor	1A	I	GDP	0,3%	1,1%	0,4%	0,5%	
II Reinforcing Factor	1A	GDP	I	0,4%	1,6%	0,4%	0,7%	
III Reinforcing Factor	1D	CI	EX	1,5%	1,1%	1,5%	1,4%	
		EX	CI	0,7%	2,2%	0,7%	2,2%	Effects that are similar across the two blocks, leading to a divergence process in case of asymmetric shocks.
IV Reinforcing Factor	2A	Ur	I	-0,2%	-0,8%	-0,2%	-0,1%	
V Reinforcing Factor	2B	CI	Ur	-0,5%	-1,1%	-0,5%	-2,4%	
		Ur	CI	-0,4%	-1,4%	-0,4%	-0,7%	
VI Reinforcing Factor	2B	ULC	Ur	0,9%	2,7%	1,2%	4,7%	
		ULC	Ex	-0,9%	-1,7%	-1,1%	-2,5%	
VII Reinforcing Factor	1A	G	I	/	0,6%	/	0,5%	
		G	GDP	/	0,6%	/	0,6%	

* More Persistency in the Overall Effect.
** Cumulative Effect 8 Quarters.

Concerning the reinforcing factors, asymmetric shocks contributed to triggering divergence through two major self-reinforcing mechanisms: I) an investment-growth feedback process (tick-dashed-dotted line in table 1); and II) the investment-unemployment loop (tick-dashed line in table 1). Lower growth in investments leads directly to lower GDP growth (I.RF), and in turn to lower investments (II.RF). Especially, the reinforcing mechanism that a falling GDP may have on CI and HHI (VI.DF) is indicative of the vicious circle the Southern region has fallen into. Moreover, lower CI leads to lower EX (III.RF), which in turn directly affects GDP growth, and indirectly impacts on investments. This channel is especially important in the Northern region since the coefficients are larger compared to the South. In contrast, the investment-unemployment loop is of crucial importance in the Southern region, and this provides further evidence of why the Southern region is still undergoing a weak recovery. As can be seen, a negative shock to investments simultaneously increases the growth rate of unemployment by 1.1%. This first effect has clear negative lagged effects on CI and HHI which decrease by 0.4% and 0.5%, respectively (V.RF and VIII.DF). Moreover, the persistence of the shock and its amplification forces are much stronger in

the Southern region. The cumulative effect within 8 quarters of a negative investment shock to the unemployment rate is almost 5.9% in the South, and just 0.7% in the North (VII.DF). This is evidence of hysteresis, i.e., current and past economic conditions affect future levels of output and employment. The stronger persistence of negative and positive effects of shocks in the South shows the need for policy-makers to implement countercyclical policies when the economy is in recession as well as in expansion.

5. Policy Implications

By characterizing the specific structural features of the Southern and the Northern regions, this analysis implicitly highlights the massive economic heterogeneity of the Euro Area. Clear differences, and some similarities were detected in the way the two economic regions respond to shocks. On the one hand, the Southern region has a more inward-looking and domestic demand-driven posture, i.e., it is more susceptible to a self-sustaining or self-defeating process than the Northern region. On the other hand, the Northern region is more exposed and vulnerable to external shocks, although its recovery is faster and is helped by foreign markets. One of the reasons for these asymmetric responses is the relative degree of openness. Exports in the Northern region weigh as much as domestic consumption, whereas, in the Southern region, consumption and investments comprise a major portion of total expenditure, making the role of government expenditure in sustaining domestic income in times of crisis even more critical.

Moreover, as Stadler states, "many innovations in technology take place in response to market conditions, particularly demand conditions….and endogenous technical change acts as propagation mechanism for shocks that have only transitory effects" (1990: 777). If this is true, then the vicious circle of lower investment - higher unemployment - lower investment (I-U-I) may determine a permanent downward-shift in the aggregate production function. Blanchard et al. (2015: 3) have shown that recessions may have "permanent effects on the level of output relative to trend", meaning that cyclical shocks matter not only in the medium-term, but also in the long-run. This is the essence of hysteresis in economic growth: a temporary higher level of unemployment, and a lower level of investment and so of productivity leads to permanent effects on potential output. On this specific point, the practical policy implications of Minsky's analysis address this issue: 'big governments' are necessary to prevent a temporary downturn becoming a deep recession with long-lasting consequences.

The export-oriented economies of the Northern region were hit more strongly in the aftermath of the crisis - between 2009 and 2010 - but then, due to the positive effects of the fiscal stimuli implemented worldwide and absorbed through the export channel, recovery took place without a backlash. It is important to note that, in order to avoid a sharp fall in investments, the southern region should have sustained the profit index with much stronger government intervention. France and Spain (unlike Italy) partially implemented an expansionary fiscal policy, but it was clearly insufficient[27]. Indeed, fiscal policy was constrained by the subsequent sovereign crisis and by financial speculation, which further weakened the already weak stimulus under the Stability and Growth pact. Indeed, the EU infringement procedure gave precise targets to speculators during the sovereign debt crisis, and this, in turn, led governments to pursue self-defeating recovery policies. As pointed out by Arestis et al. (2001: 118) "this system of financial penalties for breaches of the budget deficit criterion implies that deflationary fiscal policies will continue, and indeed intensify, as those countries that just meet the 3% requirement in conditions of cyclical upswing will have to tighten their fiscal stance to meet the 3% requirement in times of cyclical downswing". However, this is only part of the story, which is rooted in the beliefs of European policy-makers in the positive effects sustainable public finance has on confidence (Konzelmann 2014: 727). Although many are convinced of the macroeconomic importance of sustainable and solid public finances, the belief that in the aftermath of a crisis austerity measures would restore confidence was misguided. As stated by Laski and Podkaminer (2012: 264) "… attempts at suppressing the deficits emerging (or rising) under growth deceleration may be counterproductive as far as both real growth and fiscal positions are concerned".

Though, austerity measures were strongly recommended and implemented, they widened the divergence. The investment-growth feedback process and the vicious circle I-U-I affected the economy more than proportionally through the multiplier effect described in section 2. Although the shocks and type of propagation mechanism are different in the two regions, the same treatment, involving, austerity measures, was adopted by both economies. Clearly, this proved to be a self-defeating tool in the Southern region, and "not only [did] not achieve its objective but [led] to a higher debt-to-GDP ratio" (Fatàs and Summers 2015: 27). This analysis complements the evidence of DeLong and Summers (2012), underlining the factors by which fiscal consolidation produced precisely opposite outcomes in the North and South, i.e., strong recovery in the former and a permanent reduction of output and chronic high level of

unemployment in the latter: the big divergence[28].

It was well-known back in the 60s that within a monetary union asymmetric shocks through so-called reinforcing factors are the main source of economic divergence (Meade 1957; Mundell 1961). Nevertheless, it has been clarified that given the strong economic and structural heterogeneity of the Euro Area - here divided into the Northern and Southern regions - common shocks, may to the same extent become a non-negligible source of instability. Common shocks played a crucial role in exacerbating divergence in the aftermath of the crisis because the fiscal and monetary responses produced asymmetric effects, and hence asymmetric benefits[29]. The recovery may vary across countries, and can be slower and harsher depending on the type of stimuli deployed and on initial conditions, such as the level of debt, unemployment rate, profit index, and the state of confidence in the economy, factors that affect a country's ability to respond to shocks. This asymmetry in the effects and measures taken led to further de-synchronization in the business cycles of countries, creating the so-called two-speed Euro.

At this stage, the common shock has become asymmetric, and its burden for almost its entirety has been transferred from the European political debate to the national political sphere. Each member in different ways is left to deal with it, although fiscal policy is limited and monetary policy is shared. At this point, divergence starts to magnify the consequences of the initial shock, reinforcing structural differences and exacerbating asymmetry in the ability to respond to shocks. Endogenously, weak heterogeneity becomes strong in terms of a country's ability to produce and create employment, and in the way countries support each other, and finally, in the way weaker countries benefit from, and in turn, perceive the common currency. Therefore, economic heterogeneity increases the cultural and political distance between members, making the EMU and the EU integration process slower and weaker. In such a context, Europe has tried to tackle some of the spillovers, the banking crisis through the Bank Recovery and Resolution Directive (Covi 2016), leaving the sovereign and economic crises to the temporary remedies of the European Central Bank, which, although theoretically the most neutral European institution, has been the most active on both sides.

Indeed, an urgent rethinking of the direction the Euro Area aims to pursue needs to place, along with the required tools and national and supranational areas of responsibility. This is the key factor determining the potential for further integration and social cohesion, or increasing isolation and fragility. The former aim led twelve

members to sign the Treaty on European Union in Maastricht on 7 February 1992,, which established the European Economic Community - clearly defined in Title II - Art. G-2 – as follows:

The Community shall have as its task….. to promote throughout the Community a harmonious and balanced development of economic activities, sustainable and non-inflationary growth respecting the environment, a high degree of *convergence of economic performance*, a high level of *employment* and of social protection, the raising of the *standard of living and quality of life*, and economic and social *cohesion* and *solidarity* among Member States.

Most of these founding principles have been completely left behind, abandoning the essence of what European Union means. Since the great depression the same problems have persisted in our economic system, demonstrating that in capitalist economies instability arises endogenously and very suddenly. In such a macroeconomic context, European institutions need to be strengthened - first of all - to prevent members of the community from ending up isolated and left behind, as in the case of Greece. Maastricht viewed the European Economic Community as an inclusive, not exclusive, group of countries; cohesion is the greatest aim and the lack of it the most significant failure of the treaty.

Hence, a rethinking of the European macro-mechanism is needed: a common and agreed European growth strategy, which goes beyond the short-sighted approach of national governments, and gives a precise direction to European economic policy by defining clear objectives in terms of unemployment, inequalities and sustainable growth[30].

Alternative and complementary devices and proposals to the current EU architecture have been discussed in the literature: Arestis et al. (2001) regarding a 'New Full Employment, Growth and Stability Pact', Bibow (2015) for a 'Euro Tresury', and Claessens et al. (2012) on 'Euro Bonds'. Non-discretionary fiscal rules need to be shared as long as the cornerstones of a 'transfer union' remain elusive. In addition, a trade-off exists between increasing the 3% of GDP limit on national budget deficits and strengthening the European budget. Although the 3% fiscal deficit is too small to absorb shocks, an excessive burden on national public finances may be a destabilizing factor given the already high public debt overhang. For these reasons, the EU budget which is 1% of EU GDP (and 40% of which is spent on Agriculture) needs to be enlarged in order to play an active pro-convergence role (Pasimeni 2014; Cottarelli 2016). Second, a Euro Treasury may be a viable solution to guarantee a long-term homogenous

investment plan, to alleviate pressure on national governments cutting public investments (to avoid a EU budget infringement procedure), and to pragmatically enable the fall in national public debt ratios to low and safe levels.

Moreover, these new institutional arrangements need to be accompanied by complementary structural reforms directed at creating tightened coordination between Euro Area members. Hence, labour market reforms need to be settled jointly since the natural response to unemployment differentials within a monetary union should be a high degree of labour mobility (Scitovsky 1958; Mundell 1961). Similarly, wage policies need to be agreed given cross-border spillovers, and their role in the creation of European imbalances (Stockhammer, 2007; 2008; Naastepad and Storm, 2017; Covi 2017). Here, an important point needs to be clarified. Arestis and Sawyer (1998: 188) summarize the heart of Kaleckian reasoning[31]: "the national income accounting counterpart of a budget deficit is some combination of net private savings (savings minus investments) and trade deficit (capital inflow). According to this, there is an intertwined relationship between Euro Area trade imbalances and national budget deficits. This implies that a rebalancing of intra-EA trade flows is a necessary condition to achieve balanced national public finances. A transfer union directly tackles most of the issues here discussed, although it implies a loss of political independence and a higher degree of cultural and social integration. As Kaldor writes (1970: 345) "… a region which forms part of a political community… automatically gets aid whenever its trading relations with the rest of the country deteriorates".

Overall, a gradual shift towards deeper macroeconomic cooperation should be seen as an essential step in achieving further political integration in order slowly to settle on a second macro-mechanism that for the future of the Eurozone needs to transfer the burden of adjustment from the national to the monetary union level.

6. Concluding Remarks

By using the Minsky-Kaleckian theoretical framework, the paper interprets and discusses the sources of instability and fragility in the European monetary union. The focus is on reinforcing and diverging factors which endogenously produce divergence in unemployment and growth differentials, culminating in the post-crisis period. The SVAR approach shows that the two regions have intrinsically different economic structures, leading to the conclusion that a 'one size fits all policy' is detrimental to the economic and political prosperity of the Euro area. These differences reflect the

asymmetries in the region's ability to respond to shocks, and the symmetries in the recovery measures allowed and fostered major divergence. Furthermore, the lack of an effective supranational rebalancing mechanism abandoned them to themselves without tools to fight the unavoidable. The dynamics of corporate and household investments and exports differed remarkably both before and after the crisis, reflecting the strong economic heterogeneity of the Euro Area. Empirical evidence confirms the role of investments as the key variable in determining swings in the business cycle, their role in shaping the growth differentials between the Northern and Southern region, and how the unemployment rate is affected by, and in turn affects, the investment rate. The result is that the creation of a countercyclical investment mechanism within the Monetary Union is crucial, since the necessary macroeconomic tools and conditions to smoothly comply with a fair and balanced growth pact are lacking. Given that institutions are the fundamental cause of long-run growth, and particular events at critical junctures have long-lasting effects (Acemoglu et al. 2004), a rethinking of the European macro-mechanism may still convert divergence into convergence.

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Footnotes

[1] This division resembles Stockhammer and Wildauer (2016). Only countries that joined the Euro at its inception - 1999 - were taken into consideration for a homogenous length of the time series. For Greece and Luxemburg data is lacking for empirical analysis, and Finland and Ireland resemble neither the Southern nor the Northern model.

[2] Minsky (1982: 44) emphasizes that the role of the fifth determinant - consumption out of profits - to a large extent depends on interpreting "the allocation of profits to salaries, research, advertising, and 'business style' expenditures…the allocation of profits to consumption follows from the building of a bureaucratic business style, which, like inherited debt, may lead to current period 'uncontrolled' expenditures". Since in the empirical literature it is difficult to find a proxy for this variable, and since it is of small magnitude and is relevant mainly in a sophisticated financial economy, it is omitted from the analysis.

[3] Therefore, the profit function has a multiplicative behaviour of degree one or higher depending on the uses to which these export revenues are put. The same holds for investments, the budget deficit, savings out of wages, and consumption out of profits.

[4] All the data are on a quarterly basis, at constant prices, and seasonally adjusted. The OECD is the source for all the variables except savings out of wages which was taken from Eurostat. Using the trade balance instead of the current account does not change the analysis. The two are almost identical.

[5] Government expenditure is used since for the budget deficit data for Germany and Austria are not available for the period Q1-1999 to Q4-2001 and Q1-1999 to Q4-2000, respectively. Nevertheless, total government revenues are stable over time and, therefore, variations in the deficit are mainly driven by variations in government expenditure. In this respect, the level of the profit index is higher, but the variation is not affected much. Moreover, most empirical studies investigating fiscal multipliers use government expenditures as a proxy for fiscal shock (Corsetti and Muller 2006; Beetsma and Giuliodori 2011).

[6] In the Northern region, Germany counts for almost 70%, the Netherlands 16%, Belgium 10% and Austria 7%, while in the Southern region France has a weighting of 40%, Italy 35%, Spain 21%, and Portugal 4%. Although the Northern region pattern is mainly driven by the German economy, the other countries have a similar trend in the trade balance, wage index and debt level (see: Stockhammer 2015; Stockhammer and Wildauer 2016; and Covi 2017).

[7] The remaining one-third comes from private-financial corporations such as banks and insurance companies.

[8] The investment decomposition has been exploited according to a new quarterly dataset provided by Eurostat, and represents one of the novelties of the research, as well as a major contribution to the empirical literature.

[9] Government consumption expenditure is deemed exogenous for two main reasons: 1) it is the only variable directly under government control and because "austerity measures" set an exogenous limit to its growth; 2) the Wald-test does not reject the hypothesis that the interaction between G and the coefficients of other endogenous variables are simultaneously equal to zero. For this reason, government consumption expenditure is used as a control variable in all the following models. Nevertheless, in robustness checks it is included as an endogenous component and results do not change.

[10] Empirical literature has extensively discussed whether government expenditure should be treated as an endogenous or exogenous variable, i.e., whether it fluctuates and responds to GDP

shocks or is mainly driven by the fiscal policy of the government. For this reason, to check robustness, government expenditure is added to the set of endogenous variables in section 4.6.

[11] The results are also robust to a different lag-length.

[12] This is a necessary condition, but not sufficient in itself.

[13] The standard approach to recover the structural shocks is the strategy of short-run restrictions originally developed by Sims (1980): the Cholesky decomposition imposes a Wold causal order on the variables so that the shock to Y_1 feeds contemporaneously into $Y_2, Y_3, and\ Y_n$ while the shock to Y2 feeds contemporaneously into $Y_3, Y_4, and\ Y_n$, but into Y_1 only with a lag, and so on. The order of the Y_{it} in the vector Y_t is arbitrary; but, for each such ordering, the Choleski decomposition is unique.

[14] It is assumed here that $x_t = 0$.

[15] This procedure is different from testing hypotheses concerning the contemporaneous effects of shocks on the coefficients of matrix A as in Stockhammer and Onaram (2004).

[16] Exports are directly correlated with the production capacity of the economy, and therefore come after investment in the Cholesky order.

[17] In this specific case, switching the ordering of imports and exports does not change the results.

[18] I reverse the signs of the off-diagonal entries of the A matrix to simplify interpretation.

[19] All the parameters of an over-identified SVAR are statistically significant at 10% levels, since all the variables not statistically significant in a just-identified SVAR were set equal to 0.

[20] This contributes to the discussion that a higher expenditure on foreign goods from the Northern countries may directly hamper their economic growth due to their growth model. On the contrary, in the Southern region lower imports of intermediate goods have a direct effect on final output - export capacity.

[21] The model was estimated following the same procedure as for Model 1A. Concerning the order of the shocks, savings out of wages enter the system of equations as the last endogenous variable before GDP growth.

[22] The order of the shocks is the following: GFCF, (IM-S/N), EX, IM, GDP.

[23] Results are robust even if ULC is ordered first.

[24] All the parameters of an over-identified SVAR are statistically significant at 10% levels, since all the variables not statistically significant in a just-identified SVAR were set at 0. I reverse the signs of the off-diagonal entries of the A matrix to simplify interpretation.

[25] The estimates are shown as cumulative responses to highlight the fiscal multiplier, and the critical role that fiscal policy plays à la Minsky in sustaining investments, and thus economic recovery after deep recession. Note that the fiscal impact is larger in recessions than during expansions, and these estimates refer to the average effect during the period 1999 and 2015 (Auerbach and Gorodnichenko 2011).

[26] Estimates for the impulse response functions are available on request. For the sake of brevity, they are not included in the text.

[27] Unemployment in France and Spain were twice as high as in Germany. See Bibow (2013) for a comprehensive analysis of the Franco-German contradiction.

[28] They claimed that austerity policies not only caused significant temporary damage to growth but achieved the opposite outcome by permanently reducing output (De Long and Summers 2012: 234).

[29] "… the monetary union probably exacerbated these national booms and busts. Second, the existing stabilizers that existed at the national level prior to the start of the union were stripped away from the member-states without being transposed at the monetary union level. This left the member states "naked" and fragile, unable to deal with the coming national disturbances" (De Grauwe 2013: 5).

[30] As De Grawue says (2013: 5) "the endogenous dynamics of booms and busts continued to work at the national level and that the monetary union in no way disciplined these into a union-wide dynamics".

[31] See the discussion in Chapter 2, page 7.

List of Figures
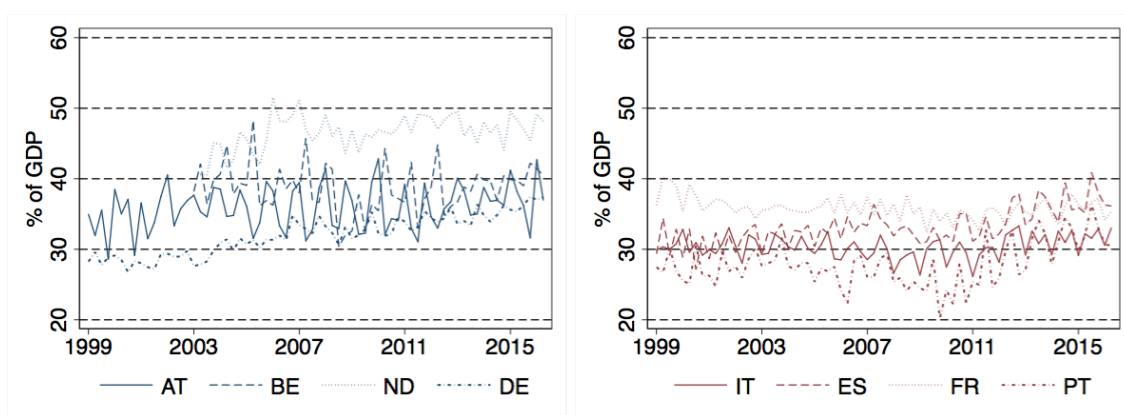
Figure 1. Profit Index at Country Level
Source: OECD and Eurostat Database; Author's Calculations.
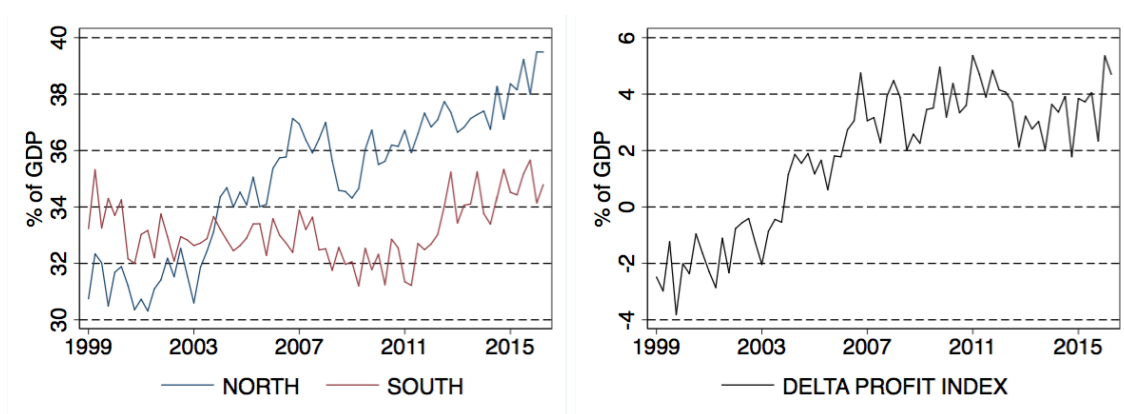
Figure 2: The Profit Index

Source: OECD and Eurostat Database; Author's Calculations.

Note: The Northern Block is composed by Germany, Austria, Belgium and Netherlands, while the Southern one by France, Italy, Spain and Portugal.
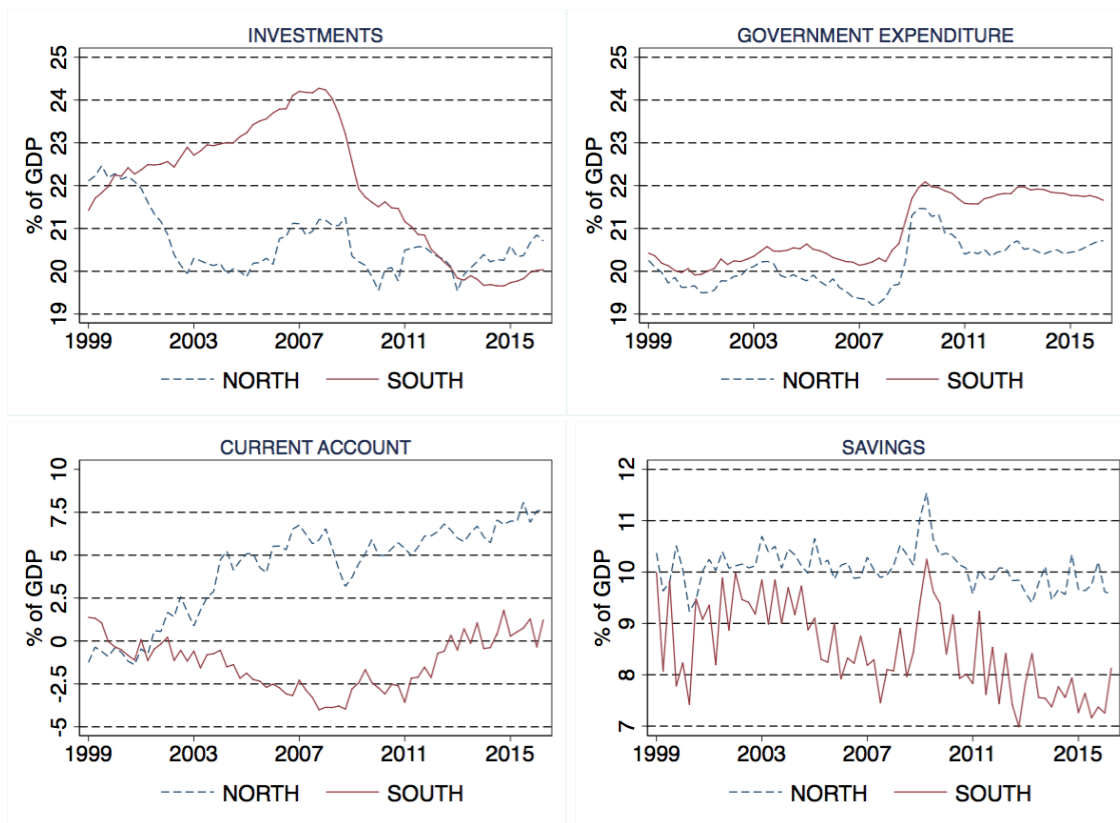
Figure 3. Evolutions of the Four Determinants of Profits

Source: OECD and Eurostat Database; Author's Calculations.
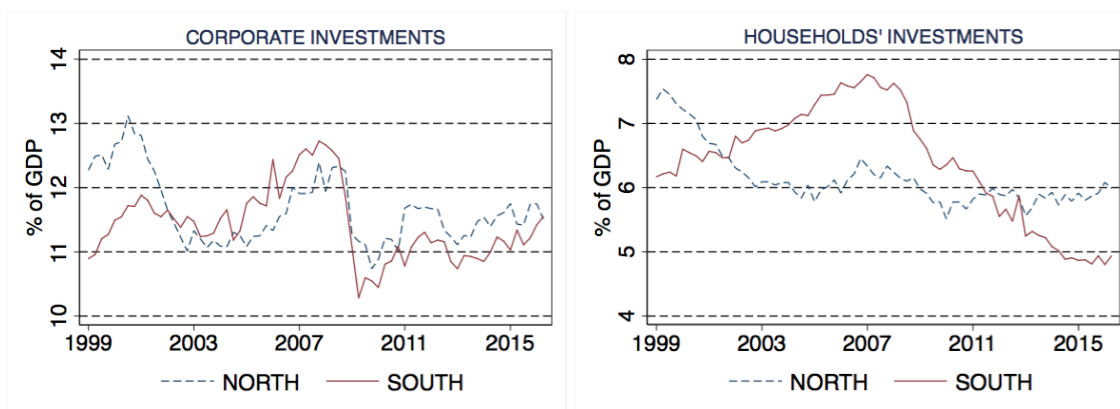
Figure 4. Investment Decomposition

Source: Eurostat database, author's calculations.

Note: Corporate Investments refer to non-financial corporations' gross fixed capital formation: buildings, machinery, software, and major improvements to fixed assets. Dwellings account for most of households' investment. The residual part includes the investment in equipment, machinery, transport equipment and constructions other than dwellings by the self-employed workers and Non-Profit Institutions Serving Households.
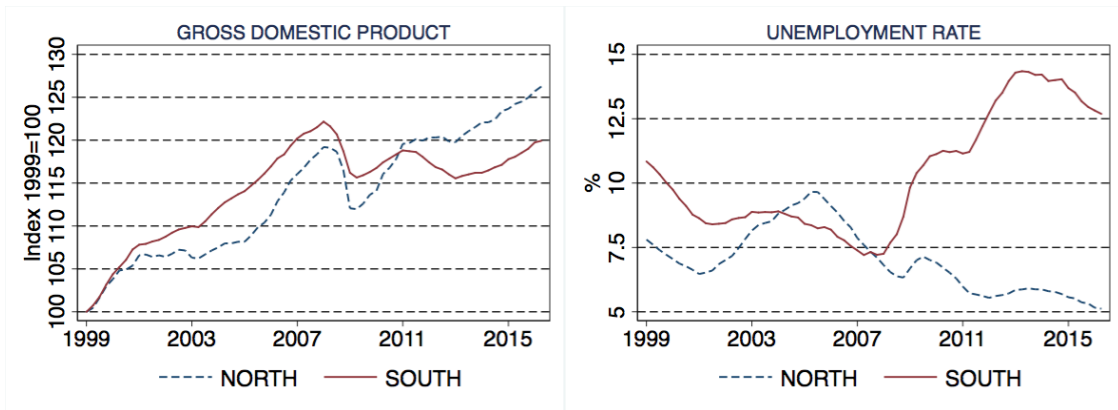
Figure 5. The Big Divergence

Source: OECD and Eurostat Database; Author's Calculations.
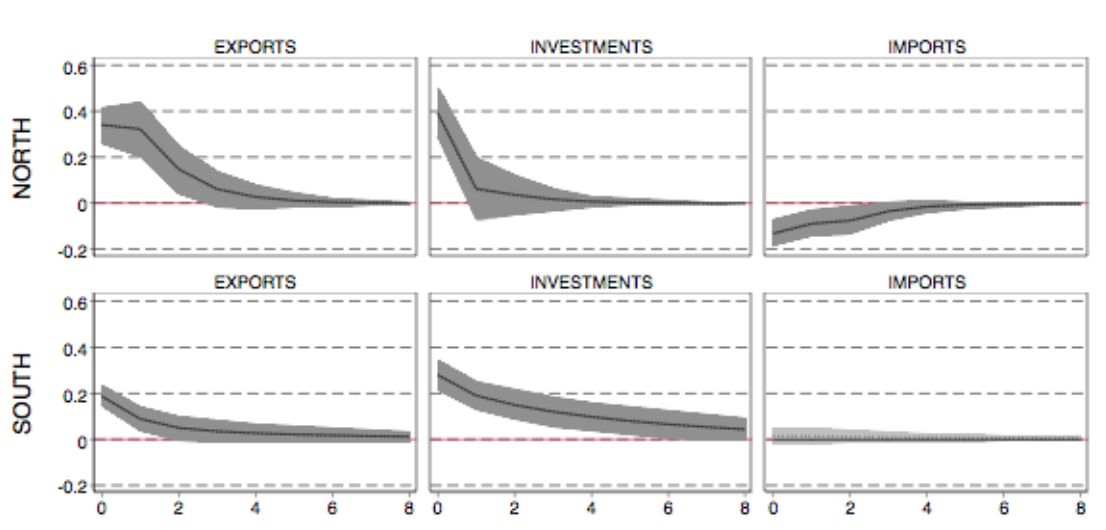
Figure 6. Model 1A - Orthogonalized and Structural Impulse Responses of GDP to an Export, Investment and Import Shock.

Note: The Variable Ordering is Investment, Exports, Imports, and GDP. The Shock is a unit standard deviation. Solid lines are point estimates, light and dark grey area are the 90% confidence regions for structural and orthogonalized IRFs, respectively. The Y-axis is in % points and the X-axis shows quarters, i.e two years.

Figure 7. Model 1A - Orthogonalized and Structural Impulse Responses to an Export Shock.

Note: The Variable Ordering is Investment, Exports, Imports, and GDP. The Shock is a unit standard deviation. Solid lines are point estimates, light and dark grey area are the 90% confidence regions for structural and orthogonalized IRFs, respectively. The Y-axis is in % points and the X-axis shows quarters, i.e two years.
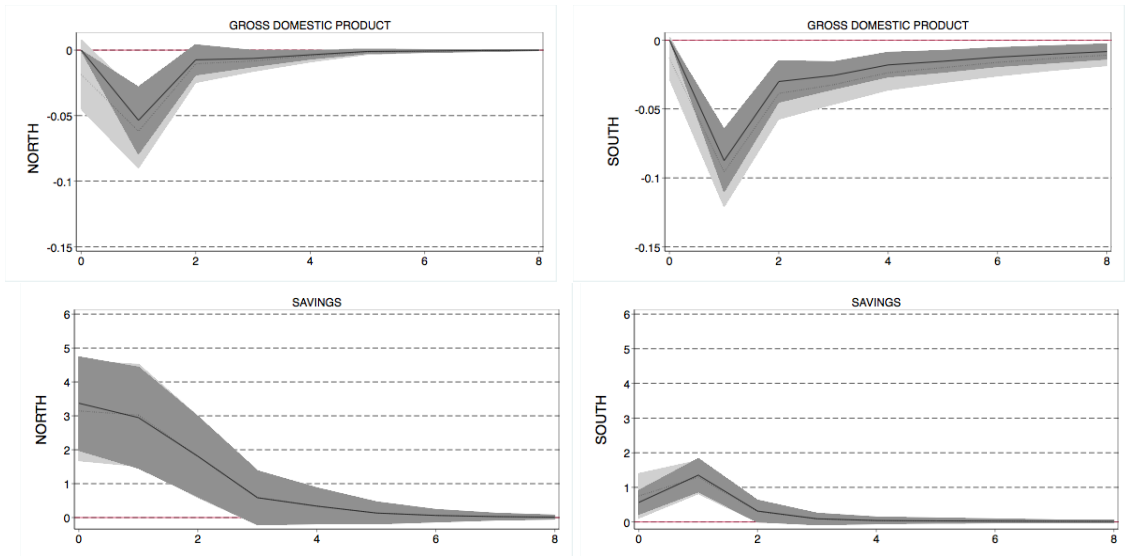

Figure 8. Model 1A - Orthogonalized and Structural Impulse Responses to a GDP Shock.

Note: The Variable Ordering is Investment, Exports, Imports, and GDP. The Shock is a unit standard deviation. Solid lines are point estimates, light and dark grey area are the 90% confidence regions for structural and orthogonalized IRFs, respectively. The Y-axis is in % points and the X-axis shows quarters, i.e two years.
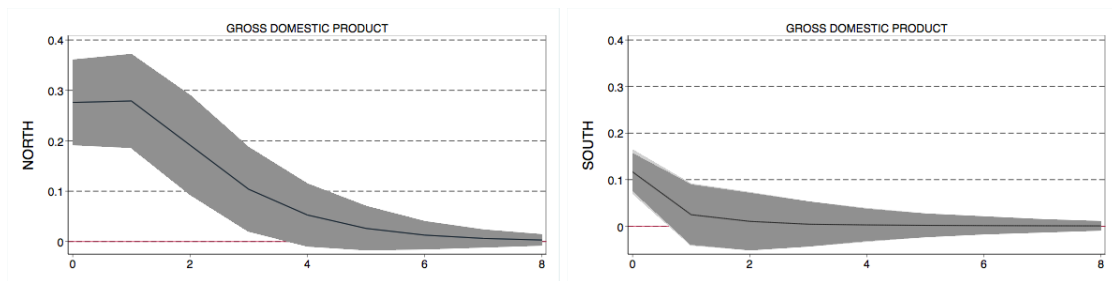
Figure 9. Model 1B - Orthogonalized and Structural Impulse Responses of GDP to a Saving Shock (First Raw) and of Savings to an Export Shock (Second Raw).

Note: The Variable Ordering is Investment, Exports, Imports, Savings and GDP. The Shock is a unit standard deviation. Solid lines are point estimates, light and dark grey area are the 90% confidence regions for structural and orthogonalized IRFs, respectively. The Y-axis is in % points and the X-axis shows quarters, i.e two years.
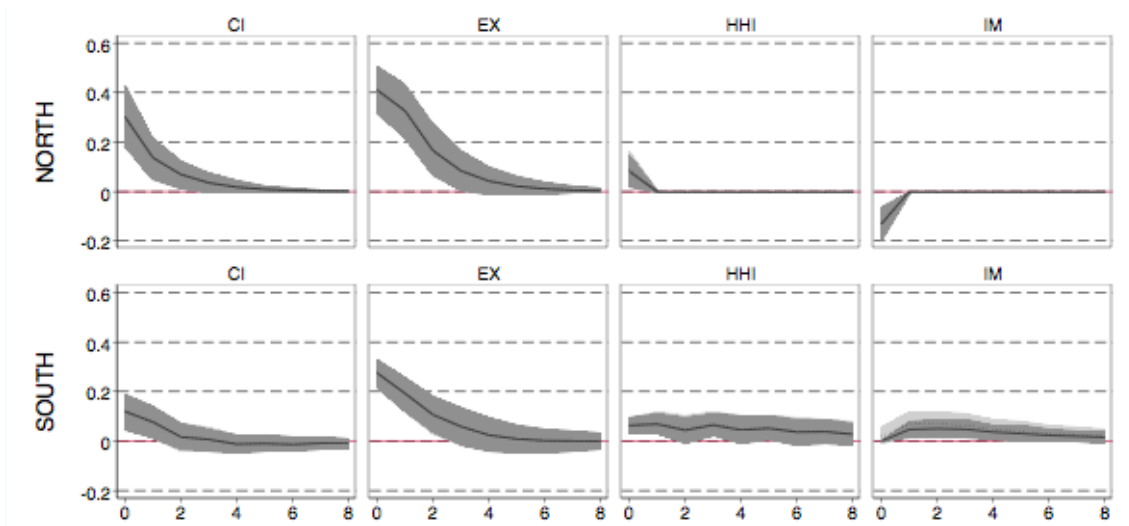

Figure 10. Model 1C - Orthogonalized and Structural Impulse Responses of GDP to Import Shock of the Opposite Block.

Note: The Variable Ordering is Investment, Imports from the Opposite Blocks, Exports, Imports, and GDP. The Shock is a unit standard deviation. Solid lines are point estimates, light and dark grey area are the 90% confidence regions for structural and orthogonalized IRFs, respectively. The Y-axis is in % points and the X-axis shows quarters, i.e two years.

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Figure 11. Model 1D - Orthogonalized and Structural Impulse Responses of GDP to a Shock to Corporate Investments, Exports, Households' Investment and Imports.

Note: The Variable Ordering is corporate investment, exports, households' investment, Imports and GDP. The Shock is a unit standard deviation. Solid lines are point estimates, light and dark grey area are the 90% confidence regions for structural and orthogonalized IRFs, respectively. The Y-axis is in % points and the X-axis shows quarters, i.e two years.
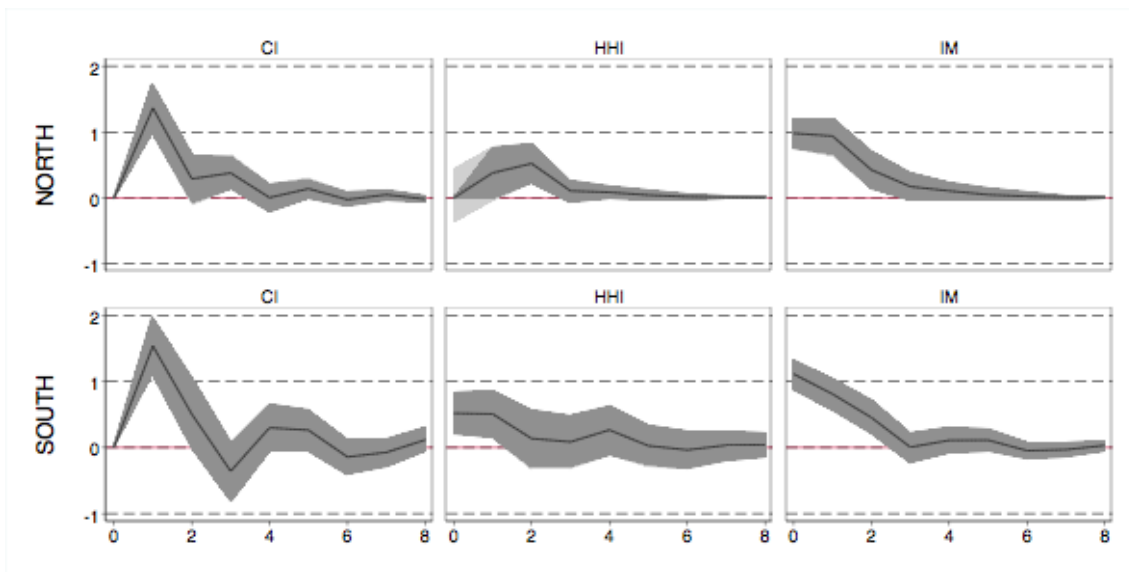

Figure 12. Model 1D - Orthogonalized and Structural Impulse Responses to an Export Shock.

Note: The Variable Ordering is corporate investment, exports, households' investment, imports and GDP. The Shock is a unit standard deviation. Solid lines are point estimates, light and dark grey area are the 90% confidence regions for structural and orthogonalized IRFs, respectively. The Y-axis is in % points and the X-axis shows quarters, i.e two years.
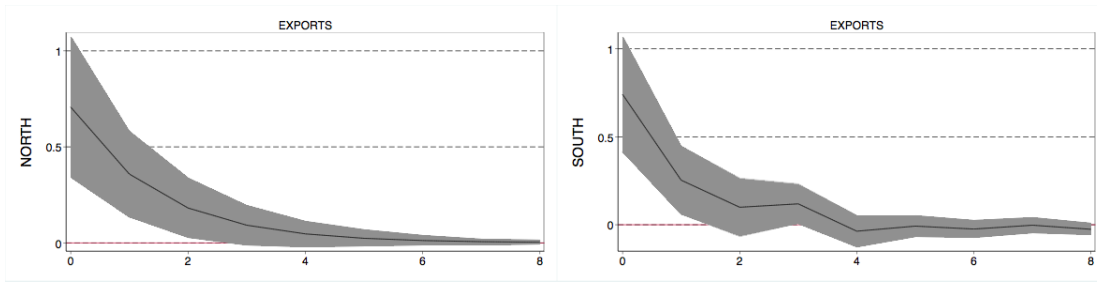
Figure 13. Model 1D - Orthogonalized and Structural Impulse Responses to a Corporate Investment Shock.

Note: The Variable Ordering is corporate investment, exports, households' investment, imports and GDP. The Shock is a unit standard deviation. Solid lines are point estimates, light and dark grey area are the 90% confidence regions for structural and orthogonalized IRFs, respectively. The Y-axis is in % points and the X-axis shows quarters, i.e two years.
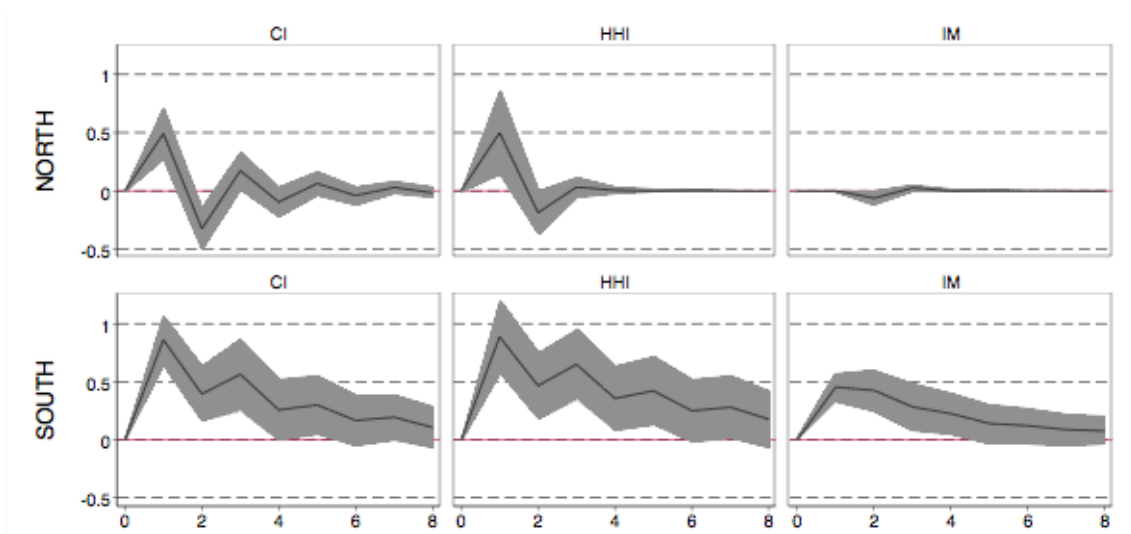

Figure 14. Model 1D - Orthogonalized and Structural Impulse Responses to a GDP Shock.

Note: The Variable Ordering is corporate investment, exports, households' investment, imports and GDP. The Shock is a unit standard deviation. Solid lines are point estimates, light and dark grey area are the 90% confidence regions for structural and orthogonalized IRFs, respectively. The Y-axis is in % points and the X-axis shows quarters, i.e two years.

Figure 15. Model 2A - Orthogonalized and Structural Impulse Responses of the Unemployment rate to Investments Shock (First Raw) and of Investments to an Unemployment Shock.

Note: The Variable Ordering is investments, unit labour costs, exports, and the unemployment rate. The Shock is a unit standard deviation. Solid lines are point estimates, light and dark grey area are the 90% confidence regions for structural and orthogonalized IRFs, respectively. The Y-axis is in % points and the X-axis shows quarters, i.e two years.
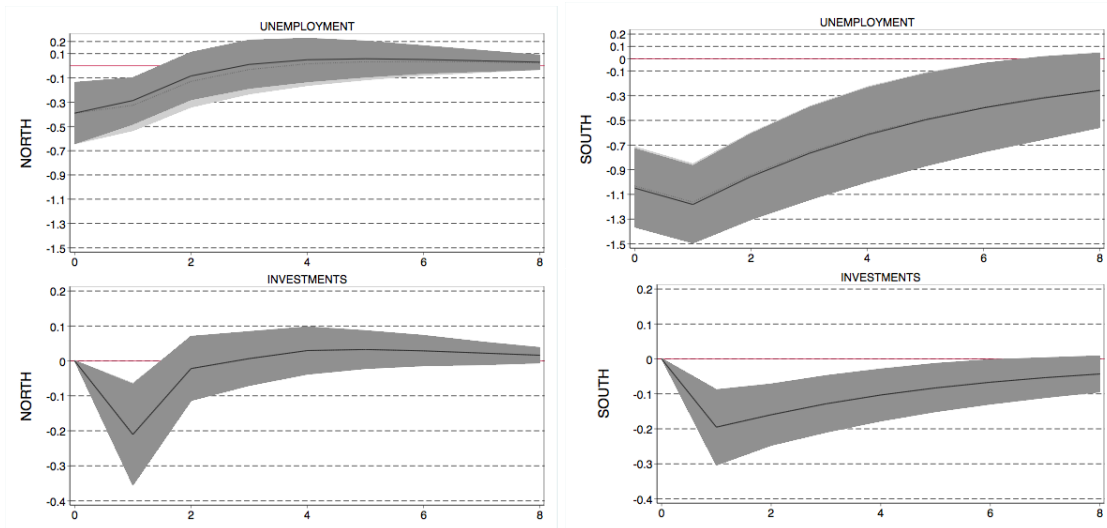

Figure 16. Model 2A - Orthogonalized and Structural Impulse Responses to a Unit Labour Cost Shock.

Note: The Variable Ordering is investments, unit labour costs, exports, and the unemployment rate. The Shock is a unit standard deviation. Solid lines are point estimates, light and dark grey area are the 90% confidence regions for structural and orthogonalized IRFs, respectively. The Y-axis is in % points and the X-axis shows quarters, i.e two years.
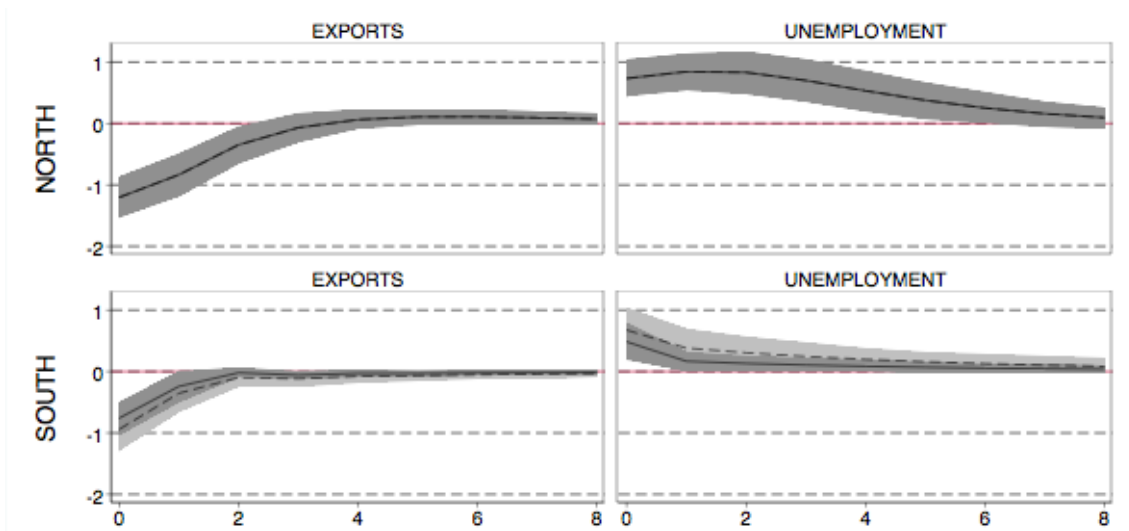
Figure 17. Model 2B - Orthogonalized and Structural Impulse Responses of the Unemployment rate to a Unit Corporate Investment Shock (First Raw) and of Corporate Investments to an Unemployment Shock (Second Raw).

Note: The Variable Ordering is corporate investments, unit labour costs, households' investments, exports, and the unemployment rate. The Shock is a unit standard deviation. Solid lines are point estimates, light and dark grey area are the 90% confidence regions for structural and orthogonalized IRFs, respectively. The Y-axis is in % points and the X-axis shows quarters, i.e two years.
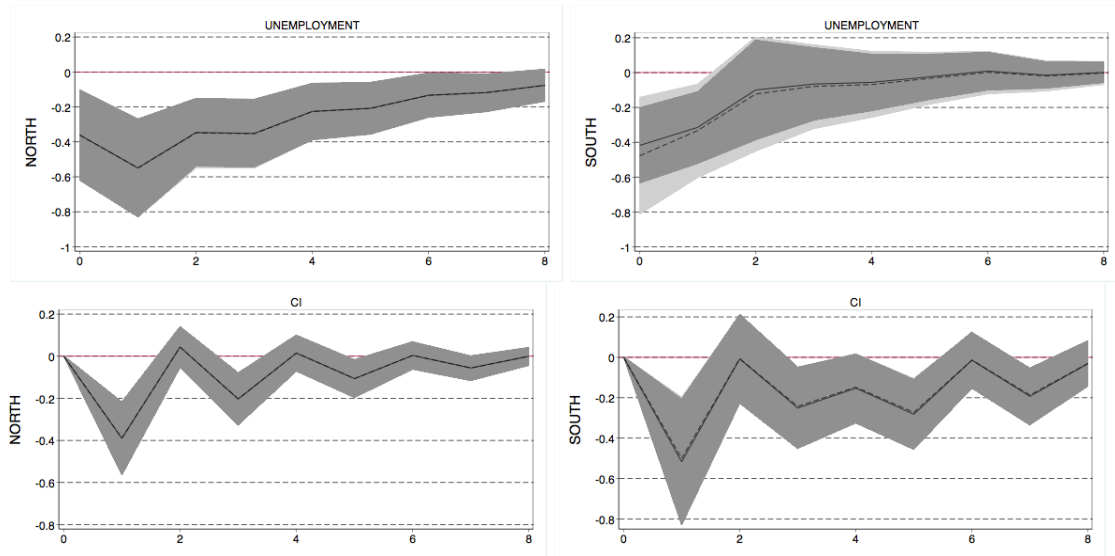

Figure 18. Model 2B - Orthogonalized and Structural Impulse Responses of the Unemployment rate to a Unit Households' Investment Shock (First Raw) and of Households' Investments to an Unemployment Shock (Second Raw).

Note: The Variable Ordering is corporate investments, unit labour costs, households' investments, exports, and the unemployment rate. The Shock is a unit standard deviation. Solid lines are point estimates, light and dark grey area are the 90% confidence regions for structural and orthogonalized IRFs, respectively. The Y-axis is in % points and the X-axis shows quarters, i.e two years.
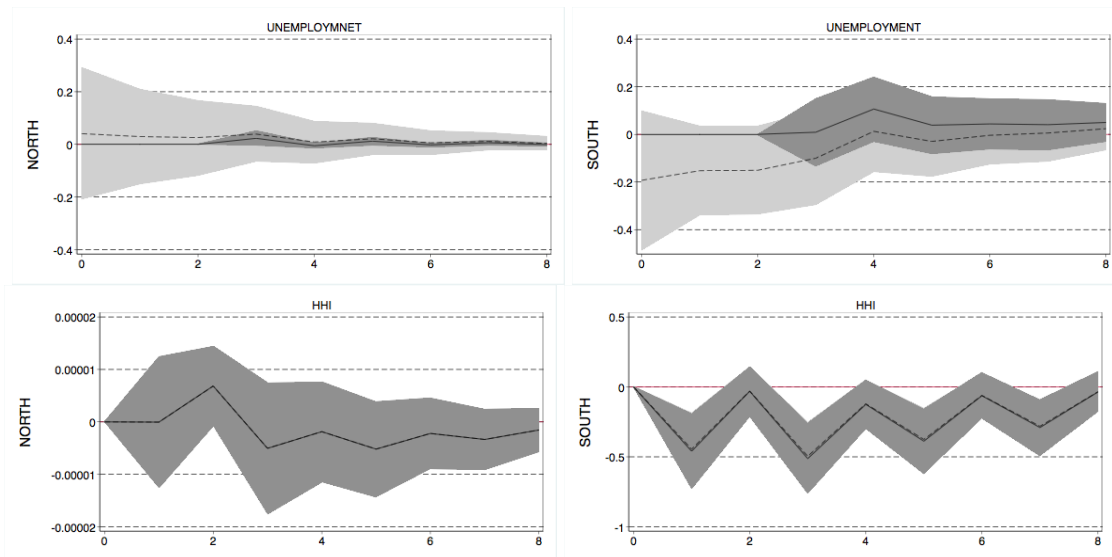
Figure 19. Model 2B - Orthogonalized and Structural Impulse Responses to a Unit Labour Cost Shock.

Note: The Variable Ordering is corporate investments, unit labour costs, households' investments, exports, and the unemployment rate. The Shock is a unit standard deviation. Solid lines are point estimates, light and dark grey area are the 90% confidence regions for structural and orthogonalized IRFs, respectively. The Y-axis is in % points and the X-axis shows quarters, i.e two years.
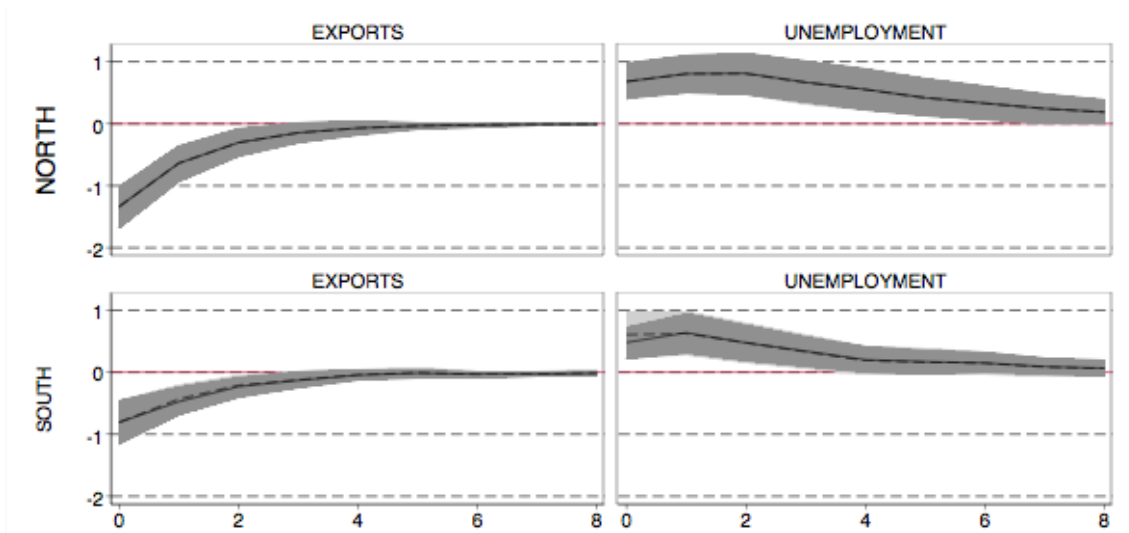

Figure 20. Model 1A - Cumulative Orthogonalized Impulse Responses to a Government Expenditure Shock.

Note: The Variable Ordering is Investment, Government Expenditure, Exports, Imports, GDP, long-term interest rate, and real effective exchange rate. The Shock is a unit standard deviation. Solid lines are point estimates, dark grey area are the 90% confidence regions, respectively. The Y-axis is in % points and the X-axis shows quarters, i.e three years.

Statistical Appendix

Table A. Unit Root Test - ADF

Augmented Dickey-Fuller test for unit root

VARIABLES	Δ log GDP	Δ log GFCF	Δ log EX	Δ log IM	Δ log SW	Δ log G	Δ log CI	Δ log HHI	Δ log Ur	Δ log ULC
Test Statistic South	-2,9***	-2,616***	-3,81***	-3,587***	-5,62***	-1,64*	-5,04***	-3,14***	-2,480**	-2,296**
Test Statistic North	-3,66***	-4,34***	-3,68***	-3,67***	-5,42***	-3,62**	-4,3***	-5,37***	-2,815***	-3,433***

No Constant, lag order (1), Number of obs = 62
*** CV at 1% (-2,615), ** CV at 5% (-1,95), * CV at 10% (-1,61).

Table B. Descriptive Statistics

Descriptive Statistics		Southern Block				Northern Block		
VARIABLES	Obs	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Δ log GDP	64	0,26%	0,59%	-2,11%	1,25%	0,33%	0,77%	-3,88%	1,68%
Δ log GFCF	64	0,12%	1,36%	-4,72%	2,45%	0,24%	1,80%	-8,03%	5,14%
Δ log G	64	0,37%	0,39%	-0,42%	1,29%	0,36%	0,53%	-1,00%	1,75%
Δ log EX	64	0,75%	2,08%	-8,98%	3,66%	1,19%	2,26%	-10,72%	5,75%
Δ log IM	64	0,70%	2,07%	-8,50%	3,78%	1,01%	1,96%	-7,52%	5,77%
Δ log SW	64	-0,47%	4,23%	-29,30%	2,59%	0,68%	9,41%	-51,85%	29,89%
Δ log CI	64	0,64%	3,41%	-9,28%	9,70%	0,52%	2,79%	-10,11%	7,41%
Δ log HHI	64	0,37%	3,06%	-6,37%	11,91%	0,28%	2,61%	-4,54%	7,61%
Δ log ULC	64	0,46%	0,55%	-0,86%	1,97%	0,29%	0,67%	-0,86%	3,33%
Δ log Ur	64	0,40%	2,98%	-4,02%	13,09%	-0,54%	2,67%	-5,31%	5,31%

Note: Quaterly Changes

Model 1A

Table 1A. Selection Order Criteria

	Southern Block				Northen Block			
Selection-order criteria								
Lag	FPE	AIC	HQIC	SBIC	FPE	AIC	HQIC	SBIC
0	1,20E-17	-27,5858	-27,3127	-26,8876	1,10E-16	-25,3955	-25.1224*	-24.6973*
1	4,3e-18*	-28,6386*	-28,1471*	-27,382*	9,0e-17*	-25,6028*	-25,1113	-24,3462
2	5,10E-18	-28,4944	-27,7844	-26,6793	1,20E-16	-25,3778	-24,6679	-23,5627
3	5,90E-18	-28,3834	-27,455	-26,0098	1,20E-16	-25,3733	-24,4449	-22,9997
4	5,60E-18	-28,4946	-27,3477	-25,5625	1,60E-16	-25,142	-23,9951	-22,2099

Sample: 2000q2-2015q1, Number of obs = 60
Endogenous: Δ log GFCF, Δ log EX, Δ log IM, Δ log GDP
Exogenous: Δ log G, q1, q2, q3, q4

Table 1B. Jarque-Bera Normality test

	Southern Block			Nothern Block		
Jarque-Bera test						
Equation	chi2	df	Prob > chi2	chi2	df	Prob > chi2
Δ log GFCF	2,794	2	0,24731	0,302	2	0,85966
Δ log EX	0,582	2	0,74733	4,681	2	0,09627
Δ log IM	6,063	2	0,04823	0,801	2	0,67009
Δ log GDP	0,108	2	0,94746	0,965	2	0,61718
ALL	9,548	8	0,29819	6,750	8	0,56388

Sample: 2000q2-2015q1, Number of obs = 60
Ho: Normality

Table 1C. Lagranger-Multiplier test

	Southern Block			Nothern Block		
Lagrange-multiplier test						
Lag	chi2	df	Prob > chi2	chi2	df	Prob > chi2
1	22,5280	16	0,12695	15,1677	16	0,51239
2	13,8409	16	0,61057	14,7547	16	0,54267
3	21,2701	16	0,16836	17,0815	16	0,38034
4	24,1478	16	0,08633	13,9394	16	0,60323

Sample: 2000q2-2015q1, Number of obs = 60
Ho: No autocorrelation at lag order.

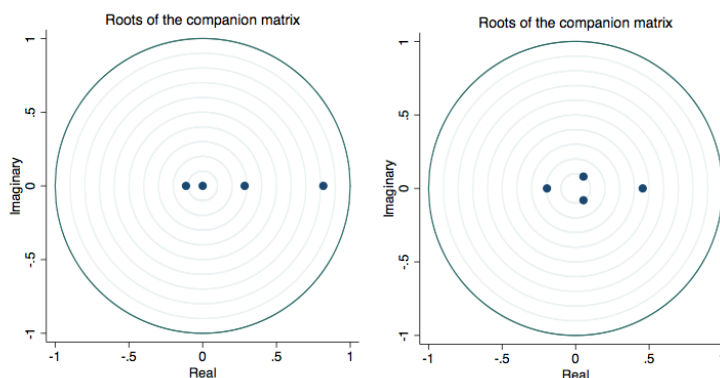**Figure 1A.** Eigenvalue Stability Condition – SB (LHS) NB (RHS)

Table 1D. Model 1A - Direct Effects: Cholesky and Inverse A matrix

SVAR Model 1A (Just identified)

	IMPULSE — Southern Block				IMPULSE — Northern Block			
Cholesky / RESPONSE	Δ log GFCF	Δ log EX	Δ log IM	Δ log GDP	Δ log GFCF	Δ log EX	Δ log IM	Δ log GDP
Δ log GFCF	0,007427	0	0	0	0,01475272	0	0	0
Δ log EX	0,01154129	0,01273034	0	0	0,00713395	0,01607635	0	0
Δ log IM	0,0107431	0,00810471	0,00821194	0	0,00686552	0,00928839	0,00900843	0
Δ log GDP	0,00278997	0,00185853	0,0001301	0,00151496	0,00391724	0,00337831	-0,0013932	0,00255031
Inverse A Matrix / RESPONSE	Δ log GFCF	Δ log EX	Δ log IM	Δ log GDP	Δ log GFCF	Δ log EX	Δ log IM	Δ log GDP
Δ log GFCF	1	0	0	0	1	0	0	0
Δ log EX	1,55396326	1	0	0	0,48356841	1	0	0
Δ log IM	1,44649145	0,63664528	1	0	0,46537319	0,57776728	1	0
Δ log GDP	0,37565185	0,14599188	0,01584234	1	0,26552641	0,21014163	-0,1546535	1

SVAR Model 1B* (Over identified)

	IMPULSE — Southern Block				Northern Block
Cholesky / RESPONSE	Δ log GFCF	Δ log EX	Δ log IM	Δ log GDP	
Δ log GFCF	0,007427	0	0	0	Just identified SVAR
Δ log EX	0,01154129	0,01273034	0	0	
Δ log IM	0,0107431	0,00810471	0,00821194	0	
Δ log GDP	0,00278997	0,00185853	0	0,00152054	
Inverse A Matrix / RESPONSE	Δ log GFCF	Δ log EX	Δ log IM	Δ log GDP	Northern Block
Δ log GFCF	1	0	0	0	Just identified SVAR
Δ log EX	1,55396326	1	0	0	
Δ log IM	1,44649145	0,63664528	1	0	
Δ log GDP	0,37565185	0,14599188	0	1	

*Restrictions: Δ log IM = 0 on GDP

LR test of identifying restrictions: Prob > chi2 = 0.496

Model 1D

Table 1E. Selection Order Criteria

Selection-order criteria	Southern Block				Northen Block			
Lag	FPE	AIC	HQIC	SBIC	FPE	AIC	HQIC	SBIC
0	8,0e-20	-29,7842	-29,4428	-28,9115	2,40E-19	-28,6972	-28,3558	-27,8245*
1	2,4e-20	-30,9842	-30,3016	-29,2389*	1,3e-19*	-29,3519*	-28,6692*	-27,6066
2	1,8e-20*	-31,3344	-30,3104*	-28,7165	1,90E-19	-28,9772	-27,9532	-26,3593
3	2,6e-20	-31,0297	-29,6643	-27,5391	1,60E-19	-29,2118	-27,8464	-25,7212
4	2,0e-20	-31,4627*	-29,756	-27,0995	2,00E-19	-29,1311	-27,4244	-24,7679

Sample: 2000q2-2015q1, Number of obs = 60
Endogenous: Δ log CI, Δ log EX, Δ log HHI, Δ log IM, Δ log GDP
Exogenous: Δ log G, q1, q2, q3, q4

Table 1F. Jarque-Bera Normality test

Jarque-Bera test	Southern Block			Nothern Block		
Equation	chi2	df	Prob > chi2	chi2	df	Prob > chi2
Δ log CI	1,137	2	0,56639	0,792	2	0,67299
Δ log EX	7,468	2	0,02389	0,5617	2	0,0603
Δ log HHI	1,361	2	0,50641	1,403	2	0,49591
Δ log IM	12,358	2	0,00207	4,573	2	0,10162
Δ log GDP	3,535	2	0,17079	0,74	2	0,69061
ALL	25,859	10	0,00393	13,125	10	0,21677

Sample: 2000q2-2015q1, Number of obs = 60
Ho: Normality

Table 1G. Lagranger-Multiplier test

Lagrange-multiplier test	Southern Block			Nothern Block		
Lag	chi2	df	Prob > chi2	chi2	df	Prob > chi2
1	14,5054	25	0,95219	16,5353	25	0,89795
2	29,7217	25	0,23488	22,5035	25	0,60653
3	20,7259	25	0,70779	29,3836	25	0,2482
4	32,4464	25	0,1455	37,9270	25	0,04703

Sample: 2000q2-2015q1, Number of obs = 60
Ho: No autocorrelation at lag order.

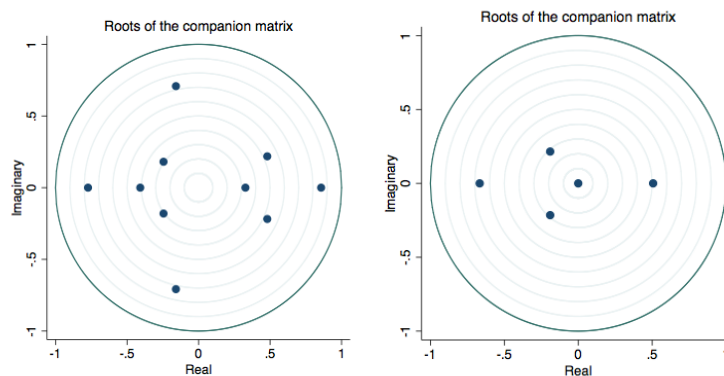**Figure 1E.** Eigenvalue Stability Condition – SB (LHS) NB (RHS)

Table 1H. Model 1D - Direct Effects: Cholesky and Inverse A matrix

Southern Block

SVAR Model 1A (Just identified)

RESPONSE — IMPULSE

Cholesky

	Δ log CI	Δ log EX	Δ log HHI	Δ log IM	Δ log GDP
Δ log CI	0,01947374	0	0	0	0
Δ log EX	0,00741083	0,01472138	0	0	0
Δ log HHI	0,00855419	0,00519722	0,01387251	0	0
Δ log IM	0,00568974	0,01111615	0,00068382	0,007579	0
Δ log GDP	0,00119766	0,00275194	0,00063185	0,00020347	0,00152415

Inverse A Matrix

	Δ log CI	Δ log EX	Δ log HHI	Δ log IM	Δ log GDP
Δ log CI	1	0	0	0	0
Δ log EX	0,38055479	1	0	0	0
Δ log HHI	0,4392681	0,35303876	1	0	0
Δ log IM	0,29217504	0,75510292	0,04929326	1	0
Δ log GDP	0,06150134	0,18693513	0,04554691	0,02684623	1

SVAR Model 1B* (Over identified)

RESPONSE — IMPULSE

Cholesky

	Δ log CI	Δ log EX	Δ log HHI	Δ log IM	Δ log GDP
Δ log CI	0,01947374	0	0	0	0
Δ log EX	0,00741083	0,01472138	0	0	0
Δ log HHI	0,00855419	0,00519722	0,01387251	0	0
Δ log IM	0,0056149	0,01115383	0	0,00761025	0
Δ log GDP	0,00119766	0,00275194	0,00063185	0	0,00153767

Inverse A Matrix

	Δ log CI	Δ log EX	Δ log HHI	Δ log IM	Δ log GDP
Δ log CI	1	0	0	0	0
Δ log EX	0,38055479	1	0	0	0
Δ log HHI	0,4392681	0,35303876	1	0	0
Δ log IM	0,28833194	0,75766209	0	1	0
Δ log GDP	0,06150134	0,18693513	0,04554691	0	1

*Restrictions: Δ log IM = 0 on GDP , Δ log HHI on IM
LR test of identifying restrictions: Prob > chi2 = 0,658

Northern Block

SVAR Model 1A (Just identified)

RESPONSE — IMPULSE

Cholesky

	Δ log CI	Δ log EX	Δ log HHI	Δ log IM	Δ log GDP
Δ log CI	0,02014451	0	0	0	0
Δ log EX	0,00706993	0,01691267	0	0	0
Δ log HHI	0,01134183	0,00050479	0,01914205	0	0
Δ log IM	0,00761348	0,0098211	-0,0006308	0,00833786	0
Δ log GDP	0,00302357	0,00412157	0,00091253	-0,0013076	0,00307439

Inverse A Matrix

	Δ log GFCF	Δ log EX	Δ log HHI	Δ log IM	Δ log GDP
Δ log CI	1	0	0	0	0
Δ log EX	0,35096036	1	0	0	0
Δ log HHI	0,56302328	0,02984662	1	0	0
Δ log IM	0,37794337	0,58069488	-0,0329525	1	0
Δ log GDP	0,15009408	0,24369697	0,04767166	-0,1568269	1

SVAR Model 1B* (Over identified)

RESPONSE — IMPULSE

Cholesky

	Δ log CI	Δ log EX	Δ log HHI	Δ log IM	Δ log GDP
Δ log CI	0,02014451	0	0	0	0
Δ log EX	0,00706993	0,01691267	0	0	0
Δ log HHI	0,01134183	0	0,0191487	0	0
Δ log IM	0,00761348	0,0098211	0	0,00836169	0
Δ log GDP	0,00302357	0,00410015	0,00081389	-0,0013115	0,00307439

Inverse A Matrix

	Δ log CI	Δ log EX	Δ log HHI	Δ log IM	Δ log GDP
Δ log CI	1	0	0	0	0
Δ log EX	0,35096036	1	0	0	0
Δ log HHI	0,56302328	0	1	0	0
Δ log IM	0,37794337	0,58069488	0	1	0
Δ log GDP	0,15009408	0,24243089	0,04250348	-0,1568414	1

*Restrictions: Δ log EX = 0 on HHI , Δ log HHI on IM
LR test of identifying restrictions: Prob > chi2 = 0.817

Model 2A

Table 2A. Selection Order Criteria

Selection-order criteria	Southern Block				Northen Block			
Lag	FPE	AIC	HQIC	SBIC	FPE	AIC	HQIC	SBIC
0	2,300E-16	-24,67	-24,40	-23,97	1,20E-15	-23,04	-22,77	-22,35
1	8,3e-17*	-25,68*	-25,19*	-24,42*	2,6e-16*	-24,54*	-24,05*	-23,28*
2	1,000E-16	-25,47	-24,76	-23,66	3,60E-16	-24,23	-23,52	-22,41
3	9,900E-17	-25,57	-24,64	-23,19	4,70E-16	-24,01	-23,08	-21,63
4	1,200E-16	-25,46	-24,31	-22,52	5,70E-16	-23,88	-22,73	-20,95

Sample: 2000q2-2015q1, Number of obs = 60
Endogenous: Δ log GFCF, Δ log ULC, Δ log EX, Δ log Ur
Exogenous: Δ log G, q1, q2, q3, q4

Table 2B. Jarque-Bera Normality test

Jarque-Bera test	Southern Block			Nothern Block		
Equation	chi2	df	Prob > chi2	chi2	df	Prob > chi2
Δ log GFCF	1,36	2	0,50643	0,013	2	0,99343
Δ log ULC	3,08	2	0,21395	10,23	2	0,006
Δ log EX	0,11	2	0,94747	13,94	2	0,00094
Δ log Ur	1,55	2	0,45974	1,64	2	0,44047
ALL	6,11	8	0,63526	25,82	8	0,00113

Sample: 2000q2-2015q1, Number of obs = 60
Ho: Normality

Table 2C. Lagranger-Multiplier test

Lagrange-multiplier test	Southern Block			Nothern Block		
Lag	chi2	df	Prob > chi2	chi2	df	Prob > chi2
1	10,62	16	0,83245	14,75	16	0,54295
2	20,88	16	0,18318	14,93	16	0,52995
3	23,44	16	0,10245	12,38	16	0,71734
4	9,89	16	0,87247	11,17	16	0,7986

Sample: 2000q2-2015q1, Number of obs = 60
Ho: No autocorrelation at lag order.

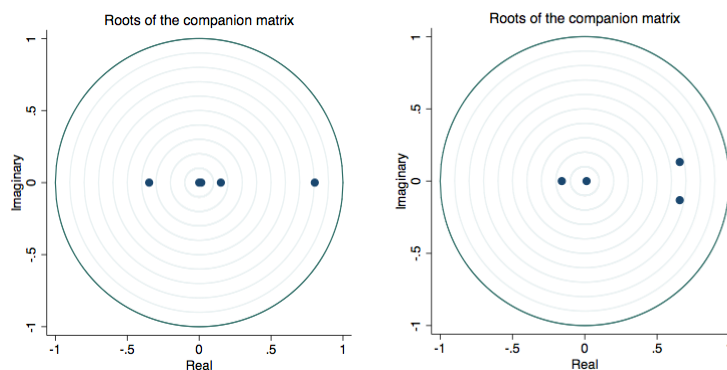## Figure 2A. Eigenvalue Stability Condition - SB (LHS) NB (RHS)

Table 2D. Model 2A - Direct Effects: Cholesky and Inverse A matrix

SVAR Model 2A (Just identified) — Southern Block

RESPONSE	IMPULSE Δ log GFCF	Δ log ULC	Δ log EX	Δ log Ur
Cholesky				
Δ log GFCF	0,0080531	0	0	0
Δ log ULC	-0,0010624	0,0044527	0	0
Δ log EX	0,0115357	-0,0067122	0,0105665	0
Δ log Ur	-0,0113781	0,0051968	-0,0011923	0,0129939
Inverse A Matrix				
Δ log GFCF	1	0	0	0
Δ log ULC	-0,1319262	1	0	0
Δ log EX	1,43246075	-1,5074471	1	0
Δ log Ur	-1,4128887	1,16711681	-0,112835	1

SVAR Model 2A (Just identified) — Northern Block

RESPONSE	IMPULSE Δ log GFCF	Δ log ULC	Δ log EX	Δ log Ur
Cholesky				
Δ log GFCF	0,014824322	0	0	0
Δ log ULC	-0,002685956	0,004469651	0	0
Δ log EX	0,007248418	-0,009580677	0,012367778	0
Δ log Ur	-0,007233879	0,004258063	-0,001701904	0,011674596
Inverse A Matrix				
Δ log GFCF	1	0	0	0
Δ log ULC	-0,18118575	1	0	0
Δ log EX	0,48895443	-2,143495796	1	0
Δ log Ur	-0,487973694	0,952661342	-0,137607916	1

SVAR Model 2A* (Over identified) — Southern Block

RESPONSE	IMPULSE Δ log GFCF	Δ log ULC	Δ log EX	Δ log Ur
Cholesky				
Δ log GFCF	0,00805306	0	0	0
Δ log ULC	-0,0010624	0,00445267	0	0
Δ log EX	0,01153569	-0,0067122	0,01056647	0
Δ log Ur	-0,0113781	0,00519679	0	0,01304849
Inverse A Matrix				
Δ log GFCF	1	0	0	0
Δ log ULC	-0,1319262	1	0	0
Δ log EX	1,43246075	-1,5074471	1	0
Δ log Ur	-1,4128887	1,16711682	0	1

SVAR Model 2A* (Over identified) — Northern Block

RESPONSE	IMPULSE Δ log GFCF	Δ log ULC	Δ log EX	Δ log Ur
Cholesky				
Δ log GFCF	0,014824322	0	0	0
Δ log ULC	-0,002685956	0,00446965	0	0
Δ log EX	0,006152935	-0,010238987	0,012433639	0
Δ log Ur	-0,006957068	0,002587171	-0,003141712	0,011903654
Inverse A Matrix				
Δ log GFCF	1	0	0	0
Δ log ULC	-0,18118575	1	0	0
Δ log EX	0,415056763	-2,290780392	1	0
Δ log Ur	-0,469300898	0,578830722	-0,252678399	1

*Restrictions: Δ log EX on Ur
LR test of identifying restrictions: Prob > chi2 = 0.6

*Restrictions: Δ log GFCF = 0 on EX , Δ log ULC on Ur
LR test of identifying restrictions: Prob > chi2 = 0.21

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Model 2B

Table 2E. Selection Order Criteria

Selection-order criteria	Southern Block				Northen Block			
Lag	FPE	AIC	HQIC	SBIC	FPE	AIC	HQIC	SBIC
0	1,50E-18	-26,84	-26,50	-25,97	1,90E-18	-26,64	-26,30	-25,76
1	5,80E-19	-27,82	-27,14	-26,07*	3,4e-19*	-28,34*	-27,66*	-26,60*
2	4,2e-19*	-28,19	-27,16*	-25,57	5,30E-19	-27,95	-26,92	-25,33
3	4,50E-19	-28,19	-26,83	-24,70	6,20E-19	-27,86	-26,50	-24,37
4	5,00E-19	-28,21*	-26,51	-23,85	7,60E-19	-278005,00	-26,09	-23,44

Sample: 2000q2-2015q1, Number of obs = 60
Endogenous: Δ log CI, Δ log ULC, Δ log EX, Δ log HHI, Δ log Ur
Exogenous: Δ log G, q1, q2, q3, q4

Table 2F. Jarque-Bera Normality test

Jarque-Bera test	Southern Block			Nothern Block		
Equation	chi2	df	Prob > chi2	chi2	df	Prob > chi2
Δ log CI	1	2	0,56699	0.476	2	0,78828
Δ log ULC	2	2	0,41008	2,310	2	0,31512
Δ log EX	5	2	0,06465	14,421	2	0,00082
Δ log HHI	2	2	0,31686	1,082	2	0,58210
Δ log Ur	1	2	0,53105	0,115	2	0,94431
ALL	12	10	0,28777	18,196	10	0,05175

Sample: 2000q2-2015q1, Number of obs = 60
Ho: Normality

Table 2G. Lagranger-Multiplier test

Lagrange-multiplier test	Southern Block			Nothern Block		
Lag	chi2	df	Prob > chi2	chi2	df	Prob > chi2
1	28,0170	25	0,30707	18	25	0,84568
2	27,6387	25	0,32475	21	25	0,70536
3	23,9595	25	0,52172	27	25	0,37415
4	23,0623	25	0,57392	28	25	0,2978

Sample: 2000q2-2015q1, Number of obs = 60
Ho: No autocorrelation at lag order.

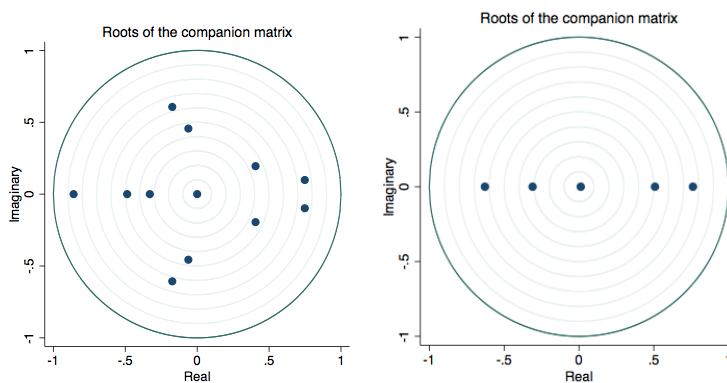**Figure 2C.** Eigenvalue Stability Condition – SB (LHS) NB (RHS)

Table 2H. Model 2B - Direct Effects: Cholesky and Inverse A matrix

SVAR Model 2B (Just identified)

Southern Block

RESPONSE — Cholesky	IMPULSE				
	Δ log CI	Δ log ULC	Δ log EX	Δ log HHI	Δ log Ur
Δ log CI	0,0198586	0	0	0	0
Δ log ULC	-0,0010463	0	0	0	0
Δ log EX	0,0089134	-0,0074115	0	0	0
Δ log HHI	0,0101324	-0,0041309	0,0073207	0,0142421	0
Δ log Ur	-0,0069335	0,0067134	-0,0069437	-0,0036805	0,0145352

RESPONSE — Inverse A Matrix	IMPULSE				
	Δ log CI	Δ log ULC	Δ log EX	Δ log HHI	Δ log Ur
Δ log CI	1	0	0	0	0
Δ log ULC	-0,0526879	1	0	0	0
Δ log EX	0,44884328	-1,7320132	1	0	0
Δ log HHI	0,51023044	-0,9653672	0,56103098	1	0
Δ log Ur	-0,3491429	1,56887419	-0,5321362	-0,2584209	1

Northern Block

RESPONSE — Cholesky	IMPULSE				
	Δ log CI	Δ log ULC	Δ log EX	Δ log HHI	Δ log Ur
Δ log CI	0,01970129	0	0	0	0
Δ log ULC	-0,00179	0,00512932	0	0	0
Δ log EX	0,00728666	-0,01163892	0,01214322	0	0
Δ log HHI	0,01229393	-0,00237722	-0,00351554	0,01889547	0
Δ log Ur	-0,0058714	0,005200139	-0,00090005	0,00037532	0,01193871

RESPONSE — Inverse A Matrix	IMPULSE				
	Δ log CI	Δ log ULC	Δ log EX	Δ log HHI	Δ log Ur
Δ log CI	1	0	0	0	0
Δ log ULC	-0,0908588	1	0	0	0
Δ log EX	0,36985698	-2,26909613	1	0	0
Δ log HHI	0,62401649	-0,463457	-0,28950663	1	0
Δ log Ur	-0,2980186	1,013806646	-0,07411954	0,01986278	1

SVAR Model 2B* (Over identified)

Southern Block

RESPONSE — Cholesky	IMPULSE				
	Δ log CI	Δ log ULC	Δ log EX	Δ log HHI	Δ log Ur
Δ log CI	0,01985856	0	0	0	0
Δ log ULC	-0,0010463	0,00427912	0	0	0
Δ log EX	0,00891338	-0,0074115	0,01304866	0	0
Δ log HHI	0,01013244	-0,0041515	0,00730904	0,01424212	0
Δ log Ur	-0,006899	0,00462957	-0,0081508	-0,0036889	0,01473443

RESPONSE — Inverse A Matrix	IMPULSE				
	Δ log CI	Δ log ULC	Δ log EX	Δ log HHI	Δ log Ur
Δ log CI	1	0	0	0	0
Δ log ULC	-0,0526879	1	0	0	0
Δ log EX	0,44884328	-1,7320132	1	0	0
Δ log HHI	0,51023044	-0,9701652	0,56013729	1	0
Δ log Ur	-0,3474061	1,0818983	-0,6246478	-0,2590139	1

Northern Block

RESPONSE — Cholesky	IMPULSE				
	Δ log CI	Δ log ULC	Δ log EX	Δ log HHI	Δ log Ur
Δ log CI	0,01970129	0	0	0	0
Δ log ULC	-0,00179	0,00512932	0	0	0
Δ log EX	0,00728666	-0,01163892	0,01214322	0	0
Δ log HHI	0,01229393	0	0	0,01936618	0
Δ log Ur	-0,0058714	0,005200139	0	0	0,01197847

RESPONSE — Inverse A Matrix	IMPULSE				
	Δ log CI	Δ log ULC	Δ log EX	Δ log HHI	Δ log Ur
Δ log CI	1	0	0	0	0
Δ log ULC	-0,0908588	1	0	0	0
Δ log EX	0,36985698	-2,26909613	1	0	0
Δ log HHI	0,62401649	0	0	1	0
Δ log Ur	-0,2980186	1,013806662	0	0	1

*Restrictions (Southern): Δ log ULC = 0 on HHI, Δ log CI on Ur, Δ log ULC on Ur
LR test of identifying restrictions: Prob > chi2 = 0.6

*Restrictions (Northern): Δ log ULC = 0 on HHI, Δ log EX = 0 on Ur, Δ log EX on Ur, Δ log HHI on Ur
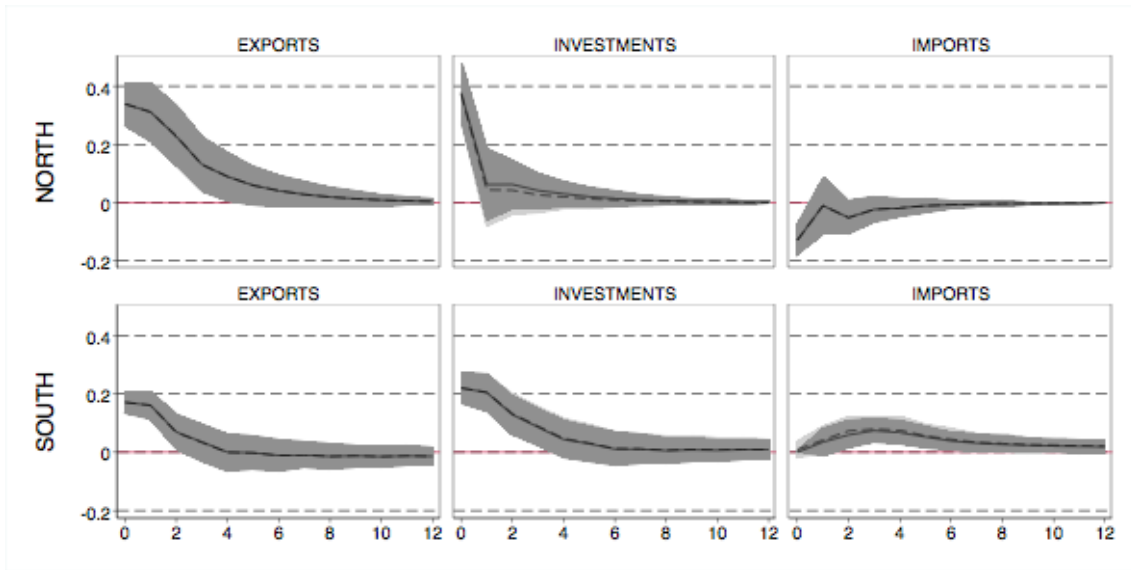LR test of identifying restrictions: Prob > chi2 = 0.47

Figure 3A. Model 1A - Robustness Figure 6 - Orthogonalized and Structural Impulse Responses of GDP to an Export, Investment and Import Shock.
Note: The Variable Ordering is Investment, Government Expenditure, Exports, Imports, GDP, long-term interest rate, and real effective exchange rate. The Shock is a unit standard deviation. Solid lines are point estimates, light and dark grey area are the 90% confidence regions for structural and orthogonalized IRFs, respectively. The Y-axis is in % points and the X-axis shows quarters, i.e three years.
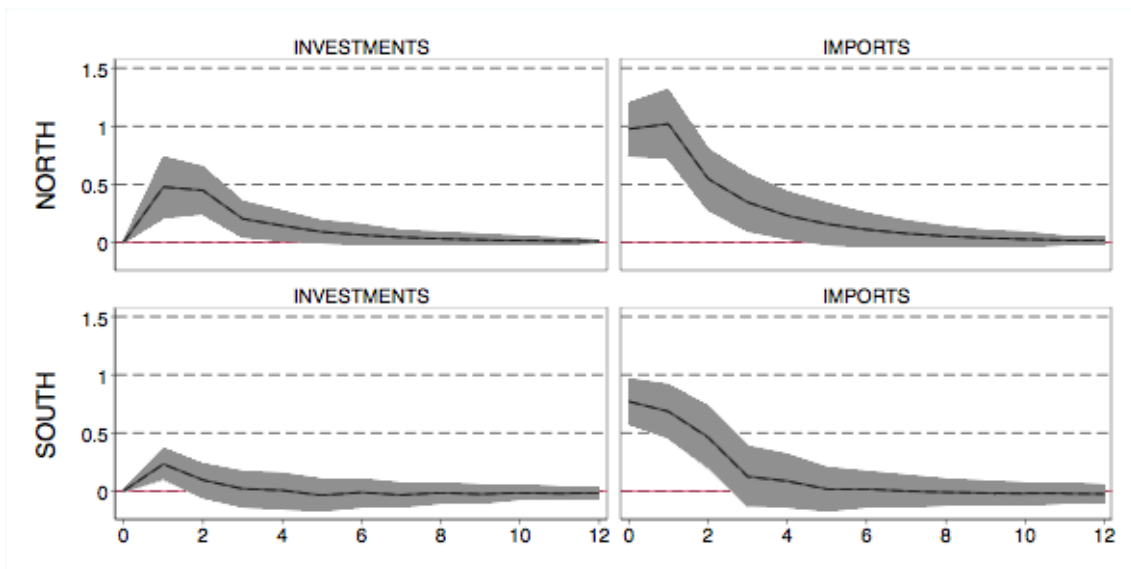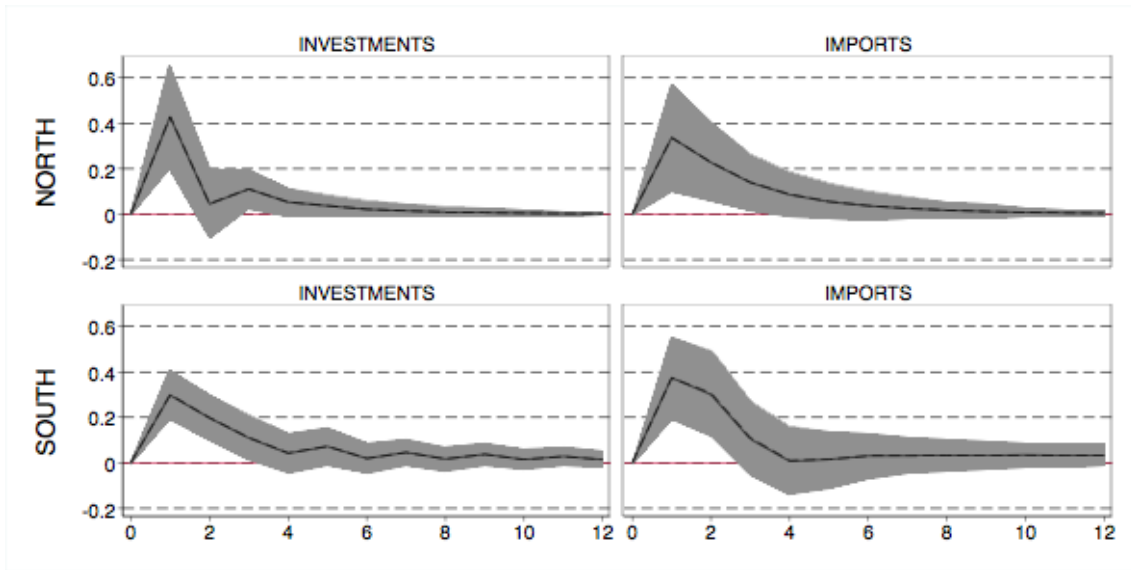

Figure 3B. Model 1A - Robustness Figure 7 - Orthogonalized and Structural Impulse Responses to an Export Shock.
Note: The Variable Ordering is Investment, Government Expenditure, Exports, Imports, GDP, long-term interest rate, and real effective exchange rate. The Shock is a unit standard deviation. Solid lines are point estimates, light and dark grey area are the 90% confidence regions for structural and orthogonalized IRFs, respectively. The Y-axis is in % points and the X-axis shows quarters, i.e three years.
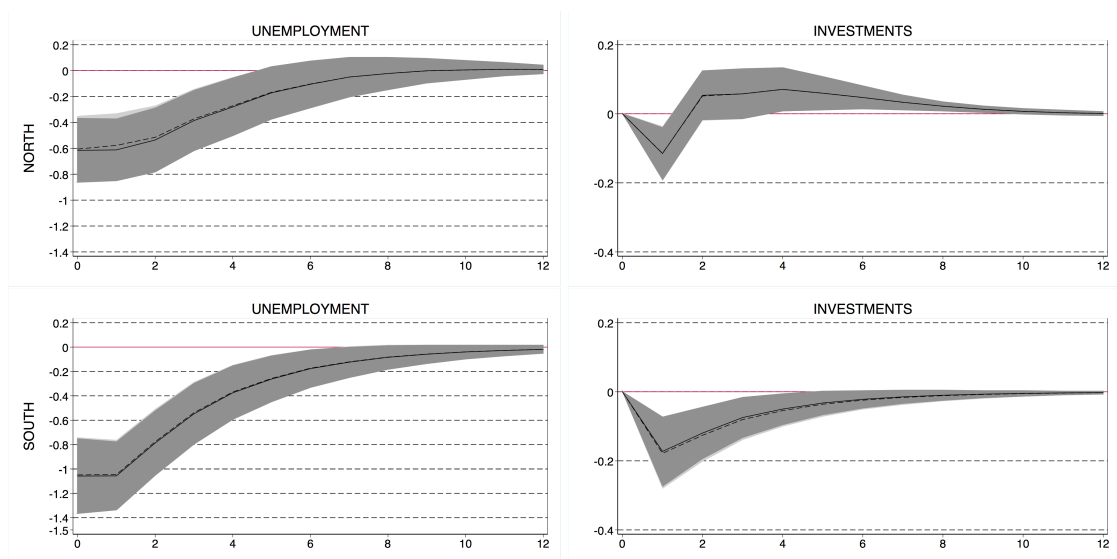
Figure 3C. Model 1A - Robustness Figure 8 - Orthogonalized and Structural Impulse Responses to a GDP Shock.

Note: The Variable Ordering is Investment, Government Expenditure, Exports, Imports, GDP, long term-interest rate, and real effective exchange rate. The Shock is a unit standard deviation. Solid lines are point estimates, light and dark grey area are the 90% confidence regions for structural and orthogonalized IRFs, respectively. The Y-axis is in % points and the X-axis shows quarters, i.e three years.
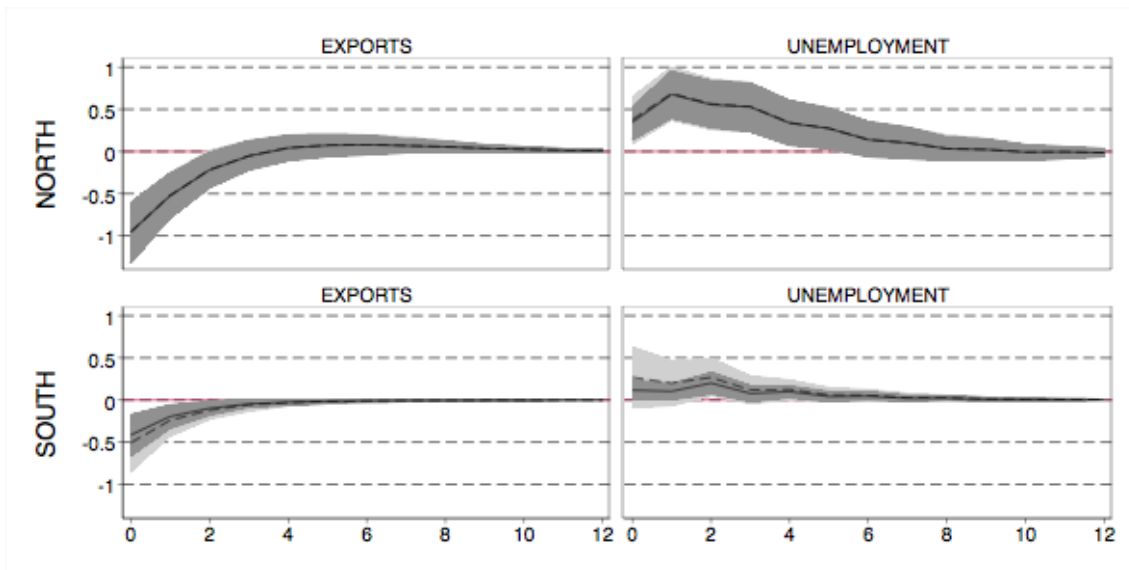

Figure 3D. Model 2A - Robustness Figure 15 - Orthogonalized and Structural Impulse Responses of the Unemployment rate to Investments Shock (First Raw) and of Investments to an Unemployment Shock (Second Raw).

Note: The Variable Ordering is Unit Labour Cost, Investment, Government Expenditure, Exports, Imports, Unemployment rate, long-term interest rate, and real effective exchange rate. The Shock is a unit standard deviation. Solid lines are point estimates, light and dark grey area are the 90% confidence regions for structural and orthogonalized IRFs, respectively. The Y-axis is in % points and the X-axis shows quarters, i.e three years.

Figure 3E. Model 2A - Robustness Figure 16 - Orthogonalized and Structural Impulse Responses to a Unit Labour Cost Shock.

Note: The Variable Ordering is Unit Labour Cost, Investment, Government Expenditure, Exports, Imports, Unemployment rate, long-term interest rate, and real effective exchange rate. The Shock is a unit standard deviation. Solid lines are point estimates, light and dark grey area are the 90% confidence regions for structural and orthogonalized IRFs, respectively. The Y-axis is in % points and the X-axis shows quarters, i.e three years.

CHAPTER IV

The Emerging Regulatory Landscape
A New Normal

Breaking the Link between Banks and Sovereigns

Abstract

The study provides an insight on the regulatory requirements banks have been complying with since the financial crisis of 2009. Precisely it focuses upon the Bank Recovery and Resolution Directive's full implementation and effectiveness. An empirical analysis on the European banks' CDS market sheds light on the mechanisms driving its current and historical developments, emphasizing the motivations for the change in the regulatory architecture. The policies will be proved to be effective in changing investors' risk perception, that is, a shift of risk burden from senior bondholders towards subordinated debt holders, as well as a breach in the link between banks and sovereigns' default probabilities, the so-called doom loop. Ultimately a comparative analysis on banks' capital requirement, return on equity, leverage and risk weighted assets provides evidence on the impact regulations have on the European banks' business strategies, thereby shaping the New Normal. In conclusion the paper discusses if the current regulatory regime will be able to prevent future sources of instability.

The notion of spontaneous order: the mutual interaction of multitudinous individual components that generates a regular, self-reproducing pattern (or order) of activities. Now the essential point about a spontaneous order is that it is definitely not a preconceived design; there is no single or group mind behind it - there is nobody 'minding the whole store'... micromotives lead to macrobehaviour that individual agents neither foresee nor intend; and yet the result - the macro-order - is a self-stabilising system, not a mere anarchic chaos of events (T.C. Schelling, 1978:20-22) [1].

The time path of the economy depends upon the financial structure. As a result of cumulative changes financial relations became conducive to instability… Policies to control and guide the evolution of finance is necessary… The enforcement of simplicity in financial arrangements will be difficult (H.P. Minsky, 1982:15-92-113)[2].

The primary aim is a humane economy as a first step toward a humane society (H.P. Minsky, 2008:326) [3].

1. Introduction

Historically the link between banks and sovereigns has been always intertwined: the bank was the economic guarantor of the state, while the sovereign was the guardian of the bank. The fortune of a bank followed the fortune of a state, and the fortune of the state was often financed by the fortune of its bank. The first prototype of bank appeared in the eleventh century in the form of a group of investors called "The Lombards" who were spreading their business across France, Germany, England and Italy. Still today in the heart of London and Paris a street testifies their contribution to the banking system, respectively Lombard Street and Rue des Lombards. The expression 'Lombard Banking' in the common usage refers to the commitment to lend against obligation, or in the current state of the arts - a collateralized operation. Despite the regulators of that time - the Church - which was against usury, financial intermediation was growing fast[4]. The natural consequence was the flourish of markets and fairs - trade - which, in turn, boosted economic growth and the wealth of nations. The growing number of financial intermediaries and the creation of new instruments such as 'bills of exchange' and 'surety' were the spark outlined the end of the Middle Age and the birth of the City-State and Sovereigns in Europe[5]. Finance was at the root of the economic development since credit allowed the state to boost trade. In turn 'social mobility' arose and spread opportunities across different social classes: the Medici Family from merchants became bankers and from bankers Lords of Florence in few decades. Nevertheless the financial system wasn't yet organised in a well-defined banking system since when Bank of Saint George - Banco di San Giorgio - was founded in 1407 as the bank of the Republic of Genoa - the oldest bank in Europe. From then on the relationship between sovereigns and

banks strengthened as long as the magnitude of the two blocks in the economy. Their exposures were so interconnected that the overlap of their destiny was the natural outcome. Nonetheless, the idea of the financial institution set up in Genoa was "in the interests of the City and its citizens - an idea that, at a certain point in history, would be adopted by the European States" and that recently has been eroded to the point that nobody believes banks pursue their operations for its own country or own customers[6]. This point of no return culminated in the aftermath of the financial crisis where everybody started blaming bankers for their moral hazard behaviours. Since then it became clear that banks where not anymore able to pursue the noble role of allocating capitals efficiently throughout markets and the real economy. The virtuous cycle of a larger volume of trade, stronger economic growth, and more investments reverted in a negative spiral where profit maximization became the unique goal of bankers: a shift from a long-term view of business to parasitic short-term strategies[7]. The consequences of this change flew naturally into the financial crisis as clearly depicted by Alan Blinder's book "After The Music Stopped":

A host of financial manipulations that ordinary people did not understand, and in which they played no part, cost million of them their livelihoods and their homes, bankrupted many businesses, destroyed trillion dollars' of wealth, brought the once-mighty U.S. economy to its knees, and left all level of government gasping for tax revenue. If people felt as though they were mugged, it's because they were [8].

Many researchers started to investigate the features of this linkage, newly so-called doom-loop, deadly embrace, or vicious cycle. The double better-off principle - positive correlation of banks' profits with customer/sovereign gains - wasn't taking place anymore. Reinhart and Rogoff[9], Taylor et al[10] and Tirole[11] as many other researchers documented and investigated clearly the causes and the effects of this change of route. As a consequence regulators started to redesign the financial structure in order to preserve the allocating role of the banking system and the long-term market functioning. Plenty of new regulatory standards followed. Banks' capital and liquidity requirements were drastically improved in order to make the banking system resilient at the expense of banks' profits. Basel III and its implementation entered into force in January 2014[12]. This was only the beginning of the end of the golden age of the banking system. Double digit returns close to 20% that were experienced since the financial deregulation of the late 70s and due to the invention of derivative contracts is now only a vague memory. Banks are currently struggling to recover their cost of capital. Nevertheless this is only the beginning. From January 2015 the new resolution and recovery regime, the so-called Bank Recovery and Resolution Directive (BRRD), entered into force in the European

Union. This new set of rules together with Basel III is the most transformational regulatory change for the banking system in history. The new architecture is and will be affecting banks' business strategies as well as investors' risk perception and investment behaviours. Regulators have been trying in shaping a 'New Normal' in the banking system and financial industry. Many believe that restoring the good old values in the banking system might be impossible, nevertheless there is no harm in trying.

According to this introduction, the paper will try to outline the current regulatory architecture in order to lead the reader pragmatically through this new landscape. The initial focus - chapter 2 - will be set upon the markets adaptation to the incoming implementation of the following regulatory initiatives: Total Loss Absorbing Capacity (TLAC)[13] and Minimum Requirement for Own Funds and Eligible Liabilities (MREL)[14]. An empirical analysis - chapter 3 - dealing with Credit Default Swap (CDS) developments between senior and subordinated debt holders will be pursued in order to shed light on the change in the investors' risk perception. Then in chapter 4 the investigation will try to assess if the new regulatory structure is effectively affecting banks' business models and in turn lightening the link between banks and sovereigns' probability of default. Ultimately concluding remarks will evaluate some policy implications as well as some open issues so as to depict the future possible sources of instability.

2. A New Normal For Debt Holders And The Financial System

The recent crisis has shown that the entire financial system needs to be reformed. Financial institutions are global, complex, and especially too onerous for governments to let them fail. Since then, resolution regimes became the cornerstone of the new regulatory architecture. Two different directions have been pursued on both sides of the Atlantic although EU and US share the very same goal: resolve failing financial institutions quickly without triggering systemic risk and avoiding government intervention. In fact the European Union Bank Recovery and Resolution Directive has almost nothing in common with the Dodd-Frank Act except the goal as we can see from table 1.

Even the scope to which the resolution procedure is directed diverges remarkably. Concerning EU the directive covers all credit institutions and investment firms, while in the case of US only large and complex banks i.e., entities with consolidated assets greater than USD 50 bn. However given the systemic nature of the problem, i.e., strong negative cross-border externalities and high level of inter countries balance sheet correlation among financial institutions, a coordination mechanism between different regulatory

regimes has been set in place. In 2011 the G20 leaders and the Financial Stability Board (FSB) developed a new international standard for effective resolution regimes[15]. The focus of this new set of rules is to make Global Systematically Important Financial Institutions (G-SIFIs) have enough liabilities with loss-absorbing capacity (TLAC) to avoid a bailout and possible 'domino effect'. Shareholders and debtholders will suffer the whole recapitalisation burden and banks won't rely on public funds anymore. Taxpayers will be finally shielded from banks' default. This is clearly emphasized by principle I of the FSB' TLAC compendium:

There must be sufficient loss-absorbing and recapitalisation capacity available in resolution to implement an orderly resolution that minimises any impact on financial stability, ensures the continuity of critical functions, and avoids exposing taxpayers (public funds) to loss with a high degree of confidence[16].

Table 1. Comparison between Resolution Regimes in EU and US

	US (Dodd-Frank Act-Title II)	EU (BRRD)	Comparability
Goal	i) To resolve failing financial institutions quickly, ensuring the stability of the financial system ii) To minimize taxpayer contributions to resolution episodes		Yes
Scope	Only large and complex banks	All credit institutions and investment firms	X
Resolution Authority	Existing Federal Deposit Iinsurance Corporation created by the Congress to, among other things, insure deposits	New Resolution Board composed by national and European authorities	X
Trigger for Resolution	i) Failing or likely to fail institutions ii) To protect public interest and financial stability iii) No private alternatives to prevent the default of the institution		Yes
Recovery Plan	No requirement	Annual review, update and submission to the resolution authority and supervisor	X
Resolution Plan	Annual review, update and submission to the resolution authority (FDIC); bank ownership	Annual review and update; resolution authority ownership	X
Resolution Strategy	Single-point-of-entry in the US. No specific reference to global resolution scheme	Multiple-point-of-entry or Single-point-of-entry with a global perspective	X
Bail-in Hierarchy of Claims	Four layers: Capital + senior debt + uncovered deposits + covered deposits	Four layers: Capital + senior debt paripassu with uncovered corporate deposits + uncovered deposits of SME & households + covered deposits	X
Resolution Fund Usage	Liquidity support	Liquidity and Capital support	X
Resolution Fund Funding	Ex-post funding by the financial sector contrbutions (if needed)	Ex-ante funding by the financial sector contributions	X
Public Support	Not allowed	Limited to a very extraordinary situation and systemic crisis	X

Source: BBVA Research [17].

To this respect at any point in time G-SIFIs have to be able to write down instruments for an amount that doubles the capital and leverage requirements, respectively 16-20% of Risk Weighted Assets and 6 % of leverage as from January 2019[18]. This new prudential ratio has to guarantee the legality, feasibility, efficiency and effectiveness of the resolution plan, making the bail-in credible and reliable. It is straightforward that not

only the banking industry is going to face a transformational change but all the stakeholders involved, especially investors who have to deal with these new sources of risk, new profitability levels, and therefore new prices that these regulatory requirements imply. The uncertainty surrounding the country-specific minimum requirements as well as the idiosyncrasies among the different bailinable instruments are the main concern for investors, since higher requirements may lead to lower profitability and higher bail-in risk. It is then crucial to highlight the main differences between TLAC and MREL requirements. To this respect the European Banking Association (EBA) aims at implementing MREL in a way that is consistent with TLAC. However differences such as type of entities involved - GSIFI vs all financial entities - time table for implementation - January 2019 vs January 2016 - and type of bailinable instruments - senior unsecured only up to 2,5% of RWA vs full compliance - will trigger price divergences from current market price.

2.1 Minimum Requirements for Global Systemically Important Financial Institutions: TLAC

Total Loss Absorbing Capacity has to comply with two pillars set by the Basel Committee on Banking Supervision (BCBS), which defines respectively the common and the bank specific minimum requirements. Pillar 1 establishes that if a bank is considered G-SIBs the minimum TLAC without capital buffers has to be equal or larger than Max (16-20% RWA; 6% leverage ratio denominator)[19]. On the other hand, given the score obtained in the measurement approach, which is used to assess if a bank is considered G-SIBs, an additional loss absorbency capacity is required[20]. According to this measurement method the TLAC requirements may range between 17-21% up to 19,5-23,5% of RWA without taking into account the conservation buffer that it is equal to 2,5 % of RWA. Every November the FSB with BCBS updates the list of G-SIBs in order to let the banks on the list comply with the new bank specific loss absorbency capacity required. Last November 2015 the G-SIBs list has been updated by the FSB, table 1 in the appendix. Thirty banks are considered G-SIBs: 10 of them from USA, 8 from the Eurozone, 4 from China, 3 from Japan, 2 from UK, 2 from Switzerland, and 1 from Sweden. As you can see, the higher the score, the larger the additional RWA amount they have to comply with. Figure 1 summarizes concisely the capital requirement thresholds and its composition. In fact we can see that long-term unsecured debt, both senior and subordinated, together with Additional Tier 1 (AdT1), and Tier 2 (T2) will constitute at least 33% of the Total TLAC requirements[21].

To this respect, it is important to stress that the instrument hierarchy for the bail-in scenario will be the principal factor affecting the price adjustment of the underlined assets. The subordination hierarchy according to the FSB will consist in making fully bailinable long-term unsecured subordinated debt, while long-term unsecured senior will count only partially, up to 2,5 % of RWA[22]. According to this hierarchy in case a resolution process would take place, equity and subordinated debt will cover the outstanding loss or the so called 'bad assets' through a resolution entity, while the senior debt will be written down as bridge bank's new equities in order to preserve the core functions of the bank. All other liabilities not being written down during the resolution process will remain with the same status in the new entity, the bridge bank. However since remarkable differences in banks' organisational model exist between Europe and Anglo-Saxon countries, the QIS will be determinant to set the optimal pillar 1 in a way not to penalize one business structure[23]. The main difference is that a system based on a holding company, like the Anglo-Saxon one, covers the resolution requirements through the holding company debt and equity issuance which are subordinated - first to be bail in - to those of the subsidiaries. Since the holding company is a non-operative company, the additional threshold of RWA, also called the management buffer, necessary to avoid a break of the TLAC minimum requirement will be much lower than in a system without a holding company in which all the subsidiaries have to issue subordinated debt and build up the management buffer. To this respect the proposed timeline established by FSB to gradually make the financial system's liability structure comply with TLAC minimum requirements is smooth. By looking at figure 2, two important deadlines have to be highlighted for the purpose of this analysis.

*Insert About Here **Figure 2***
TLAC Timeline

During the third quarter of 2015, the final recommendation requirements were finalized so as to allow, within January 2019, the G-SIBs to implement the mandatory structural changes to their liability structure. From now on, the G-SIBs will have almost three years to issue long-term unsecured debt as well as T2 and AdT1 instruments. During this phase-in period as long as banks will adjust their balance sheets, investors will re-price the intrinsic risk given the new probability of default and their expected loss in case of

bail-in. In the next paragraph a deeper analysis on the European Union Bank Recovery and Resolution Directive and on its bail in tool - Minimum Requirement for Own Funds and Eligible Liabilities (MREL) - will provide a clear picture on how requirements may differ and, in turn, trigger price asymmetries within the same group of eligible debt instruments and among different types of banks, systemic and not.

2.2 The European Union Bank Recovery and Resolution Directive: MREL

The BRRD entered into force in January 2015, nevertheless the cornerstone of its resolution tool, the MREL will only be binding from January 2016. For the purpose of our analysis, the focus will deal with four main points which table 2 outlines concisely. First of all, the directive covers all financial institutions in the European Union, not only the global systemically important banks. This implies a major change in the cost structure of the European financial system, which, in turn creates negative spill-over effects on the non-financial sectors. The real economy may enter into a transitional period of business model transformation where companies will gradually switch to more equity funding instead of relying exclusively on banks' lending[24].

Table 2. Comparison between MREL and TLAC

	MREL	TLAC	Comparability
Scope of Covered Firms	All credit Institutions and investment firms	Global systemically important banks (G-SIBS)	X
Objective	To ensure that there is an appropriate level of loss-absorbing and recapitalisation capacity for the relevant group to be resolvable and that the critical functions can be continued without taxpayer (public) funding and avoiding adverse effects on the financial system.		Yes
Eligible Instruments	Equity, junior debt, senior debt, and other unsecured liabilities with residual maturity over 1 year.	Equity, junior debt, senior subordinated debt and part of the senior unsubordinated debt which is pari-passu with excluded liabilities.	X
Pillar 1 vs Pillar 2 Approach	Case-by-case approach (Pillar 2) based on each bank's characteristics: resolvability assessment; complexity, risk profile, etc.	All banks should have the same Pillar 1 minimum TLAC requirement plus a Pillar 2 firm-specific requirement.	X
Sizing	MREL shall be calculated as a % of the institution's total liabilities and own funds, considering derivatives netting rights.	Pillar 1 standard minimum: (16-20% of-RWA or 6% of leverage assets) plus Pillar 2 caseby- case requirements.	X
Long-Term Unsecured Debt Subordination	Statutory subordination through different hierarchy of claims. Senior debt is subordinated to SME and retail deposits but pari passu with corporate deposits and derivates.	Contractual subordination to all excluded liabilities such as derivatives, secured deposits, etc. Despite the contractual subordination, the TLAC would accept a limited amount of senior debt without subordinated clauses.	≈
Placement SPEs: Internal TLAC	No mentioned	SPE banks would have to issue external TLAC at parent level and transfer it downstream via on-balance sheet items or collateralised guarantees, internal TLAC, to the material entities within the group.	X
Placement	At group or individual level, depending on the resolution strategy: under an SPE at consolidated group and MPE strategy at individual subsidiary level.	TLAC should be place at each point of entry. It will be determined by the resolution strategy: at parent level under an SPE scheme and at subsidiary level under an MPE scheme.	Yes
Disclosure	Banks will have to disclose the amount, maturity and composition of TLAC/MREL maintained by each resolution entity and at each material subsidiary.		Yes
Come into Force	MREL requirement is already approved and will come into force in 2016.	No earlier than 1 January 2019	X
Conditionally	Not mentioned, but it is assumed that the breach of the MREL would imply the requirement of developing and carrying out an MREL restoration plan.	A breach or likely breach of TLAC should be treated as severely as the minimum capital requirement.	≈

Source: BBVA Research[25].

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Second, the measurement method to appraise the minimum requirements is more discretionary than in the TLAC specification. The minimum threshold should be close to 8% for all credit institutions, nevertheless higher requirements will be decided on a case by case basis given the size, the business model and the risk profile of the bank[26]. Moreover if losses exceed the MREL requirements a resolution fund will contribute up to 5 % of the bank's total liabilities[27]. In exceptional cases such as in the event of a systemic crisis, if these funds are not enough to cover all the losses, government stabilisation tools can be used to avoid destructive consequences on the financial system and real economy. The time-table for the phase-in period is much more stringent than the one for TLAC since MREL has become binding in January 2016 as required by Art. 45 of the BRRD. The natural consequence is that banks' liability structure will have to adapt faster and thus investors. However the European Banking Association (EBA) and the European Commission (EC) may review in 2016 the MREL standards in order to make it comply with the TLAC general framework, which was finalized by FSB in November 2015[28].

Lastly, the preventive and preparatory procedures and plans as well as the actions in case of MREL breach are more discretionary and complex than in the TLAC procedures. In fact as a complement to liquidity and capital plans, which are under banks' own responsibility, recovery plans have to be carried out and submitted to the supervisor in case the situation deteriorates[29]. Moreover if the entity under stressed conditions is not able to restore its availability, then the resolution authority in cooperation with the supervisor and the institutions themselves may oblige the bank to enter the resolution procedure and therefore starts to develop a resolution plan. This assessment is completely at the discretion of the resolution authority, which is empowered to appraise the specific point of non-availability (PONV). This is a crucial step since a breach in the MREL does not automatically kick off the resolution procedure, while under TLAC, a breach of the minimum threshold is, as stated by principle 10 of the FSB's final document, equivalent to "a breach of minimum capital requirement"[30]. For example "if maturing TLAC debt is not renewed, a bank will breach its capital buffer first and will suffer capital distribution penalties as long as the capital buffer is eroded"[31]. This implies that both shareholders and AdT1 investors will have to incorporate this risk in their evaluation schemes since even a small breach may trigger the cancellation of dividends and coupon payments. According to what has been highlighted up to now, differences between TLAC and MREL exist and they are reflected in the shortfalls banks experience for these two

indicators. In fact by looking at table 3 we can appraise the current shortfalls for a selected sample of European, Swiss and UK banks, out of which 15 also belong to the group of G-SIBs.

Table 3. TLAC and MREL shortfalls

Bank	Issuer Credit Strenght Rating	TLAC (% of RWA)	Shortfall to 20%	Shortfall (EUR bn)	MREL [2] (% of Liabilities + Own Funds)	Shortfall to 8%	Shortfall (EUR bn)
Barclays	A	17.50%	2.50%	12.9	5.50%	2.50%	40.9
BBVA	A	15.30%	4.70%	15.8	8.60%	Above	Above
BNP Paribas	A+	13.30%	6.70%	41.6	4.30%	3.70%	69.8
Commerzbank	BBB+				5.80%	2.20%	12.9
Credit Agricole*	A	17.40%	2.60%	12.6	4.90%	3.10%	53.3
Credit Mutuel*	A				5.80%	2.20%	14.5
Credit Suisse	A+	22.10%	Above	Above	7.10%	0.90%	6.7
Danske Bank	A-				5.40%	2.60%	11.6
Deutsche Bank	A-	18.90%	1.10%	4.2	4.60%	3.40%	57.2
DNB	A+				7.00%	1.00%	2.9
Groupe BPCE*	A+	14.70%	5.30%	19.7	4.80%	3.20%	35.2
HSBC	AA-	16.60%	3.40%	30.9	7.60%	0.40%	8.9
ING*	A	17.40%	2.60%	7.4	6.20%	1.80%	13.9
Intesa*	BBB+				8.00%	Above	Above
KBC	A-				6.80%	1.20%	2.9
Lloyds	A				7.60%	0.40%	4.6
Nordea	A+	20.60%	Above	Above	4.90%	3.10%	19.6
Rabobank	A+				6.10%	1.90%	12.6
RBS	BBB+ [1]	18.30%	1.70%	8.1	7.10%	0.90%	11.1
Santander	A	14.30%	5.70%	31.8	6.80%	1.20%	14.2
SocGen	A	14.90%	5.10%	17.8	4.00%	4.00%	53.2
Swedbank	A-				5.30%	2.70%	6.1
UBS*	A	19.00%	1%	1.9	4.30%	3.70%	31.1
Unicredit*	BBB	15.20%	4.80%	18.5	6.90%	1.10%	8.9

Source: Scope Ratings[32].

Note: Data is from H1 2014 unless mentioned otherwise, if marked '*' they refer to 2013. [1] Rating includes one notch up for UK government majority ownership. [2] We have calculated liabilities and own funds as total assets minus minority interests. [3] Banks' outstanding senior unsecured liabilities are excluded from calculation.

For this sub-group the MREL shortfall is two times higher than the TLAC shortfall, respectively an average of EUR 28.26 bn and EUR 14.88 bn per bank[33]. Moreover, as we can see, the credit ratings developed by Scope are almost all beyond the A threshold, though they assume no government bail-out. This is due to the trade-off between higher minimum requirements and the no government bail-out, where the former compensates the latter. However not all the rating agencies think the same way. Fitch rating has underlined that for 2015 it is expected to downgrade 30% of all the European financial institutions, whose 81% because of the changing view on government support[34]. According to them 44% of their ratings in the EU are currently lifted up by the bail-out option in case of default. Since regulators are taking away this option, banks will face debt downgrades. This event will be an additional factor triggering yield increase and price asymmetries among banks with different ratings.

Moreover not only the issuer but also the specific asset type can face a rating downgrade. In fact ceteris paribus, a subordinate debt will be affected by the probability of default of the bank itself but also on the amount of instruments that has been issued. The former category reflects the bank's credit risk, while the latter reflects the priority of claims under resolution as well as the 'real capital buffer' among each category as depicted in table 4. In fact, if AdT1 instruments instead of covering 18,75% of the 8% minimum requirement cover only 10%, the remaining burden would be borne by T2 instruments which consequently become more risky and therefore costly - higher yields.

Table 4. Hierarchy of Claims

Bailin Liability Seniority Waterfall for EU Banks
1. Additional Tier 1
2. Tier 2
3. Other Subordinated Debt
4. Senior Unsecured Debt and Non-Eligible Deposits (Wholesale and Institutional)
5. Non-Covered Eligible Deposits (Individual and SME) -- Preferred
6. Deposit Guarantee Scheme (For Covered Deposits - Super Preferred)

Source: Scope Ratings[35].

On the one hand the shortfalls imply that an increasing amount of AdT1 and T2 as well as senior unsecured instruments will be issued by the banks facing the shortfall[36]. Already in 2014 the T1 and T2 issuances increased remarkably, almost EUR 15 bn per quarter, compare to an average of EUR 7.5 bn in 2013[37]. On the other hand, this means that possible price adjustments will be experienced for the new issuances. Moreover, senior unsecured instruments did not diverge from the path experienced in recent years. However, for the reason above explained and since covered bonds are excluded from the bailinable instruments category, a higher issuance amount of senior unsecured is expected during 2016[38]. Given the hierarchy of claims in case of resolution, it is likely that T2 instruments will be the preferred instruments together with subordinated debt not classified as AdT1 or T2.

In the end, before starting with the empirical analysis, a further theoretical point deserves attention: the extra insulation of senior unsecured debt given the new credit derivative definition.

2.3 The New Credit Derivatives Definition

On 22nd September 2014, the new 2014 ISDA Credit Derivatives Definitions were implemented. The new definitions constitute a watershed in the credit derivatives market

and address the issues arisen from the financial crisis regarding credit and succession events. To this respect several changes have been implemented, even if only two main points deserve attention for the purpose of this analysis: where financial reference entity terms are applied to a CDS for which the relevant reference obligation is a senior obligation, and a governmental intervention or restructuring credit event occurs in respect of subordinated debt, only the protection on the subordinated CDS will be triggered. For the protection on the senior CDS to be triggered a governmental intervention or restructuring credit event would need to occur in respect of the senior debt.

There has been a further split of subordinated and senior CDS when determining successor reference entities for a financial reference entity. The subordinated CDS will follow the subordinated debt and the senior CDS will follow the senior debt such that if the senior debt and the subordinated debt are transferred to two different entities, the subordinated CDS and senior CDS will subsequently refer to different reference entities. As we can understand, the introductions of these two specifications create an additional 'contractual buffer' to the senior debt so as to insulate senior debt holders from credit events which may trigger only subordinated debt restructuring. This line of reasoning works in theory, but as we can see in table 5 also in practice.

Table 5. Senior and Subordinated 5-year CDS Spreads for selected European Banks

Issuer	Senior 5Y			Sub 5Y			Sub / Senior Ratio	
	2003	2014	Increase	2003	2014	Increase	2003	2014
Credit Agricole	60	62	3%	89	126	42%	1.5	2.0
Barclays	63	64	3%	97	155	60%	1.6	2.4
BBVASM	70	73	4%	92	175	90%	1.3	2.4
BNP Paribas	58	60	3%	80	121	51%	1.4	2.0
Commerzbank	83	85	2%	135	255	89%	1.6	3.0
Deutsche Bank	68	71	4%	92	157	71%	1.4	2.2
HSBC	50	51	4%	79	115	46%	1.6	2.2
Intesa	78	81	4%	105	180	71%	1.3	2.2
Lloyds	61	63	3%	97	145	49%	1.6	2.3
RBS	75	78	4%	105	190	81%	1.4	2.4
Santander	69	72	4%	93	167	80%	1.3	2.3
SocGen	71	74	4%	96	171	78%	1.4	2.3
Standard Chartered	85	88	4%	109	177	62%	1.3	2.0
Unicredit	90	94	4%	132	245	86%	1.5	2.6
Bankia	125	130	4%	190	350	84%	1.5	2.7
Bank of Ireland	155	155	0%	223	450	102%	1.4	2.9
ING	56	57	2%	80	137	71%	1.4	2.4
Monte dei Paschi	215	225	5%	295	515	75%	1.4	2.3
Banco Popular Espanol	175	185	6%	220	430	95%	1.3	2.3
Rabobank	46	48	4%	69	113	64%	1.5	2.4
Banco de Sabadell	130	135	4%	185	345	86%	1.4	2.6
Average	89	92	4%	126	221	71%	1.4	2.4

Source: BNP Paribas[39].

Subordinated premia spiked on the 20th September 2014, when the New Credit Derivative Definition came into force. To this respect table 5 shows the main developments since September 2014 between 5-year senior and subordinated CDS spread for 14 European banks. This is due to the implementation of the new Credit Derivative Definition, which clearly specifies the different treatments between senior and subordinate CDS contracts, making the latter category riskier than the former. The subordinate CDS premia increased by 71% on average compared to the senior one, which increased only by 4%. This has remarkably affected the risk embodied in these instruments and therefore their price, creating a watershed among debtholders.

In the following paragraph an historical analysis on the subordinated-senior CDS spread evolutions is developed in order to tackle the causes and the reasons why we are facing the current financial and in turn regulatory developments.

3. The Impact of Regulations on Banks' Default Probabilities

The historical analysis, going back to the financial crisis of 2009, is essential to understand why we are facing the current regulatory transformation. This watershed, as we will see, affects dramatically investors' risk perception, modifies market prices and identifies who will bear losses.

By looking at figure 3 we can see that - on average - the CDS differentials increased about 80 basis points on 20th September 2014, with wider spikes for those banks less credit worthy such as Banco Comercial Portuguese and Monte dei Paschi. However this spike reverted to its downward sloping path originated on the 6th September 2012 when the ECB announced the implementation of the Outright Monetary Transaction programmes (OMTs)[40]. The recent trend inversion may be due to two main events. On the one hand, on 26th October 2014 the Asset Quality Review (AQR) and the Comprehensive Assessment results have been made public by the Single Supervisory Mechanism (SSM), thereby reducing information asymmetries between banks and investors. Thanks to this, the consensus view seems to have reached a more balanced risk perception, leading to a decline in risk premia[41]. On the other hand, in January 2015 the BRRD came into force whose implications, as already investigated, lead to a reduction of the banks' default probabilities.

However by looking at figure 4, which mirrors figure 3 except for depicting the ratio instead of the difference in risk premia, we realize that the threshold reached after the introduction of the New Credit Derivative Definition is the highest ever experienced. This is due to the fact that during the financial crisis of 2009 as well as during the European

Sovereign Crisis of 2010-2012 the premia increased quite proportionally among subordinated and senior CDS. The risk was widely systemic, driven on the one hand by the deterioration of banks' rating, and on the other hand by the awareness that a default would have triggered not only the subordinated tranches, but also the senior ones - the waterfall effect. Nevertheless this time the current regulatory framework has been set with the precise aim of avoiding the so called 'waterfall effect'. The senior debt has been insulated in such a way that the risk is 2.5 times higher for subordinated debt holders than for senior debt holders. Since January 2009, that is, during the strongest market turmoil, the average subordinated-senior CDS ratio was close to 1.7, but never to the level we are currently experiencing. As we can see in figure 5, four periods have been highlighted, respectively two consecutive financial market turmoil, one of low risk premia, and period 4 that can be considered the 'New Normal'.

*Insert About Here **Figure 3***
Evolutions in the differentials between European Banks' Subordinate and Senior 5Y CDS

*Insert About Here **Figure 4***
Developments in the ratio between the European Banks' Subordinate and Senior 5Y CDS

Period 1 represents the financial crisis of 2009, while period 2 represents the sovereign crisis. In both periods of financial market distress the average subordinated-senior CDS ratio was close to 1,7-1,8. However the causes triggering the increase in CDS premia were remarkably different. In fact in period 1, the risk was idiosyncratic, bank specific, though it became systemic due to the high level of banks' balance sheets interconnectedness. So given the 'too big to fail' issue, the risk was transferred from the banking system to the sovereigns, a 'reverse waterfall', also defined as a bottom-up flow of risk. On the other hand, in period 2, the reverse took place; a top-down flow of risk was transferred from sovereigns to the banking system. Banks owing most of the sovereigns' debt of their home country experienced a drastic depreciation of their high-quality liquid assets, and at the same time were losing the bail-out insurance in case of a possible default since governments couldn't afford any rescue. In period 3, a decrease of CDS premia took place with an average ratio of 1.53. This was due primarily to the implementation of non-standard monetary policy measures such as the Outright Monetary Transaction programme which was used by the ECB to signal financial markets that the Eurozone was 'ready to do whatever it takes to preserve the euro'[42]. However this measure together with the international settlement of Basel III which was agreed in 2010-2011 and whose implementation started in 2013 succeeded in stabilizing financial

markets on a theoretical basis since most of the new regulatory initiatives were still far to be implemented[43]. Moreover the 'vicious cycle' or the so-called 'doom-loop' between weak banks' balance sheet and sovereign fragility worked bilaterally[44]. This implies that, in order to tackle in a permanent way this issue, a threefold programme was necessary. On the one hand, Basel III tackled the issue of weak bank balance sheets by enhancing minimum capital and liquidity standards. On the other hand, through the Fiscal Stability Treaty also called the 'Fiscal Compact', which entered into force in January 2013, and through the ECB monetary policy role of safeguarding financial stability, European governments' fundamentals were reassured. Nevertheless these two measures were not enough alone, since they only strengthened the resilience of the two financial blocks - banking system and sovereigns - without breaking the link between these two. At this stage the Bank Recovery and Resolution Directive plays its key role. In fact as explained in section 2.2 breaking this link is its principal and ultimate objective:

In the future, shareholders and creditors will have to bear the burden of bank failure, minimizing moral hazard and risks to taxpayers. Removing the implicit subsidy of large banks by governments will avoid the build-up of excessive risk and leverage within banks and the banking system as a whole… In this way MREL ensures sufficient loss absorbing capacity that should enable an orderly resolution, ensuring continuity of critical functions without recourse to public funds[45].

As we realize this is a complementary and a necessary feature in order to deal effectively with the so called 'doom-loop' effect, not only an increased resilience of the financial system but a mechanism able to self-balance detrimental diverging forces capable to destroy permanently market efficiency. This in turn may be able to restore long-term credibility of all the investors involved: shareholders, debtholders, governments, and taxpayers.

This outcome comes from the new allocation of risk within the pool of investors. In fact previously, both regulatory opaqueness and the bailout of last resort didn't allow to identify precisely the allocation of losses, which is an essential feature to establish the hierarchy of claims and in turn the price of the default risk. In an environment of asymmetric and limited information, risk, such as the probability of default of governments and banks, is amplified by the link instead of reduced. Breaking the link, therefore, may lead to a double better-off: an absolute lower default premium for both parts, and a relative lower default premium in stress time for the counterparty not affected. On the other hand, the same line of reasoning can be used to explain the change in risk perception between senior and subordinated debt holders. Before the introduction of the New Credit Derivative Definition a precise adverse event that triggered a

subordinated debt contract default was at the same time involving senior debt holders. This link after being broken, led subordinated debt holders to bear a higher burden due to the different allocation of risk. However apart from that, since regulations have improved capital requirements such as Tier 1 and Additional Tier 1, not only senior debt holders, but also subordinated debt contracts has benefited from this insulation. Tier 1 for the major European banks passed from 6.5 % to 12.5 % between 2007 and 2014, almost doubled up, as well as the ratio of Risk Weighted Assets on total assets passed from 50% to 40%[46]. These effects are visible in figure 5 and 4 respectively. The burden on subordinated debt increased compared to senior debt, nevertheless the path is downward sloping leading to lower absolute premia. In the last chapter an empirical investigation will try to verify if the stylized facts till here presented and the theoretical reasoning upon developed have produced the expected outcomes regulators were aimed at.

4. Breaking The Link: An Empirical Investigation

In order to shed light on this crucial issue, it is necessary to investigate the link between banks and sovereigns' probability of default, that is, the main objective the BRRD wants to achieve. By looking at figure 5 we can see that banks' 5Y senior CDS move in complete synchrony with sovereign 5Y senior CDS. In addition we also see that for country with high debt to GDP ratio such as Italy and Spain the governments' CDS premia are almost equal in magnitude to the country's bank CDS premia. Contrary in the case of Germany and France, the sovereign premia are lower than the banks' ones.

*Insert About Here **Figure 5***
Main European Banks and Sovereigns 5Y Senior CDS Developments

To assess the co-movement between the sovereign premia and the banks' premia, a linear correlation coefficient is computed. Between the time period January 2009 and January 2015 the average linear correlation between sovereign and banks was close to 0.8.

However by looking at figure 6, we can appraise the evolution of the correlation coefficient throughout the four periods. As we can see, during period 1, 2 and 3 the coefficient almost approached the parity, that is, a perfect synchronic movement. But then starting from period 4 - the New Normal - it strongly decreased, passing from an average of 0.74 to 0.1. To this respect, it is important to underline that in fourth quarter 2014 the ECB has implemented its most powerful non-standard monetary policy tool, the Public Sector Purchase Program (PSPP-QE), which consists in buying on the secondary market

European government bonds in order to reduce their premia. In fact by looking at the period January 2015 - February 2016 we can see that the premia drastically decreased.

*Insert About Here **Figure 6***
European Banks' Correlation with Their Sovereigns

To this respect it is important to explain through which channels the QE affects CDS premia, with a specific focus on the default risk channel. QE may lower risk premia by "stimulating the economy (therefore corporates' probability of default will decrease), or since investor risk aversion falls as the economy recovers, or by increasing financial health/capital in the intermediary sector"[47]. Therefore one may argue that QE has affected asymmetrically sovereigns and banks' premia, and for this reason the correlation coefficient changed its magnitude in period 4. Nevertheless many non-standard monetary tools have been already implemented in the last couples of years and especially during period 2 and 3. The most important are Long Term Refinancing Operations (LTROs), Outright Monetary Transactions (OMTs), Security Market Program (SMP), the ABS Purchase Programme, and the relaxation of collateral standards, and they, as documented by many researchers, influenced risk premia and risk aversion without affecting the intensity of the co-movement between sovereigns and banks' default probabilities[48]. For this clear reason it is the BRRD that lays at the basis of this change, and not the Quantitative Easing.

Moreover the BRRD and the wide spectrum of new regulatory standards - Basel 3 - as well as the New Supervisory and Resolution Entities - SSM and SRM - are only at the beginning of their course. Most of the approved changes have just recently started to be enforceable such as MREL, while other measures like TLAC will need almost three years to be fully effective. According to this transformational process, it is coherent to expect a gradual adaptation of financial markets towards the direction indicated by Regulators.

Although it has been already analysed some of the developments in the financial markets, to puzzle out the 'big picture' regulators aimed to achieve, the following stylized facts deserve attention.

The implementation of these standards has produced a gradual shift in banks' performance. The return on equity (RoE) decreased sharply from the peak reached between the end of the 80s and the beginning of the 2000s. During those years the average RoE was close to 20-25%, an astonishingly return given the average experienced between the 20s and the 70s - around 7%[49]. Looking at table 6 we can see how the RoE

for some selected European G-SIB Banks evolved since the years before the last financial crisis.

Table 6. Historical Evolutions of Tier1, Return on Equity, and Risk Taking for Selected G-SIB

	2014	2013	2012	2011	2010	2009	2008	2007	2006	Correlation	
AVG Tier 1	12.7%	12.5%	13.0%	11.6%	11.7%	11.0%	9.0%	7.9%	8.2%	-0.7	Tier 1 vs RoE
AVG RoE	4.4%	4.4%	5.1%	7.4%	8.7%	6.6%	2.2%	16.8%	18.8%	-0.8	Tier 1 vs RWA/ToT Assets
AVG RWA/ToT Assets	36.9	35.9	34.1	36.4	36.4	37.3	36.7	40.1	37.5	0.6	RoE vs RWA/ToT Assets
AVG ToT Assets/Tier 1	23.0	24.6	24.8	26.5	26.3	27.3	37.3	36.8	37.4	0.6	RoE vs ToT Assets/Tier 1

Source: Public Consolidated Financial Statements, Own Calculations.
Note: RoE is calculated as Profit after-tax divided by total equity excluding non-controlling interests. Profits after-tax have been depurated from goodwill depreciation.

As it is clear, RoE passed from 20% in 2006 to almost 2% in 2008, and then it averaged around 5%[50]. As expected after the crisis RoE has improved from the bottom reached in 2008, however it didn't recover to the pre-crisis level. Especially what we see is the downward trend started in 2010.

Is it a coincidence that just in 2010 and during the following years the regulatory standards here highlighted were implemented and became binding? One may think that the recession following the financial crisis takes all credit.

Likely the recession affected the magnitude of the banks' RoE, nevertheless the trend is a clear symptom of the regulatory change. If this is not the case, why did RoE reach 8.7% in 2010, and then started to slow down? If recession accounts for the whole decrease, then we would expect a reverse trend, that's is, lower RoE in 2009 and 2010, and higher RoE from 2011 onwards, when the harshest times were close to an end. However the data show a downward trend beginning in 2011. Moreover the counterfactual is pretty clear. If we look at the correlation between average tier 1 and average RoE, the coefficient is strongly negative, -0.7. This means the higher the banks' capital - tier 1 - the lower the return on equity. This is clear-cut since a higher denominator for the computation of the RoE, ceteris paribus, leads to lower values. In addition, if we look at the correlation between RoE and the Risk Taking proxy - RWAs - as well as between RoE and the Leverage proxy - LR - the coefficient is 0.6 in both cases[51]. This implies that lower 'risk taking' and lower 'leverage' levels lead to a lower RoE. Though this is only a correlation coefficient, logically we are pretty confident on the direction of the causality.

A compact summary of what has been depicted up to here is drawn in figure 8, which summarizes the evolution of banks' business strategies. In order to maximize return on equity, in 2006, a bank could have exploited leverage or could have increased the risk of its assets pool, therefore the ratio of RWAs over total assets. Therefore, a bank could

decide to locate itself in the South-East region - lower leverage but higher risk per unit of asset - or in the North-West region - higher leverage but lower risk per unit of asset. Both strategies nonetheless have the same outcomes and the same objective: "the gains risk being privatized and the losses socialised"[52]. Both strategies bring extremely high returns in good times, while heavy losses in bad times. Given the high levels of risk-taking and leverage, losses are amplified so that governments need to intervene in order to avoid a complete collapse of the financial system. Through this mechanism, banks succeeded in amplifying and privatizing all the profits in good times, while, during bad times, they were able to socialise most of the losses. This is the perfect solution to the banks' payoff maximization problem. Moral hazard behaviours were the natural banks' best response to the lack of binding regulations, and to the 'too-big to fail' problem.

*Insert About Here **Figure 7***
Leverage, Risk Taking and Return on Equity for Selected G-SIB Banks

To this respect, as we see in figure 7, regulators have tried to work the 'regulatory loophole' out. Since 2010 banks started to locate themselves closer to the imaginary 45-degree line, although there are still evidences that banks prefer corner solutions within the regulatory constraints in place. During this period the barycentre shifted down, and at the same time the RoE, represented by the size of the bubbles, decreased more than proportionally than the shift. Nevertheless all that glitters isn't gold. Since the leverage ratio given the new regulatory standards is binding at 33%, the banks' tendency is to find some margins in risk taking positions. RWAs decreased but only marginally compare to the big shift in leverage. In fact if Basel 3 and CRD4-CRR has improved the minimum capital requirements, what has been left far unresolved is the denominator, that is, the calculation of RWAs. Inconsistencies among EU countries as well as discrepancies might have boosted the capital ratio beyond their real values[53]. This can be the possible future source of risk, as it was already one of the triggering factors in the 2009 financial crisis.

5. Concluding Remarks

What we have seen so far is the mutation of the regulatory landscape banks have been facing since the aftermath of the financial crisis. These new standards have affected banks' business strategies, which struggle to find higher returns. On the other hand, banks have always survived bad times. New creative solutions were shaped, profits were boosted, and the good old times cyclically surged. Most of them are the longest-lasting corporations in the world, and there is a reason for that. Adaptation, especially in finance is much easier to be implemented than in the old-fashion manufacturing sector. At the

same time investors' risk perception is changing. Financial markets are ruling the New Normal for the banking industry. Not only the CDS correlation between Banks and Sovereigns has changed remarkably, but as investigated in Ambrosini and CovI, after 26th October 2014 - the Comprehensive Assessment result announcement - also the correlation between CDS and equity prices broke down. These two complementary analyses embody the same view on the growth prospects of the banking sector for the incoming years: lower structural profits but higher profit sustainability as well as lower probability of default but higher privatization of losses, the New Normal. Given the data analysis, the new banking regulation seems to effectively tackle the issues arose. One may wonder how much efficiently, but the answer goes well beyond the capabilities and the scope of this paper. To this respect there will be always winners and losers. For the last 40 years the banking industry has been a sure bet for investors, now not anymore. Nevertheless there are still plenty of things to improve on a theoretical and technical basis. On the latter point, regulators can always improve risk-valuation techniques such as risk weighted assets computation, network modelling, as well as probability of fat-tails events, but in the end, they will always enjoy unfavourable positions since, for their own nature, they are followers, and not market-makers. Bounded rationality obliges policy makers to work optimally ex post - hopefully - but sub optimally ex ante. For this reason the former point necessitates further investigation. Incentives will push banks to find new ways to boost profits, though the new landscape in place. They - for sure - won't accept the New Normal like it is. They will exploit one of the possible regulatory discrepancies to come back on track. These are the natural consequences incentives create. Paradoxically the current Bank Recovery and Resolution Directive in a worst-case scenario, given the level of losses, may bail-in a bank by resetting shareholder equity and at the same time by converting debt holders, and by drying up non-covered deposits. This is a fundamental step to "breaking the link" and avoid the doom loop with sovereigns. However this may not change banks' incentives. Actually one may think that shareholders, though they are the first to bear losses, may feel "less guilty" since the directive now attaches the negligence also to the debtholders and depositors for their investment choices. The burden will be still socialised, just in different way than before. Shareholders will lose their capitals, but no more than that. To this respect, Haldane emphasizes that "the rational response by market participants is to double up their bets"[54]. Therefore, to solve this issue substantially, we need to change definitively bankers' incentives. Banking Regulation needs to put in place a payoff function that

allows bankers to stick to a balance growth path, not shape them as risk/profit-seekers[55]. The burden should be rightly proportional to the losses occurred ex-post, not limited to the ex-ante calculations of a pre-determined level of capital over a metrics - RWAs - that can be doubly biased, internally by moral hazard as well as externally by the unpredictability of the events. Instead of setting a maximum threshold of losses, therefore a bounded range between 0 and tier 1, regulators should set a minimum threshold, that is from tier 1 up to infinity, in order to communicate the clear message that if the losses are greater than the shareholders' capital, those paying won't be government, tax payers or other firms, but still them.

The rules of the game now in place soften instability by setting upward constraints to the banking system's performance so as to achieve a lower but stable profit growth. Nevertheless this will not prevent the system from being unstable, from seeking profits, from escaping the next financial crisis. The only way to try to tackle effectively the endogenous instability of a capitalist system is a change of incentives: an increase in shareholders' liability through the implementation of 'unlimited liability' in the banking industry. Perhaps by attaching full responsibility to individual agents, micromotives will lead to more stable and farsighted macro behaviours, and finally to a humane economy.

References and Footnotes

[1] Schelling, T.C. (1978) Micromotives and Macrobehaviour. New York: W.W. Norton.

[2] Minsky, H.P. (1982) Can It Happen Again? Essays on Instability and Finance. New York: M.E. Sharpe Inc.

[3] Minsky, H.P. (2008) Stabilizing an Unstable Economy. New York: McGraw-Hill. First edition 1986 by Yale University Press

[4] Felloni, G. (2008) The primacy of Italian finance from the Middle Ages to early modern times. In A. Cova, S. La Francesca, A. Moioli, and C. Bermond (eds.) Storia d'Italia. Annali 23. La banca. Torino, pp. 93-149.The Council of Lion as well as of Vienna respectively in 1274 and 1311 condemned usury by excommunicating all those states that allowed its operation. "It was not until 1745, however, that Benedict XIV's encyclical (*Vix pervenit*) admitted the legality for anyone to apply a moderate interest charge on loans, so scaling down the canon law ban and paving the way for the adoption of loan agreements", see p. 9.

[5] Ibid., p.10.[4] These bills of exchange allowed merchants to trade abroad without the need of having the money pragmatically. This has been a revolution in terms of risk-protection and market access. As Felloni emphasizes "The limits fixed by the Church may have helped to contain certain explicit forms of money lending with interest, but they were not able to prevent other modified or disguised variations developed to dodge the accusation of usury".

[6] See p.11, Felloni, G. (2005) Genoa and the history of finance: a series of first?. Banco di San Giorgio, Genova

[7] Mazzucato, M. (2013) The entrepreneurial state: debunking public vs. private sectors myths. New York: Anthem Press.

[8] See p.4, Blinder, A.S. (2013) After the music stopped. The financial crisis, the response, and the work ahead. Pinguin Books, New York.

[9] Reinhart, C.M. and Rogoff, K. S. (2009) The aftermath of financial crisis. American Economic Review 99(2): 466-72; Reinhart C.M. and Rogoff K.S. (2009) This time is different: eight centuries of financial folly. Princeton: Princeton University Press.

[10] Taylor, A. Jordá, O. and Schularick M. (2013) Sovereigns versus banks: credit, crises, and consequences. Working Paper 19506, National Bureau of Economic Research, Cambridge.

[11] Tirole, J. (2015) Country solidarity in sovereign crises. American Economic Review 105(8): 2333-63.

[12] Basel III has been converted into a EU legislative package by the Capital Requirement Directive (CRD IV), which aims at enhancing quality and quantity of capital, the basis for new liquidity and leverage requirements, and creating new rules for counterparty risk, and new macroprudential standards. It will be fully loaded within 2019.

[13] The Financial Stability Board (FSB) has issued on November 9th 2015 a set of principles and a detailed term sheet on the adequacy of loss-absorbing and recapitalisation capacity of global systemically important banks (G-SIBs) in response to the request of G20 leaders (2013 St. Petersburg Summit) to enhance loss-absorbing capacity of G-SIBs in resolution. For further details, see Financial Stability Board. (2015) Principles on loss-absorbing and recapitalisation capacity of G-SIBs in resolution. Total loss-absorbing capacity term sheet, 9th November 2015. http://www.fsb.org/wp-content/uploads/TLAC-Principles-and-Term-Sheet-for-publication-final.pdf

[14] To avoid institutions structuring their liabilities in a way that hampers the effectiveness of bail-in or other resolution tools, the BRRD requires institutions to meet a robust minimum requirement for own funds and eligible liabilities (MREL). This is not a fixed figure imposed by legislation, but is to be set on a case-by-case basis by resolution authorities. To ensure consistency, the BRRD lays down common criteria for resolution authorities to apply and these technical standards further specify these minimum criteria. For further details, see European Parliament. (2014) Directive 2014/59/EU of The European Parliament and of The Council of 15 May 2014 establishing a framework for the recovery and resolution of credit institutions and investment firms. Official Journal of the European Union, 15th May 2014. http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0059&from=EN

[15] For further details see Financial Stability Board Key Attributes 2011/2014; Financial Stability Board. (2011) Key attributes of effective resolution regimes for financial institutions. October 2011. http://www.financialstabilityboard.org/wp-content/uploads/r_111104cc.pdf?page_moved=1; Financial Stability Board. (2014) Key attributes of effective resolution regimes for financial institutions. Oct. 2014. http://www.financialstabilityboard.org/wp-content/uploads/r_141015.pdf

[16] See Financial Stability Board, p.4. [13]

[17] See p.50, BBVA Research. (2014) Compendium on bank resolution regimes: from the FSB to the EU and US frameworks. Regulation Outlook, June 2014. https://www.bbvaresearch.com/wp-content/uploads/2014/06/Regulation-Outlook.pdf

[18] Ibid., p.10. Nevertheless, as from January 2022 it will increase respectively to 18% of RWAs and to 6,75% of the Basel III leverage ratio denominator. This requirement does not include any applicable regulatory capital buffers (Basel III), which must be met in addition to the TLAC RWA Minimum. Moreover this requirement does not limit authorities' powers to set a threshold above the common minimum or to put in place buffers in addition to the TLAC LRE Minimum.

[19] Still the threshold is under calibration since according to the Bank of England the optimal bank capital for a bank should be around 20% of RWA. The calibration is a fundamental step of the approach since a disproportion of treatment between RWAs and Leverage threshold may harm one specific business model, respectively commercial and investment bank if the RWAs and leverage constraints are set too high. See Miles, D. et al (2011) Optimal bank capital. Discussion Paper N. 31, Bank of England

[20] The indicators used to assess the systemic importance of the bank are equally weighted and consists in the following ones: size, cross-jurisdictional activity, interconnectedness, substitutability/financial institution infrastructure and complexity. See p.4, Bank for International Settlements. (2011) Global systemically important banks: assessment methodology and the additional loss absorbency requirement. November 2011. http://www.bis.org/publ/bcbs207.pdf

[21] See BBVA Research, p.1.[17]

[22] For further details, see principle 11 "priority", p.15. [13]

[23] It is important to underline that if the minimum TLAC is set too high, two negative externalities could harm economic growth: 1) enough instruments may not be available in the market or an insufficient demand may trigger a deleveraging process thus reducing outstanding credit to corporates and households. 2) In order to maintain profitability in line with corporate's goal, banks may seek risky investments to offset TLAC costs. On the other hand a too low TLAC threshold may let the bail-in tool be ineffective, thus leaving the 'too big to fail' issue unsolved in case of a financial crisis.

[24] This is even more relevant in the case of the European Union, where banks lending counts for almost 80% of total funding compare to less than 25% of the US economy. Wehinger, G. (2012). Bank deleveraging, the move from bank to market-based financing, and sme financing. Technical Report 2012/1, OECD Journal: Financial Market Trends.

[25] See p.13, BBVA Research. (2014) Compendium on bank resolution regimes: from the FSB to the EU and US frameworks. Regulation Outlook, June 2014. https://www.bbvaresearch.com/wp-content/uploads/2014/06/Regulation-Outlook.pdf

[26] The minimum threshold should be larger than the following ratio: owns funds plus eligible liabilities with residual maturity >1 year divided by total liabilities and own funds considering netting rights in derivative contracts. "Resolution authorities are therefore required to assess whether the level of MREL is sufficient to ensure that the conditions for use of the resolution fund described in Article 44 of the BRRD could be met. That article requires that a contribution to loss absorption and recapitalisation of not less than 8% of the total liabilities including own funds of the institution (or, under certain conditions, 20% of RWAs) has been made by the holders of relevant capital instruments and other eligible liabilities". See p.12, European Banking Association. (2015) EBA Final Draft Regulatory Technical Standards. On Criteria for Determining the Minimum Requirement for Own Funds and Eligible Liabilities Under Directive2014/59/EU. Regulatory technical standards,3rd July 2015. www.eba.europa.eu/documents/10180/1132900/EBA-RTS-2015-05+RTS+on+MREL+Criteria.pdf

[27] The resolution fund will be funded by all financial institutions proportionally to their total liabilities and risk profile. By December 2014 the resolution fund must have reached at least 1 % of the amount of all covered deposits. See p. 27. [26]

[28] The EBA is additionally required to submit a report to the Commission by 31 October 2016 reviewing the implementation of an MREL at national level and several aspects of the framework for an MREL set out in the BRRD. See p.6. [27]

[29] The supervisors will assess and approve recovery plans annually. See, p. 16.[27]

[30] See Financial Stability Board, p.7. [13]

[31] The European approach is more discretionary since breaching the MREL can be due to market systemic problems or to excess perceived vulnerabilities and not by the worsening of the financial position of the bank. See BBVA Research. (2015) MREL and TLAC: What are the consequences of breaching them?, Europe Regulation Outlook, 8th Jan. 2015. www.bbvaresearch.com/en/publicaciones/mrel-and-tlac-what-are-the-consequences-of-breaching-them/

[32] See p.10, Scope Ratings. (2014) European banks through new eyes: an outlook for 2015 and beyond. 2nd December 2014. SCOPE: OUTLOOK 2015

[33] The cumulative shortfalls are respectively EUR 423.9 bn and EUR 223.2 bn. For further investigation, see European Commission. (2013) Bail-in tool: a comparative analysis of the institutions' approaches. Working paper European Commission, 18th October 2013. http://www.thetimes.co.uk/tto/multimedia/archive/00477/EC_BAIL-IN_-_compar_477750a.pdf

[34] See International Financial Law Review, March 2015; www.iflr.com/Article/3417863/Why-Fitch-will-downgrade-a-third-of-Europes-banks-in-2015.html

[35] See p. 4, Scope Ratings. (2014) AT1 capital instruments background and key risks for investors. 10th June 2014

[36] AdT1 securities can cover 18,75% of the 8% capital requirement, while T2 securities up to 25%.

[37] See Scope Ratings, p.21.[33]

[38] It is important to underline that secured debt such as covered bonds and short-term debt with maturities of seven days or less are not subject to bail-in. Moreover senior unsecured can be issued through a holding company or in case through a parent operating company specifying in the debt contract the "bail-in clause".

[39] See p.4, BNP Paribas. (2014) Credit Focus: The new financial CDS landscape. 2nd October 2014.

[40] The announcement has led to "a decrease of about 200 basis points in the 2-year government bond rates in Italy and Spain, while leaving German and French bond yields for comparable maturities largely unaffected". See Altavilla, C. et al (2014) The financial and macroeconomic effects of OMT announcements. ECB Working Paper n. 1707

[41] For further details on the topic and the effect of the Stress Test results on the European banking sector performance see also Ambrosini, G. and Covi, G. (2016) Stressing Bank's Asset Variance: The Impact of the 2014 Comprehensive Assessment on the CDS-Stock Relationship. Verona, IT: Department of Economics, University of Verona; Milan, IT: Department of Economics, Management and Quantitative Methods, University of Milan (Mimeo). DOI: 295075413

[42] Despite none OMT programmes were ready to start in September/October, the financial markets straight away took notice of the additionally planned OMT packages from ECB, and started slowly to price-in a decline of both short-term and long-term interest rates in all European countries previously suffering from stressed and elevated interest levels (as OMTs were regarded as an extra potential back-stop to counter the frozen liquidity and highly stressed rates; and just the knowledge about their potential existence in the very near future helped to calm the markets).

[43] See table 2 in the appendix and for further details on the regulatory requirements see also Bank for International Settlements. (2010) Basel III: a global regulatory framework for more resilient banks and banking systems. December 2010. http://www.bis.org/publ/bcbs189.pdf; Bank

for International Settlements. (2013) Basel III: liquidity coverage ratio and liquidity risk monitoring tools, January 2013. http://www.bis.org/publ/bcbs238.pdf

[44] For a detailed overview of this topic see Tirole, J. and Farhi, E. (2014) Deadly embrace: sovereign and financial balance sheets doom loops. Working Paper 164191, Harvard University OpenScholar.

[45] See European Banking Association, p.5. [26]

[46] See p.15.[105] It is important to be aware that banks' internal models may stretch the data in order to depict higher capital ratios and lower Risk Weighted Assets amounts.

[47] See p.8, Krishnamurthy, A. and Vissing-Jorgensen, A. (2011) The effects of quantitative easing on interest rates: channels and implications for policy. NBER Working Paper 17555

[48] For further details on this topic see also Fratzscher, M., Lo Duca, M., and Straub, R. (2014) ECB unconventional monetary policy actions: market impact, international spillovers and transmission channels. IMF 15th Jacques Polak Annual Research Conference; November 2014, Washington DC.

[49] See p.15, Haldane, A.G. and Alessandri, P. (2009) Banking on the State. N. 139/2009. http://www.bis.org/review/r091111e.pdf. Andrew Aldane does his analysis for the UK Banking Sector, nevertheless a similar pattern can be found for US and European Banks.

[50] Similar results can be achieved with other metrics such as rate of return on risk-weighted assets - RoRWAs. In fact "European banks' return on risk recovered from the 2009 financial crisis, peaking in 2010 with an average 1.3% RoRWA. Since then, however, RoRWA has declined to 0.5% on average. This translates to a level of profitability below the cost of capital, which means banks are destroying value". See p.7, Sinn, W. D'Acunto, R. and Oldrini A. (2013) European banking: striking the right balance between risk and return. Bane & Company Report

[51] Risk taking is computed as RWAs over Total Assets, while Leverage is Total Assets over Tier 1.

[52] See Haldane, A.G. et al, p.5. [49]

[53] Since the probability of default (PD) as well as loss given default (LGD) used to calculated RWAs through model provided by the Bank of International Settlement can not be always computable or objective, risky outcomes may lay under the surface. Moreover since 'the black swan' pops up suddenly and not gradually, and for its intrinsic nature cannot be forecasted, drastic recalibration may take place. This point rises the issue of pro-cyclical biases, a large capital base in period when it is unnecessary, while lack of buffers when it is most needed.
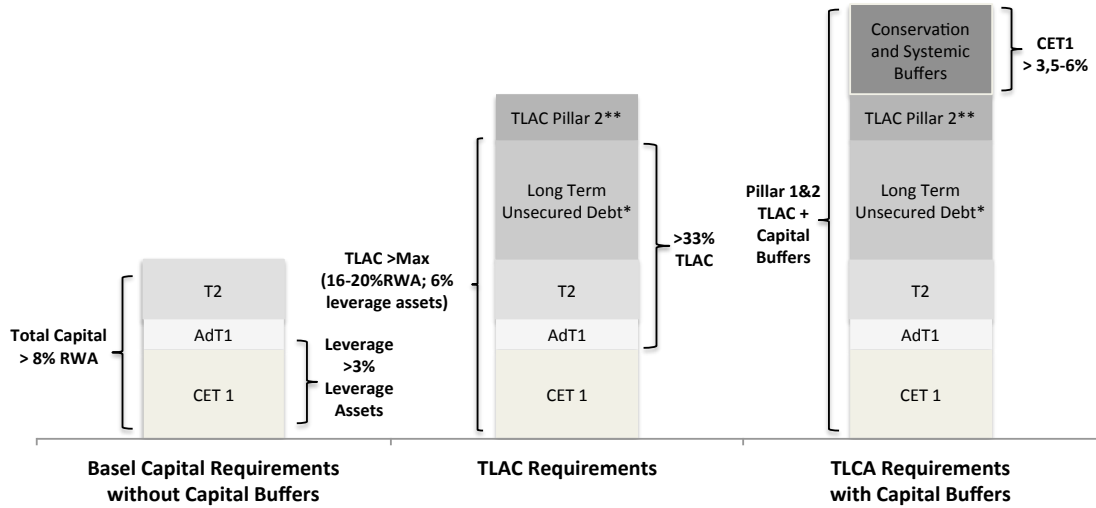
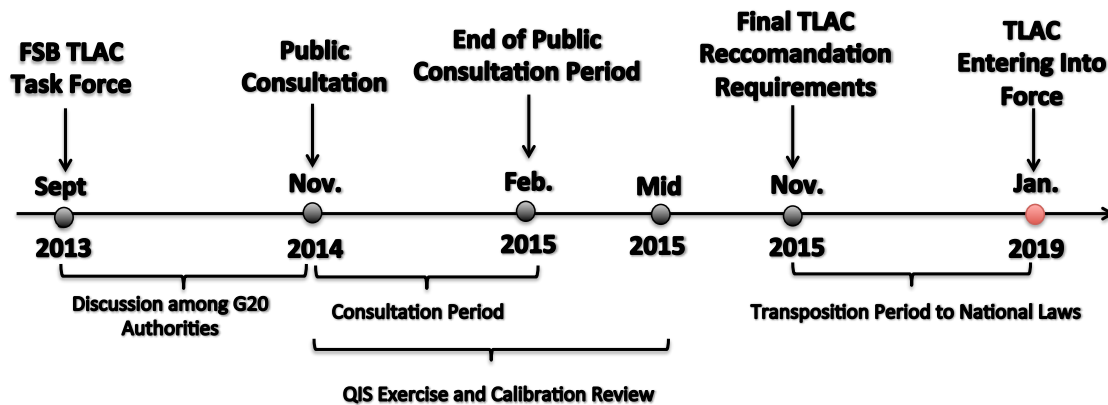**Figure 1.** TLAC minimum requirement proposed by the FSB
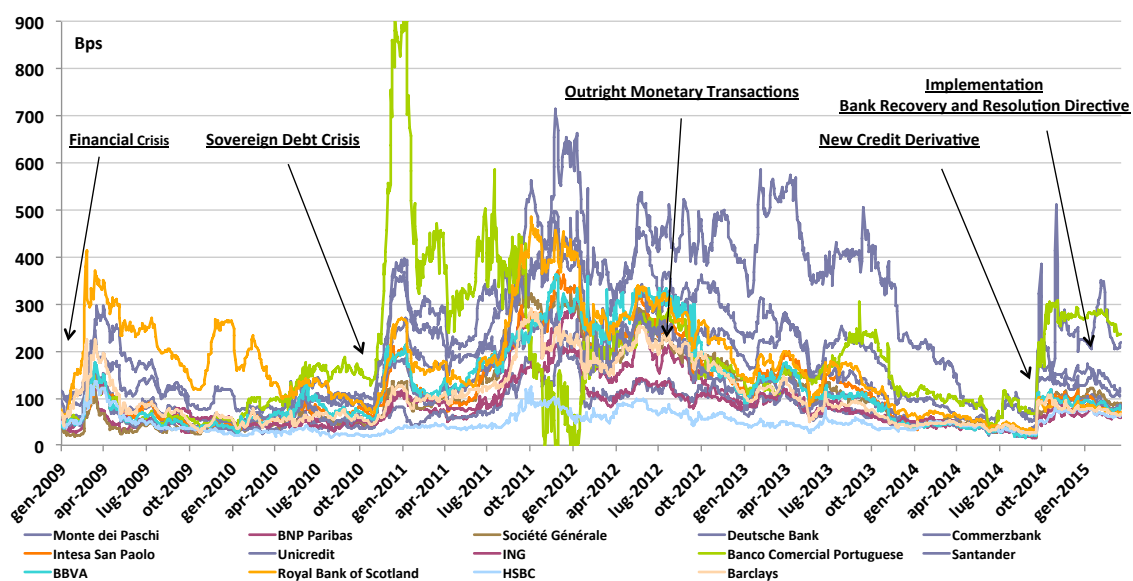

Figure 2. TLAC Timeline

Figure 3. Evolutions in the differentials between European Banks' Subordinate and Senior 5Y CDS
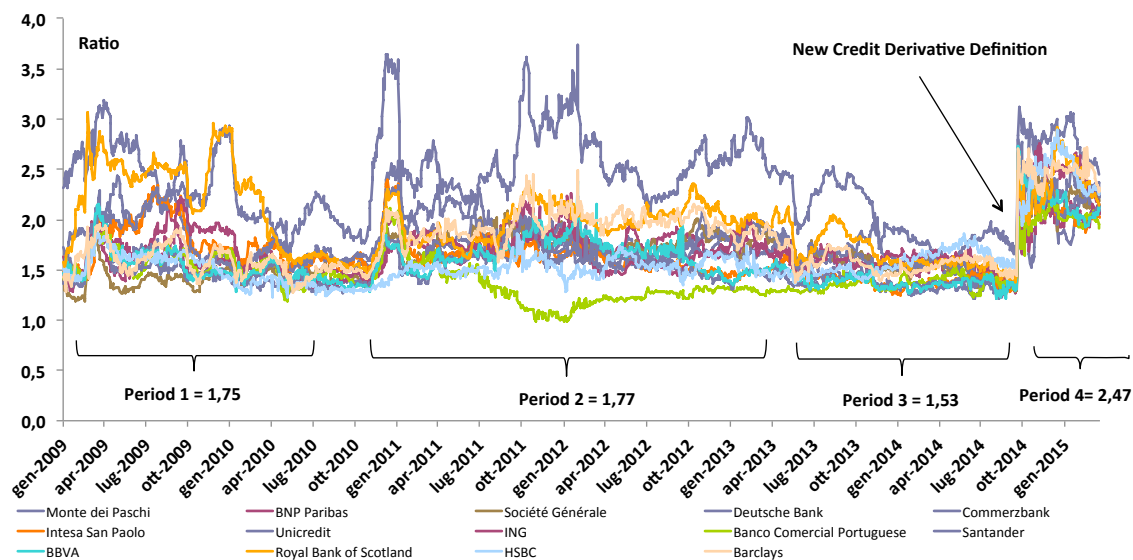
Source: Bloomberg, author's own calculations.

Figure 4. Developments in the ratio between the European Banks' Subordinate and Senior 5Y CDS

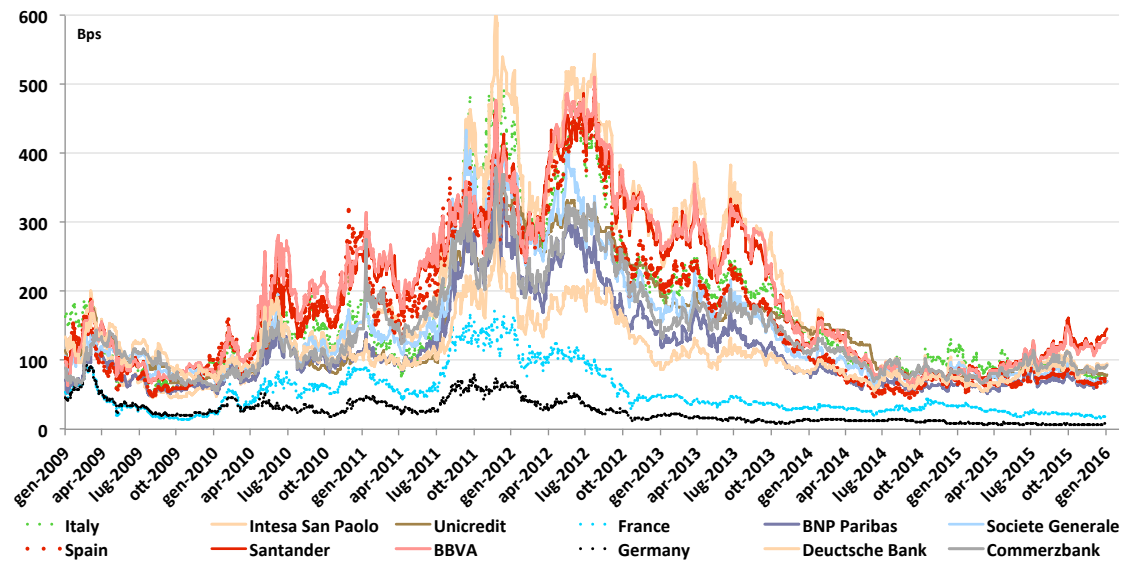Source: Bloomberg, author's own calculations.

Figure 5. Main European Banks and Sovereigns 5Y Senior CDS Developments
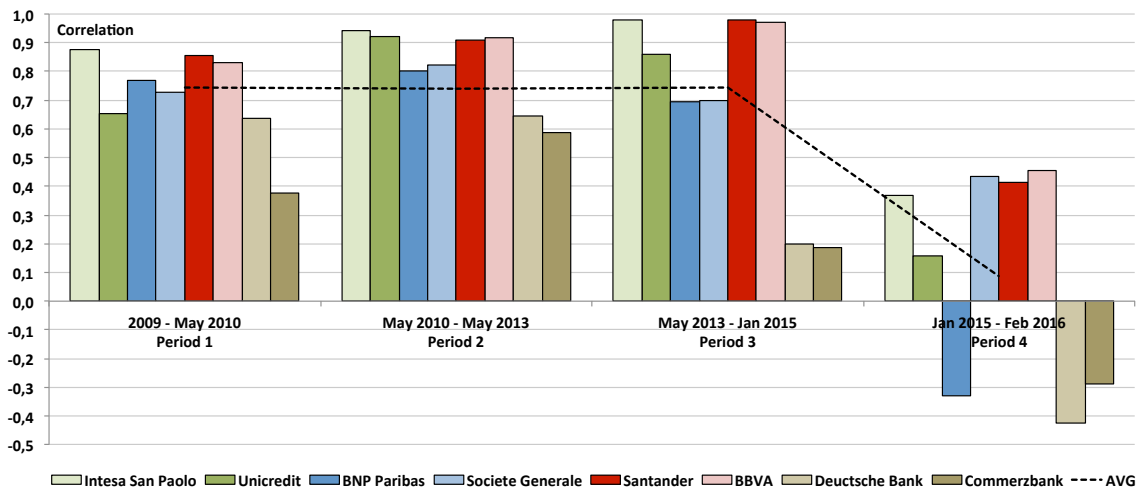
Source: Bloomberg, author's calculations.

Figure 6. European Banks' Correlation with Their Sovereigns

Source: Bloomberg, author's calculations
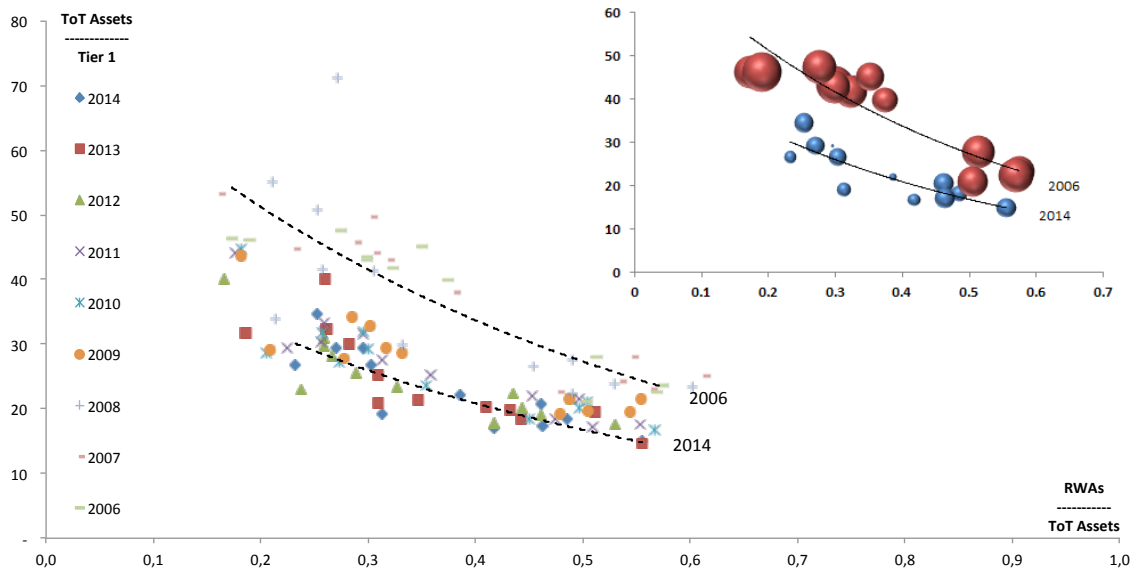
Figure 7. Leverage, Risk Taking and Return on Equity for Selected G-SIB Banks

Source: Public Consolidated Financial Statements, Own Calculations. Note: The size of the bubbles represents the Return on Equity of the Banks

Appendix

Table 1. G-SIBs as of November 2015

Bucket	G-SIBs	Bucket	G-SIBs
3,50%	/	1%	12. Agricultural Bank of China
2,50%	1. HSBC 2. JP Morgan Chase		13. Bank of China 14. Bank of New York Mellon 15. China Construction Bank 16. BBVA
2%	3. Barclays 4. BNP Paribas 5. Citigroup 6. Deutsche Bank		17. Groupe BPCE 18. Group Crédit Agricole 19. Industrial and Commercial Bank of China 20. ING Bank 21. Mizuho FG 22. Nordea 12. Royal Bank of Scotland 23. Santander
1,50%	7.Bank of America 8. Credit Suisse 9. Goldman Sachs 10. Mitsubishi UFJ FG 11. Morgan Stanley		24. Société Générale 25. Standard Chartered 26. State Street 27. Sumitomo Mitsui FG 28. UBS 29. Unicredit Group 30. Wells Fargo

Source: Financial Stability Board.

Table 2. Basel III phase-in arrangements

	Phases	2013	2014	2015	2016	2017	2018	**2019**
Capital	Leverage Ratio							
	Minimum Common Equity Capital Ratio	3,5%	4%	4,50%				4,5%
	Capital Conservation Buffer				0,625%	1,25%	1,875%	2,5%
	Minimum Common Equity plus Capital Conservation Buffer	3,5%	4%	4,5%	5,125%	5,75%	6,375%	7,0%
	Phase-in of deductions from CET1*		20%	40%	60%	80%	100%	100%
	Minimum Tier 1 Capital	4,5%	5,5%	6,0%				6,0%
	Minimum Total Capital			8,0%				8,0%
	Minimum Total Capital plus Conservation Buffer		8,00%		8,625%	9,25%	9,875%	10,5%
	Capital Instruments that no longer qualify as non-core Tier 1 capital or Tier 2 capital							
Liquidity	Liquidity Coverage Ratio - Minimum Requirement			60%	70%	80%	90%	100%
	Net Stable Funding Ratio						Introduce Minimum Standard	

Source: Bank of International Settlement.

CHAPTER V

End of the Sovereign-Bank Doom Loop in the European Union?

The Bank Recovery and Resolution Directive

Co-Authored with Ulrich Eydam

Abstract

In this paper we examine the relationship between the default risk of banks and sovereigns, i.e. the 'doom-loop'. Specifically, we try to assess the effectiveness of the implementation of the new recovery and resolution framework in the European Union. We use a panel with daily data on European banks and sovereigns ranging from 2012 to 2016 in order to test the effects of the Bank Recovery and Resolution Directive on the two-way feedback process. We find that there was a pronounced feedback loop between banks and sovereigns from 2012 to 2014. However, after the implementation of the European Banking Union, in 2015/2016, the magnitude of the doom-loop decreased and the spillovers became statistically not significant. Furthermore, our results suggest that the implementation of the new resolution framework is a suitable candidate to explain this finding. Overall, the results are robust across several specifications.

Over the course of the past 800 years, the terms of trade between the state and the banks have first swung decisively one way and then the other. For the majority of this period, the state was reliant on the deep pockets of the banks to finance periodic fiscal crises. But for at least the past century the pendulum has swung back, with the state often needing to dig deep to keep crisis-prone banks afloat. Events of the past two years have tested even the deep pockets of many states. In so doing, they have added momentum to the century-long pendulum swing. Reversing direction will not be easy. It is likely to require a financial sector reform effort every bit as radical as followed the Great Depression. It is an open question whether reform efforts to date, while slowing the swing, can bring about that change of direction. (Haldane 2009: 11).

1. Introduction

In the wake of the financial crisis the relationship between the default risk of governments and banks has become one of the major challenges in stabilizing the financial system. On the one hand the European banks are one of the major creditors for European sovereigns. This implies that a decrease in the prices of government bonds can induce a deterioration of the banks' balance sheet. On the other hand, with the emergence of the financial crisis in 2007/2008 it became evident that in times of financial turmoil governments ultimately have to bail-out national banks. Such bail-outs go hand in hand with large increases in government debt that directly affect the solvency of national governments. Hence, if the bail-outs are large the value of government bonds decrease which in turn affects the portfolio of the national banks and finally creates a feedback process between the default risk of banks and sovereigns. This risk connection, evolving from the aforementioned interdependence is often called the 'doom loop' or the 'vicious cycle'. The connection between a fragile banking system and deteriorated government fiscal positions magnified the difficulties to reestablish a stable macroeconomic environment in the euro area. In order to achieve financial stability, European policy-makers have decided to introduce a common framework for bank supervision and resolution: The European Banking Union (EBU).

Two sets of regulatory measures have been implemented in the European Union in order to tackle respectively the fragility of national governments and of the banking system. On the one hand, the European Fiscal Compact (EFC) updated the Stability and Growth Pact with stricter criteria on fiscal provision, and the European Stability Mechanism (ESM) provided financial assistance programs to the member states in financial distress. The former entered fully into force on 1st May 2013, while the latter became effective on 1st January 2014. On the other hand, three macroprudential measures were undertaken to

make the banking system more resilient. The Basel III Accord was implemented in the European Union on 26th June 2013 through the Capital Requirements Regulation and Directive - CRD IV - which strengthens banks' balance sheet by enhancing minimum capital and liquidity standards as well as by imposing a leverage ratio. The European Parliament initiated the European Banking Union by creating the Single Supervisory Mechanism (SSM), which on 4th November 2014 transferred the responsibility of financial supervision to the European Central Bank (ECB). And, the Single Resolution Mechanism (SRM) was enacted through the Bank Recovery and Resolution Directive (BRRD), which defines a common resolution framework for banks. It entered fully into force on 1st January 2016. The banking union aims to ensure the safety and soundness of the European banking system, to increase financial integration and stability and to create a consistent and homogenous supervisory and resolution framework across its member states.

So far several studies have focused on the risk transfer from banks to sovereigns through bank bail-outs, Sgherri and Zoli (2009) find that concerns about the solvency of the banking system have led to increases in sovereign bond risk premiums in several European countries. Further evidence in favor of this channel is provided by Ejsing and Lemke (2011) and Stanga (2011). Dieckman and Plank (2011) document that this risk transfer is stronger the lager a country's financial system is. While confirming the presence of risk transfers from banks to sovereigns in the bail-out period Acharya et al. (2014) also show that there is a risk transfer from sovereigns to banks. The presence of a two-way feedback process is confirmed by Alter and Beyer (2014) who construct spillover indices which capture the average interdependence between sovereigns and banks. They find an intensification of the feedback process in the euro area between 2010 and 2012. Alter and Schueler (2012) find heterogeneous effects of the feedback process across European countries but not within. Fratzscher and Rieth (2015) document that the risk link from sovereigns to banks is stronger than vice versa. Singh et al. (2016) point out that before the financial crisis risk spillovers mainly went from sovereigns to banks, however the outbreak of the financial crisis marked a turning point in this relationship.

We contribute to this literature by providing further evidence for the presence of the doom-loop in the euro area and by assessing whether the new regulatory standards, implemented trough the EBU, are sufficient to break or weaken the link between sovereign and bank default risk. Specifically, we evaluate empirically if the correlation of

risks decreases through the implementation of the new recovery and resolution framework.

In order to identify the two-way feedback process, we estimate two specifications to evaluate the risk spillovers from sovereigns to banks and from banks to sovereigns. To this respect, we need to overcome an omitted variables problem. Both bank and sovereign credit risk are affected by macroeconomic factors that could induce co-movements between them, even in absence of a direct link. This problem is addressed by implementing a fixed effect estimation approach. First we control for bank-country specific effects and time fixed effects, additionally we include measures of volatility, foreign exposure of banks and the CDS market index.

We find that there was a pronounced two-way feedback process between bank and government CDS in the European Union from 2012 to 2014. On the one hand, an increase in sovereign CDS of 10% translates into 0.2-0.3% increase in bank CDS. On the other hand, an increase in the country's banking system CDS of 10% translates into a 2-3% increase in sovereign CDS. However, our results indicate that since the implementation of the banking union, and especially after the introduction of the BRRD, this risk-link weakened in both directions. While we find a highly significant coefficient on government CDS before the implementation, its significance decreased in 2015 and it finally became statistically not significant in 2016. In the same way, the coefficient of banking sector distress was economically and statistically significant during the period 2012-2014 and turned statistically not significant between January 2015 and March 2016. These findings are robust across several different specifications. Furthermore, by implementing interaction terms we find that the implementation had a significant negative effect on the risk link. According to our results the implementation decreased the magnitude of the spillovers from sovereigns to banks by around 0.28% and spillovers from banks to sovereigns by 3.9%.

The remainder of the paper is organized as follows. Section 2 briefly recaps the discussion on the link between sovereign and bank risk and provides an overview of regulatory changes implemented in the European union. Section 3 presents the data, the estimation strategy and results of both specifications. Section 4 discusses the relevance of our findings and concludes.

2. The Risk Link and The European Banking Union

The Euro crisis can be viewed as a phenomenon of multiple dimensions. The first dimension is a banking crisis in which undercapitalized banks face liquidity problems. The second dimension is a sovereign debt crisis in which sovereigns face increasing bond yields and might have challenges to fund the government activity. According to Shambough (2012) and Mody and Sandri (2012) those events are mutually reinforcing and are further exacerbated by the overall weak growth in the euro area.

Those dimensions taken together constitute the so-called 'vicious cycle' or 'doom loop'. This terminology clearly indicates that the problem is a two-way feedback process. In the absence of a supranational resolution mechanism, sovereigns are solely in the responsibility to bail-out the national banks. Such a bank bail-out has a direct impact on the debt level of the sovereign and an indirect impact on the yields the sovereign has to pay when issuing debt[1]. Domestic banks hold a large share of the debt issued by their corresponding sovereign on their balance sheets. The bail-out event triggers a fall in the price of sovereign bonds, which in turn leads to a deterioration of the bank's balance sheet. Hence, a bank bail-out can start a downward spiral from government debt to bank balance sheets and vice versa[2]. As argued by Merler and Pisani-Ferry (2012) and Breton et al. (2012) this feedback process is particularly pronounced in the euro area and adversely affects its financial stability.

Many authors such as Merler and Pisani-Ferry (2012) and Breton et al. (2012) suggest to move the supervision of large banks and the responsibility to rescue them to a supranational level. A supranational resolution mechanism could weaken the feedback process by reducing the potential cost of a bail-out for the national governments. As suggested by Breton et al. (2012) a bail-in mechanism, that is designed to clearly define the legal responsibility in the case of a default, could as well reduce the intensity of the feedback process. The aim of the bail-in mechanism is to induce investors and creditors of banks and sovereigns to price in the risk of a default correctly.

In order to address the issue of financial stability in the euro area, the European Parliament in accordance with the European Council decided to establish the EBU. As of 2016, the EBU consists of two pillars: The Single Resolution Mechanism (SRM) accompanied by the Single Supervisory Mechanism (SSM). The third pillar which should be implemented in the near future is the harmonization of deposit guarantee schemes across countries. Those pillars were legislated through the so-called Single Rulebook, which governs the legal framework of the EBU. The legislation took place through three

directives. Overall, the main goals of the reforms were to establish a harmonized legal framework across Europe, to reduce the degree of financial vulnerability and to alleviate the connection between the banking and sovereign risk (European Parliament, 2014).

In October 2013, the council of the European Union announced the implementation of the SSM. From November 2014, onwards the European Central Bank (ECB) has overtaken the task to supervise the European banking sector, according to the rules stated in the SSM. Therefore, the ECB is directly supervising the most 'significant' banks within Europe[3]. National supervisory boards are supporting the ECB by providing information on the significant banks and by supervising the remaining banks in their home countries. The SSM should ensure a common and coordinated supervision of banks, which in case of a failure could threaten the financial stability of the euro area (European Parliament, 2010). In April 2014 the member states agreed upon the Deposit Guarantee Scheme Directive (DGSD) which should harmonize deposit insurance across member states. However, so far there is no clear consensus on a harmonized deposit scheme thus the DGSD is not yet effective.

In May 2014, the second pillar - the SRM - has been implemented through the BRRD, subsequently it entered into force in August 2014. Finally, the majority of participating states has ratified the new directives in November 2015. The new resolution framework established through the SRM then entered fully into force on 1 January 2016. From then on, the Single Resolution Board (SRB) makes all decisions regarding the resolution of banks, under the supervision of the ECB. Under the new recovery and resolution framework banks are required to prepare recovery plans that are solely private law arrangements and do not involve institutional interventions. Furthermore, detailed resolution plans in accordance with the supervising authorities have to be prepared. Finally, the new framework provides the SRB with a set of tools applicable in the case of a default. Specifically, those tools are; sales of business, bridge institutions, asset separation and a bail-in tool (European Parliament, 2014, Article 37). This new legal framework applies to all banks within the EMU and other European banks that can choose to participate voluntarily[4].

The main novelty is the implementation of the bail-in tool. The bail-in tool works through a so-called liability cascade that defines a stepwise bail-in, in case of a bank resolution. This means that in case of default not only equity, but also debt instruments, issued by the defaulting institute, can be written-down or converted into equity. If these measures are still insufficient to recapitalize the bank, also subordinated liabilities and finally deposits

that are not covered by the deposit guarantee schemes can be accessed. The bail-in therefore works like a firewall that should increase the loss absorbing capacity of banks before the governments have to recapitalize the banks. In order for this new resolution mechanism to be effective, banks need to ensure that they have enough liabilities that could be bailed-in. Therefore, the BRRD defines a minimum requirement for eligible liabilities, the so-called 'Minimum Required Eligible Liabilities' (MREL). The resolution authority sets the MREL on a case-by-case basis (European Parliament, 2014, Article 45). The Single Resolution Fund (SRF), which is set up by the European banks, completes the new resolution framework. Starting in 2015 the fund should be fully in operations in 2023 with a total amount of 55 billion euros. The SRF constitutes the last step in the resolution mechanism and clearly addresses the risk link between banks and sovereigns by imposing a firewall that should prevent spillovers from banks to sovereigns.

In June 2013 the Capital Requirements Regulation and Directive (CRD IV) was implemented, it legislates the conversion of the Basel III capital and liquidity requirements into EU law. Therefore, from January 2014 onwards banks have to adjust gradually to the new capital requirements stated in Basel III. Furthermore, Basel III defines a minimum leverage ratio and new liquidity requirements. Those measures should increase the loss absorbing capacity of banks and enhance liquidity of the banking sector in times of turmoil (European Parliament, 2013).

Furthermore, there have been two regulations that directly target the solvency of sovereigns. The European Fiscal Compact (EFC) defines stricter rules regarding sovereign budgets. Overall, it should increase fiscal discipline across European sovereigns and by this targets the sovereign side of the relationship. The European Stability Mechanism (ESM) allows sovereigns to apply for financial support if they are in financial difficulty or if their financial sector is in need of recapitalization. Hence, it targets the sovereign side of the feedback process as well as the connection that goes from banks to governments.

Figure 1 depicts the doom-loop relationship and shows the reforms that have been taken in order to resolve this source of instability. Here, channel 1 labels risk spillovers from sovereigns to banks, while channel 2 denominates spillovers from banks to sovereigns.

Insert About Here **Figure 1**
The Doom-Loop.

Overall, one might categorize the measures taken into three broad categories. First, measures which aim at stabilizing the solvency of sovereigns, i.e. the EFC and the ESM.

The EFC, by enhancing fiscal discipline across countries, should affect expectations about the sustainability of government activity. In addition, the ESM, by providing access to emergency funds, works like a lender of last resort for sovereigns.

The second category comprises measures which aim at stabilizing the banking systems, i.e. CRD IV, the SSM and the SRM. The adjustment of the Basel accord should improve the resilience of the banking system by enhancing equity standards and by defining liquidity ratios. These measures strengthen the loss absorbing capacity of the banking sector and thus reduce the default probability of banks. Furthermore, within this new framework, the SSM addresses the problem of asymmetric information and regulatory arbitrage. By moving the supervision of banks to a supranational level coordination, problems between national authorities should be reduced and hence a sound supervision should be possible. Overall, this should reduce problems which result from cross-border activity of banks and thus strengthen confidence in the banking system.

Finally, the SRM falls into the second category by increasing the loss absorbing capacity of banks in case of a default. However, it also constitutes the third category, namely measures which target the spillovers between sovereigns and banks. By imposing a new resolution framework that consists of the bail-in cascade and the SRF the financial responsibility of governments in case of a bank default should be reduced. If market participants consider this new resolution mechanism to be effective, the risk link could be weakened (Covi, 2016).

Moreover, the new resolution framework interdicts a direct recapitalization of banks through governments. According to the new resolution framework government interventions are only allowed after the bail-in cascade has proceeded. This exerts ambiguous effects on the risk link. On the one hand, the ban of a direct intervention could reduce the risk spillovers from banks to sovereigns. On the other hand, it also reduces implicit public guarantees for banks, which in turn weakens the balance sheet position of banks and thus might increase the default probability of banks[5].

Two major issues cast doubt on the efficacy of the BRRD. A more general critique along the line of Haldane (2012) is that, as long as the Basel II regulations could not prevent the Great Financial Crisis of 2008/2009, then the additional requirements stated in Basel III might not be the right way to stabilize the financial system. This perspective can be connected to the idea that the financial system is over-regulated, and too complex to be effectively supervised. In the same line of reasoning Chen (2015) points out, that the weakness of the assessment procedure concerning recovery and resolution plans together

with the complexity of the banks' balance sheet and the lack of coordination between National Competent Authorities (NCAs) and SSM can undermine the credibility of the BRRD, and in turn its effectiveness[6]. The second issue, a more technical point, concerns the capability of a resolution authority to bail-in bank assets located abroad or issued in a foreign country where the law of the home country does not apply. In this situation, cross-border claims, which enter the MREL calculation, may not be legally sizeable in case of a bail-in, in turn, this may undermine the effectiveness of the resolution plan. Thus as clearly emphasized by Lehmann (2016) measures by the resolution state can have effects only to the extent permitted by the law of the target state, thereby making private international law collide with the banking resolution plan.

Throughout this regulatory landscape, the final judgment is left to the markets participants, who have to deal with these additional requirements and evaluate the likelihood of a bank or government default. Their judgment finally depends on the remaining likelihood of government interventions and ultimately determines the cost for a default protection, the credit default swap price. Hence, we formulate the following research hypotheses:

Research Hypothesis: *The implementation of the BRRD has weakened the two-way feedback process in the European Union due to restrictions on government interventions and by increasing the loss absorbing capacity of banks in case of a default.*

According to the regulatory timetable, we should see a decrease in the explanatory power of the sovereign CDS on bank CDS and vice versa during the implementation period, that is, between January 2015 and January 2016. Furthermore, we might expect a further decrease or even a breakdown of the bank to sovereign channel after the bail-in tool became fully effective across all the EMU member states[7]. In the next section, we evaluate how market participants have responded to the BRRD implementation by conducting a panel data analysis.

3. The Empirical Analysis

3.1 Data and Summary Statistics

In order to assess the impact of the BRRD implementation, we have to identify those countries which have complied with the regulatory requirements. According to the third ISDA monitor, which keeps track of the implementation in national law of the BBRD, as of 7th January 2016 all the members of the European Union with the exception of Poland have implemented it (ISDA 2016)[8]. Moreover, the United Kingdom although it has

implemented the bail-in tool in January 2015, it lacks the complementary measure - MREL - that ensures the effectiveness of the bail-in tool. For this reason, banks headquartered in the UK will be omitted from the sample[9].

As a proxy for credit risk we use the CDS prices of banks and sovereigns, and each bank is matched with the corresponding sovereign. We use Datastream to determine whether a bank has publicly traded 5-year senior CDS. We identify 47 banks with publicly traded CDS. However, in order to ensure the availability of control variables we restrict the sample to include only banks with publicly traded equity and available sovereign CDS data over the entire period. To this respect, Greece is omitted from the sample since sovereign CDS are not quoted during the period of the analysis. According to these criteria, we identify 30 banks.

In the next step, we construct a measure of foreign exposure for each country's financial sector following the procedure described in Archarya et al. (2014) and Kallestrup et al. (2016). This variable should account for the fact that changes in banks' credit risk may be driven by changes in the sovereign credit risk of other countries. The Bank for International Settlement provides quarterly data on total claims which the domestic banking system owns vis-à-vis the private and public entities of foreign countries. This allows us to construct a foreign exposure index as the weighted average of the other countries' sovereign CDS rates, where the weights are determined according to country-specific exposures up to 85% of the total banking system's foreign claims[10]. As additional control variables we use the VDAX, to capture changes in aggregate volatility, and the iTraxx Europe, to control for common movements in CDS markets. Both variables are important factors in pricing credit risk. In order to analyse the spillovers from banks to sovereigns we construct a measure of financial distress. Financial sector distress is defined as the weighted average of banks' CDS by country. For this measure Table 1 reports the list of banks by country of origin and total assets.

Table 1. List of banks by country and total assets.

TOTAL ASSETS		2012	2013	2014	2015	2016	AVG 2012-2016
Country	Banks			Billion Euro			Country Weight
Austria	Erste Group	213	208	198	200	206	100%
Belgium	KBC Bank	257	239	245	252	262	49%
	Dexia Credit Local	357	223	247	230	238	51%
France	BNP Paribas	1907	1810	2077	1994	2121	39%
	Credit Agricole	1783	1688	1763	1698	1857	35%
	Societe Generale	1251	1235	1308	1334	1367	26%
Germany	Commerzbank	636	551	558	533	536	22%
	Deutschebank	2020	1611	1709	1640	1741	67%
	IKB Industriebank	32	27	25	21	21	1%
	Bayerische Landesbk	286	255	232	215	224	10%
Ireland	Allied Irish bank	123	118	112	107	107	40%
	Bank of Ireland	148	132	130	131	130	48%
	Permanent Tsb	41	37	36	29	30	12%
Italy	Monte dei Paschi	218	198	183	169	174	10%
	Popolare di Milano	48	45	45	47	52	2%
	Intesa Sanpaolo	673	624	646	676	700	34%
	Unicredit Bank	927	846	844	860	892	45%
	Mediobanca	62	62	54	55	56	3%
	Unione di Banche	132	124	122	120	117	6%
Netherlands	ING Bank	1166	1081	993	842	869	100%
Portugal	Banco Comercial Portugu	90	82	76	75	76	100%
Spain	BBVA	621	583	651	750	741	28%
	Banco de Sabadell	161	163	163	209	204	8%
	Banco Popular Espanol	172	164	179	179	182	7%
	Banco Santander	1282	1134	1266	1340	1324	54%
	Bankinter	58	55	57	57	61	2%
Sweden	Nordea Bank	668	630	669	646	675	56%
	Svenska Bank	262	273	309	277	314	24%
	Swedbank	203	201	233	236	264	19%
Denmark	Danske bank	468	434	464	442	455	100%

The dataset ranges from January 2012 to end of March 2016. In order to avoid stale data we drop observations with two consecutive zero changes in bank CDS and sovereign CDS[11]. Therefore, the N by T dimension of the dataset equals 30 banks and 955 trading days, respectively. This yields a total of 28.236 observations. Moreover, to identify the evolution of the 'doom-loop' from the aftermath of the Euro crisis to the BRRD implementation, we divide the time span in four sub-periods of equal length, and a fifth period with one quarter of data[12]. Table 2 reports the summary statistics for bank CDS and sovereign CDS, foreign exposure, and stock prices for the full sample, and the subsamples in levels and percentage points.

Table 2 Summary Statistics of Bank and Sovereign CDS

Full Sample (01/01/2012 to 31/03/2016)	n	Mean	S.D.	Min	.25	Mdn	.75	Max
Bank CDS (bp)	28236	239	194	38	108	172	306	1819
Sovereign CDS (bp)	28236	111	132	7	29	70	140	1521
Δ Log(Bank CDS)	28236	0%	3%	-43%	-1%	0%	0%	33%
Δ Log(Sovereign CDS)	28236	0%	5%	-56%	-1%	0%	1%	53%
Δ Log(Bank Stock Price)	28236	0%	3%	-108%	-1%	0%	1%	109%
Δ Log(Foreign Exposure CDS)	28236	0%	2%	-34%	-1%	0%	1%	20%
Period 1 (01/01/2012 to 01/01/2013)								
Bank CDS (bp)	7267	411	257	71	210	344	533	1819
Sovereign CDS (bp)	7267	213	201	10	47	151	340	1521
Δ Log(Bank CDS)	7267	0%	3%	-43%	-1%	0%	0%	17%
Δ Log(Sovereign CDS)	7267	0%	6%	-56%	-2%	0%	2%	50%
Δ Log(Bank Stock Price)	7267	0%	4%	-34%	-2%	0%	2%	43%
Δ Log(Foreign Exposure CDS)	7267	0%	2%	-13%	-2%	0%	1%	11%
Period 2 (01/01/2013 to 01/01/2014)								
Bank CDS (bp)	7141	260	143	53	144	240	364	742
Sovereign CDS (bp)	7141	112	95	8	22	95	197	502
Δ Log(Bank CDS)	7141	0%	2%	-16%	-1%	0%	0%	18%
Δ Log(Sovereign CDS)	7141	0%	5%	-51%	-1%	0%	1%	53%
Δ Log(Bank Stock Price)	7141	0%	3%	-20%	-1%	0%	1%	23%
Δ Log(Foreign Exposure CDS)	7141	0%	2%	-12%	-1%	0%	1%	12%
Period 3 (01/01/2014 to 01/01/2015)								
Bank CDS (bp)	6093	143	72	38	83	127	187	400
Sovereign CDS (bp)	6093	62	42	8	28	58	88	316
Δ Log(Bank CDS)	6093	0%	3%	-29%	-1%	0%	0%	25%
Δ Log(Sovereign CDS)	6093	0%	5%	-39%	-1%	0%	1%	41%
Δ Log(Bank Stock Price)	6093	0%	3%	-35%	-1%	0%	1%	34%
Δ Log(Foreign Exposure CDS)	6093	0%	2%	-16%	-1%	0%	1%	14%
Period 4 (01/01/2015 to 01/01/2016)								
Bank CDS (bp)	6188	128	65	39	75	119	160	452
Sovereign CDS (bp)	6188	54	37	7	14	62	81	197
Δ Log(Bank CDS)	6188	0%	3%	-24%	-1%	0%	1%	28%
Δ Log(Sovereign CDS)	6188	0%	6%	-39%	-1%	0%	0%	39%
Δ Log(Bank Stock Price)	6188	0%	3%	-108%	-1%	0%	1%	109%
Δ Log(Foreign Exposure CDS)	6188	0%	3%	-34%	-1%	0%	1%	20%
Period 5 (01/01/2016 to 31/03/2016)								
Bank CDS (bp)	1547	177	126	45	93	152	202	738
Sovereign CDS (bp)	1547	63	45	7	20	70	88	286
Δ Log(Bank CDS)	1547	0%	4%	-24%	0%	0%	1%	33%
Δ Log(Sovereign CDS)	1547	0%	6%	-34%	-1%	0%	1%	43%
Δ Log(Bank Stock Price)	1547	0%	4%	-36%	-2%	0%	1%	36%
Δ Log(Foreign Exposure CDS)	1547	0%	3%	-16%	-1%	0%	1%	18%

Period 1 starts in January 1st, 2012, and ends in December 2012. This period captures the peak of the Euro crisis as well as the "whatever it takes" Draghi's speech on 26th July 2012, which defined the initial decrease in sovereign and bank default risk. Throughout this period the average bank CDS and sovereign CDS is at its highest, respectively 411 bps and 213 bps. Moreover, the CDS volatility is extremely high respectively 257 bps for banks' CDS, while 201 bps for sovereign CDS.

During period 2, which starts in January 2013 and ends in December 2013, the average bank and sovereign CDS and their volatility almost halved. This trend continues in the following periods. Both series reach their lowest level in period 4 (the BRRD phase-in period), with average bank and sovereign CDS of 128 bps and 54 bps, respectively.

Ultimately, in period 5 which starts in January 2016 and ends in March 2016, although

the bail-in tool becomes enforceable, the average bank and sovereign CDS increase compared to period 4. The average bank CDS increases by almost 100 basis points, while the sovereign CDS increases by 10 bps. Remarkably, banks' CDS volatility spikes to the level experienced between 2013 and 2014, while sovereigns' CDS volatility increased by just 7 bps compared to the average of the previous year. In this context, it is important to emphasize that an increase/decrease of the co-movement between the two time series may be triggered by a common factor, and not by a strengthening or weakening of the sovereign-bank channel. This specific point is going to be analysed in the following section.

This countertrend might reflect the financial market distress started in January 2016, during which Eurostox600 and the Eurostox600banks lost respectively 30% and 40% of their market value compared to December 2015. Figure 2 illustrates the evolution of both indexes. To this respect, the market turmoil, taking place between January and March 2016, represents an ideal robustness check. In fact, an increase in the co-movement without a strengthening of the feedback-loop between sovereign and bank CDS may give the first evidence that the link between the two has weakened.

*Insert About Here **Figure 2***
Stock Market Performance January 2012 - March 2016.

3.2 Stylized Facts

In order to frame the co-movement of bank and sovereign CDS from its inception - the Sovereign Crisis of 2012 - figure 3 shows the scatterplot of monthly averages of bank and sovereign CDS between January 2012 and March 2016.

Clearly, after the beginning of the European sovereign debt crisis - in the end of 2009 - bank and sovereign CDS started to commove strongly. Concerns regarding the solvability of the banking system, which owned a significant part of the sovereign debt created the feedback loop. The co-movement kept on intensifying during the period 2011- 2012, the peak of the crisis. In 2013, bank and sovereign CDS faced an evident decrease in absolute terms, but the positive correlation between both remained. Only from 2014 onwards, the slope flattened remarkably, and almost became horizontal during 2015. Contrary in the beginning of 2016 the trend reversed, and the line steepened again due to the January stock market turmoil, which revived the co-movement between both time series.

For this reason, as clearly pointed out by Acharya et al. (2014), a key problem in quantifying the direct feedback loop between sovereign and financial sector credit risk is

that both series can co-move due to factors which are potentially unobservable. In the case at hand, shocks to macroeconomic fundamentals may trigger an increase in sovereign CDS, and at the same time through a different channel, affect the profitability of a bank. Such a factor can lead to increases or decreases in the co-movement between both time series even if the doom-loop is inactive. Thus, changes in macroeconomic and financial conditions may generate a correlation between sovereign and bank credit risk even in the absence of a direct feedback mechanism.

Insert About Here **Figure 3**
Co-movement of sovereign CDS and bank CDS between 2012 and 2016.

3.3 Channel 1: The Risk Transfer from Sovereigns to Banks

In order to quantify the risk transfer from sovereigns to banks - channel 1 - we need to address the problem of co-movement between the CDS of banks and sovereigns. To this end, we employ a fixed effects estimation strategy. Bank fixed effects should control for all bank specific characteristics, while time fixed effects should take into account market wide common effects. On top of that, a set of control variables is included to capture additional confounding factors. This approach closely resembles the one implemented by Acharya et al. (2014)[13].

3.3.1 Benchmark Specification Ch. 1

We estimate the following OLS benchmark regression - equation (1) - in order to quantify and verify whether the effect of sovereign CDS on bank CDS - the β coefficient - has changed between before and after the BRRD implementation. According to our research hypothesis, we expect β to be positive and statistically significant before the implementation of the BRRD, while less statistically significant and smaller afterwards.

Benchmark Specification Channel $1 - Bank\ and\ Time\ Fixed\ Effects$:

$$\Delta \log(BANK\ CDS_{ijt})$$
$$= \alpha_i + \zeta_t + \beta \Delta \log(SOV\ CDS_{jt}) + \omega \Delta \log(BANK\ CDS_{it-1}) + \gamma \Delta \log(FX_{jt}) \dots$$

$$+ \varphi \Delta \log(SP_{it}) + \delta \Delta log(X_t) + \varepsilon_{ijt} \qquad (1)$$

Equation (1) is presented as follows: *i* is the subscript identifying the bank, *j* indicates the residence country of the bank, and *t* indicates time. $\Delta \log(BANK\ CDS_{ijt})$ is the change in

the natural logarithm of the bank CDS from day t to t+1, and $\Delta \log\left(SOV\ CDS_{jt}\right)$ is the daily change in the natural logarithm of sovereign CDS, the variable of interest in this specification. Moreover, the benchmark specification controls for endogeneity arising from the relation between bank and sovereign CDS and its dynamic nature by adding the lagged value of the dependent variable - $\Delta \log(BANK\ CDS_{it-1})$. In this way, we control for the possibility that current changes in the dependent variable may depend on past changes of itself[14]. Next, $\Delta \log\left(FX_{jt}\right)$ is the daily change in the natural logarithm of the foreign exposure index, $\Delta \log(SP_{it})$ is the daily change in the natural logarithm of banks' stock prices, and $\Delta(X_t)$ is the change in the global factors - VDAX and iTraxx Europe. Lastly, α_i are bank fixed effects capturing idiosyncratic characteristics of banks, while ζ_t are day fixed effects, which capture the additional sources of variability across time. We cluster the standard errors at the bank level to allow for correlation of error terms within banks. In order to address potential non-normalities of the errors, standard errors are bootstrapped with 200 replications. Table 3 presents the results of the benchmark model. We include results for the period before, during, and after the BRRD implementation.

Table 3 Bank CDS and Changes in Sovereign CDS Explanatory Power: Time and Bank Fixed Effects. This table shows the effect of sovereign credit risk on bank credit risk before, during and after the implementation of the BRRD. Standard errors are clustered at the bank level and bootstrapped. ***, **, and * indicates statistical significance at the 1%, 5%, and 10% level, respectively. The regression specification is given by: $\Delta \log\left(BANK\ CDS_{ijt}\right) = \alpha_i + \zeta_t + \beta\Delta \log\left(SOV\ CDS_{jt}\right) + \omega\Delta \log(BANK\ CDS_{it-1}) + \gamma\Delta \log\left(FX_{jt}\right) + \varphi\Delta \log(SP_{it}) + \delta\Delta log(X_t) + \varepsilon_{ijt}$

Δ Log (BANK CDS) VARIABLES		(1) Fixed Effects 2012-2016	(2) Fixed Effects 2012	(3) Fixed Effects 2013	(4) Fixed Effects 2014	(5) Fixed Effects 2015	(6) Fixed Effects 2016
Δ Log (SOV CDS)	β	0.0183*	0.0344***	0.0240**	0.0306**	-0.00638	-0.00538
		(0.00975)	(0.0132)	(0.0114)	(0.0151)	(0.0208)	(0.0221)
Lagged Δ Log (BANK CDS)		-0.0377**	-0.0346	0.00102	-0.0738***	-0.0863**	0.0705*
		(0.0164)	(0.0357)	(0.0194)	(0.0194)	(0.0418)	(0.0370)
Δ Log (FX)		0.0521**	0.0951	0.132***	0.0793***	0.00640	0.0273
		(0.0234)	(0.0633)	(0.0401)	(0.0291)	(0.0222)	(0.0484)
Δ Log (SP)		-0.0373***	-0.0482***	-0.0453***	-0.0354**	-0.0113	-0.0684**
		(0.0130)	(0.0185)	(0.0155)	(0.0151)	(0.0211)	(0.0340)
Δ Log (VDAX)		0.230***	0.106*	0.367*	-0.196	-0.549***	0.0612
		(0.0417)	(0.0631)	(0.201)	(0.193)	(0.176)	(0.0838)
Δ Log (ITRAXEU)		-0.668***	-0.0103	-1.436**	1.079**	1.037*	0.393
		(0.228)	(0.0862)	(0.617)	(0.499)	(0.540)	(0.248)
Constant		-0.0192***	0.00197	-0.00933**	-0.00294	0.0196***	-0.00195
		(0.00585)	(0.00207)	(0.00469)	(0.00300)	(0.00590)	(0.00190)
Observations		28,236	7,267	7,141	6,093	6,188	1,547
R-squared		0.406	0.384	0.461	0.364	0.401	0.488
No. Banks		30	29	29	30	29	29
Bank FE		YES	YES	YES	YES	YES	YES
Time FE		YES	YES	YES	YES	YES	YES

Column (1) reports estimates for the entire period, columns (2) to (4) for the period preceding the BRRD implementation, while columns (5) to (6) for the implementation period. First of all, β the coefficient on sovereign CDS is positive and statistically significant in the period preceding the BRRD implementation. A 10% increase in sovereign CDS corresponds to 0.34%, 0.24%, and 0.31% increase in bank CDS respectively during 2012, 2013 and 2014. This brings additional evidence in support of the direct risk transfer from sovereigns to banks investigated in the doom loop literature. Nevertheless, regarding our research hypothesis, we find that during the BRRD phase-in period and full implementation, the β coefficient experiences a strong reduction in magnitude and becomes statistically not significant. Overall, the model specification seems to perform relatively well since the control variables are statistically significant and with the expected sign. Altogether, the variables explain on average 40% of the variation in daily changes in bank CDS. These values are in line with the previous studies.

 The decrease in magnitude and the drop in statistical significance show that a structural break in the relationship between sovereign and bank credit risk has occurred in 2015. Since this coincides with the BRRD implementation, this might indicate a connection between both. Overall, it justifies further investigations of the two events[15].

To further investigate the connection, and to ensure that the results are not driven by ad-hoc sample splitting, we estimate the benchmark specification with a one-year rolling window. Figure 4 reports the evolution of the β coefficient. It is evident that the β coefficient reduces in magnitude between April 2015 and March 2016. Furthermore, the estimates during this time window are not significant anymore which is indicated by the widening of the confidence intervals. As highlighted, this shift in the coefficient takes place in the period during which most EU members ratified the BRRD. Overall, this approach verifies the sample splitting and justifies the period of interest[16].

Insert About Here **Figure 4**

Sovereign CDS Coefficient Dynamics: One-Year Rolling-estimation Window.

Furthermore, the vertical lines indicate the announcement and introduction of the ECB's Public Sector Purchase Program (PSPP), commonly called QE. It is apparent that the β coefficient reacted neither to the former nor to the latter[17]. This initial claim will be further corroborated in the following section.

3.3.2 BRRD Dummy Specification Ch. 1

In order to test whether there is a direct effect of the introduction of the BRRD on the risk spillovers from sovereigns to banks we create a BRRD dummy. $BRRD_j$ takes on the value J= 0 before the full implementation of the BRRD, while it takes on the value J = 1, when the BRRD was ratified and applies[18]. Furthermore, in order to see the effect of the implementation on the β coefficient, we include an interaction term between the BRRD dummy and sovereign CDS, $[(BRRD_j * \Delta \log(SOV\ CDS))]$. To this respect, we expect the coefficient of the BRRD dummy - Θ_1 - and the coefficient of the BRRD interaction term - Θ_2 - to be negative and statistically significant[19]. Furthermore, we include the same set of control variables as in the benchmark specification. This yields the following estimation equation:

$BRRD\ Dummy\ Specification\ Channel\ 1 - Bank\ and\ Time\ Fixed\ Effects$:

$$\Delta \log(BANK\ CDS_{ijt})$$

$$= \alpha_i + \zeta_t + \beta \Delta \log(SOVCDS_{jt}) + \omega \Delta \log(BANKCDS_{it-1}) + \gamma \Delta \log(FX_{jt}) \dots$$

$$+ \varphi \Delta \log(SP_{it}) + \delta \Delta log(X_t) + \Theta_1 BRRD_j + \Theta_2 [(BRRD_j * \Delta \log(SOV\ CDS_{jt})] + \varepsilon_{it} \qquad (2)$$

Estimates of Θ - the parameters of interest in this specification - are reported in table 4. Column (1) reports the estimates of the benchmark specification for the purpose of comparison, column (2) reports the results with the BRRD Dummy, while column (3) includes both, the BRRD dummy and the BRRD interaction term. The same specification is repeated for columns (4) to (6) at monthly frequency and reported with the inclusion of the ECB's PSPP[20].

The coefficient of the BRRD dummy Θ_1 is negative and statistically significant at 1%. This corroborates the intuition that throughout this period the BRRD and its bail-in tool have induced a structural break in the risk-relationship previously highlighted by the dynamics of the β coefficient in figure 4. Moreover, the results reported in column (3) show that Θ_2 is negative and statistically significant at 5%. This indicates that banks in countries which have implemented the BRRD experienced a strong decrease in the risk connection to their sovereigns. Furthermore, the difference between β and Θ_2 is in line with the estimate of the β coefficient reported in table 3. The foreign exposure measure

and stock prices possess the expected sign and also behave consistently with the reported estimates of the benchmark specification. Overall the specification explains 40% of the variation in bank CDS.

Ultimately, we want to verify whether these results are sensitive to changes in the data frequency, to this end we estimate equation 2 with monthly data. Performing the analysis with monthly data allows us to include data on the ECB's PSPP. This should enable us to verify whether some of the variation captured by the BRRD interaction term comes from the contemporaneous implementation of the QE.

Columns (4) to (6) show that the coefficient of $\Delta \log(PSPP)$ is negative but not statistically significant. This robustness check confirms the initial descriptive evidence of figure 4, in which the QE implementation seemed to have no effect on the risk connection. According to the ECB, the QE aims at reducing the level of the sovereign bond yields, and therefore it targets only one side of the relationship, and not the risk-transfer between the two.

Columns (5) and (6) reports the estimates for Θ_1 and Θ_2. To this respect, the BRRD dummy and the BRRD interaction term are negative and statistically significant respectively at 1% and 10% of confidence level. Across the three specifications the PSPP remains statistically not significant. Moreover the coefficient of Θ_2 indicates that the full implementation of the BRRD, i.e., the bail-in tool almost halved the risk-transfer from sovereign to banks. Again we find a significant shift of the slope for banks in countries which have fully implemented the BRRD. This strengthens the results provided at daily frequency. Overall, these findings support our research hypothesis.

Table 4 Banks CDS: BRRD Dummy and Sovereign CDS Interaction Term. This table examines the robustness of our main results by reporting the coefficients after having included the BRRD dummy and the interaction term between the BRRD dummy and sovereign CDS, columns (2) and (3), respectively. The same specification is performed at monthly frequency columns (4) to (6), and the public sector purchase program of the ECB is added as further control variable. Standard errors are clustered at the bank level and bootstrapped. ***, **, and * indicates statistical significance at the 1%, 5%, and 10% level, respectively. The regression specification is given by:
$\Delta \log(BANK\ CDS_{ijt}) = \alpha_i + \zeta_t + \beta \Delta \log(SOV\ CDS_{jt}) + \omega \Delta \log(BANK\ CDS_{it-1}) + \gamma \Delta \log(FX_{jt}) +$
$\varphi \Delta \log(SP_{it}) + \delta \Delta log(X_t) + \Theta_1 BRRD_j + \Theta_2 \big[(BRRD_j * \Delta log(SOV\ CDS_{jt})\big] + \varepsilon_{it}$

Δ Log (BANK CDS) VARIABLES		(1) Fixed Effects 2012-2016	(2) Fixed Effects 2012-2016	(3) Fixed Effects 2012-2016	(4) Fixed Effects 2012-2016	(5) Fixed Effects 2012-2016	(6) Fixed Effects 2012-2016
Δ Log (SOV CDS)	β	0.0183* (0.00975)	0.0183* (0.00975)	0.0215** (0.0108)	0.207*** (0.0379)	0.207*** (0.0379)	0.223*** (0.0407)
Interaction Term:	Θ						
BRRD DUMMY			-0.00155*** (0.000425)	-0.00160*** (0.000420)		-0.00752*** (0.00271)	-0.00927*** (0.00275)
(BRRD DUMMY) * SOV CDS				-0.0276**			-0.105* (0.0632)
Δ Log (PSPP)					-0.601 (0.941)	-0.432 (0.892)	-0.279 (0.859)
Constant		-0.0192*** (0.00585)	-0.0164*** (0.00570)	-0.0161*** (0.00577)	-0.00234 (0.0388)	-0.00522 (0.0372)	0.00566 (0.0387)
Observations		28,236	28,236	28,236	1,252	1,252	1,252
R-squared		0.406	0.406	0.406	0.696	0.696	0.697
No. Banks		30	30	30	26	26	26
Bank FE		YES	YES	YES	YES	YES	YES
Time FE		YES	YES	YES	YES	YES	YES
Lagged Δ Log (BANK CDS)		YES	YES	YES	NO	NO	NO
CONTROL VARIABLES		TABLE 3	TABLE 3	TABLE 3	TABLE 3	TABLE 3	TABLE 3
DATA FREQUENCY		**DAILY**	**DAILY**	**DAILY**	**MONTHLY**	**MONTHLY**	**MONTHLY**

3.4 Channel 2: Risk Transfer from Banks to Sovereigns

In order to investigate the second channel - the feedback loop from banks to sovereigns - we create a financial sector distress variable (FSD) following the approach of Acharya et al. (2014). In order to address possible confounding factors we employ a fixed effects estimation strategy with country and time fixed effects as employed in Dieckmann and Plank (2012) and Kallestrup et al. (2016). Country fixed effects - α_i - should control for all country specific characteristics, while time fixed effects - ζ_t - should take into account market wide common effects. Furthermore, we control for the endogeneity arising from the relation between bank and sovereign CDS by adding the lagged dependent variable - $\Delta \log(SOVCDS_{it-1})$ - and changes in global factors by adding the VDAX and iTraxx Europe - $\Delta log(X_t)$. Apart from the FSD variable and the banks' specific factors, the channel 2's benchmark specification is the mirror image of the one presented for channel 1.

3.4.1 Benchmark Specification Ch. 2

The model specification we are going to estimate is given by equation (3). The coefficient of interest β is expected to be positive and statistically significant before the implementation of the BRRD, while smaller and not statistically significant after.

Benchmark Spcification Channel 2 − Country and Time Fixed Effects :

$$\Delta \log(SOV\ CDS_{it}) = \alpha_i + \zeta_t + \beta \Delta \log(FSD_{it}) + \omega \Delta \log(SOV\ CDS_{it-1}) + \delta \Delta log(X_t) + \varepsilon_{it} \quad (3)$$

Table 5 presents the estimates of this model specification. Column (1) shows the estimates for the benchmark specification during the entire period, columns (2) to (4) present the results before the BRRD implementation, while columns (5) to (6) reports the estimates after. The β coefficient of financial sector distress (FSD) is positive and statistically significant at 1% during the period preceding the BRRD implementation. Contrary, after the implementation it strongly decreases and becomes statistically not significant. During the period 2012-2014 a 10% increase in FSD corresponded to 2-3% increase in sovereign CDS. Overall, the variables explain 30% of the variation in daily changes in bank CDS across the entire period. These findings complement the previous investigation and confirm the structural break in the risk-relationship between banks and sovereigns from 2015 onwards. Nevertheless, further evidences is necessary to assess the effect of the BRRD implementation on the second channel.

Table 5 Sovereign CDS and Financial Sector Distress: Country and Time Fixed Effects. This table shows the effect of banks' credit risk on sovereign credit risk before and after the implementation of the BRRD. Standard errors are clustered at country level and bootstrapped by 200 replications. ***, **, and * indicates statistical significance at the 1%, 5%, and 10% level, respectively. The regression specification is given by:
$$\Delta \log(SOV\ CDS_{it}) = \alpha_i + \zeta_t + \beta \Delta \log(FSD_{it}) + \omega \Delta \log(SOV\ CDS_{it-1}) + \delta \Delta log(X_t) + \varepsilon_{it}$$

Δ **Log (SOV CDS)**		(1) Fixed Effects	(2) Fixed Effects	(3) Fixed Effects	(4) Fixed Effects	(5) Fixed Effects	(6) Fixed Effects
VARIABLES		2012-2016	2012	2013	2014	2015	2016
Δ Log (FSD)	β	0.203***	0.301***	0.324***	0.217**	0.0300	-0.0170
		(0.0641)	(0.0810)	(0.123)	(0.105)	(0.155)	(0.136)
Lagged Δ Log (SOV CDS)		-0.300***	-0.288***	-0.233***	-0.218***	-0.432***	-0.246***
		(0.0283)	(0.0727)	(0.0489)	(0.0329)	(0.0394)	(0.0430)
Δ Log (VDAX)		0.246*	0.327	-0.435	-0.415***	-0.0318	-0.0819
		(0.140)	(0.218)	(0.433)	(0.105)	(0.130)	(0.297)
Δ Log (ITRAXEU)		-1.237**	-0.656**	1.651	-0.226	1.297	1.001
		(0.545)	(0.324)	(1.644)	(0.237)	(1.144)	(1.627)
		(0.0283)	(0.0727)	(0.0489)	(0.0329)	(0.0394)	(0.0430)
Constant		-0.0155	-0.00167	-0.00329	-0.000648	-0.00134	0.0191
		(0.0111)	(0.00598)	(0.00365)	(0.00131)	(0.00471)	(0.0236)
Observations		8,946	2,502	2,351	1,808	1,827	458
R-squared		0.300	0.344	0.235	0.296	0.322	0.304
No. Countries		11	10	10	11	10	10
Country FE		YES	YES	YES	YES	YES	YES
Time FE		YES	YES	YES	YES	YES	YES

3.4.2 BRRD Dummy Specification Ch. 2

In the same vein as for channel 1, we construct an interaction term between the BRRD dummy - $BRRD_j$ - and the financial sector distress variable - $\Delta \log(FSD_{it})$ which is denoted $[(BRRD_j * \Delta\log(FSD))]$. This enables us to quantify the direct effect of the implementation on the risk transfer from banks to sovereigns. Furthermore, we include the same set of control variables as in the benchmark specification. This yields the following estimation equation:

BRRD Dummy Spcification Channel $2 - Country\ and\ Time\ Fixed\ Effects:$

$$\Delta\log(SOV\ CDS_{it}) = \alpha_i + \zeta_t + \beta\Delta\log(FSD_{it}) + \omega\Delta\log(SOV\ CDS_{it-1}) + \tau_1 BRRD_j + \cdots$$
$$+ \tau_2[(BRRD_j * \Delta\log(FSD_{it}))] + \delta\Delta\log(X_t) + \varepsilon_{it} \tag{4}$$

Our interest lies in the coefficients of the BRRD dummy and the BRRD interaction term, respectively τ_1 and τ_2. We expect both τ to be negative and statistically significant.

Table 6, which retains the same structure of table 4, reports the estimates for the benchmark specification in column (1), for the BRRD dummy in column (2), and for the BRRD interaction term in column (3). Then, the same specification is repeated for columns (4) to (6) at monthly frequency and reported with the inclusion of the ECB's PSPP. In addition, we include the debt to GDP ratio to further control for country specific debt dynamics as commonly employed in the literature[21].

The coefficient of the BRRD dummy τ_1 is negative and statistically significant at 5%. Moreover, the results reported in column (3) show that τ_2 is negative and statistically significant at 1%. Both results suggest that those countries implementing the resolution framework experienced a strong decrease in the risk transfers.

Next, we perform the analysis with monthly data to control for the data frequency, the ECB's PSPP, and the country's ratio of debt to GDP. To this respect, the coefficient of the PSPP is positive and statistically not significant. Clearly it does not affect the β coefficient. Nevertheless, the coefficients of the BRRD dummy and interaction terms, though with the expected sign and a consistent magnitude, are both statistically insignificant. By looking at table 7 in the appendix, we can see that the breakdown is also present at monthly frequency[22]. This result is overall satisfying since the sign and magnitude are consistent, while the lack of statistical significance might be driven by the

few data points available[23]. All the variables explain 55% of the variation in monthly changes in sovereign CDS across the entire period. These evidences further corroborate the findings provided for channel 1, emphasizing that the BRRD and thus the EBU seem to have a symmetric effect on both channels[24].

Table 6 Sovereign CDS: BRRD Dummy and Financial Sector Distress Interaction Term. This table examines the robustness of our main results by reporting the coefficients after having included the BRRD dummy, and the interaction term between the BRRD dummy and financial sector distress, columns (2) and (3), respectively. The same specification is performed at monthly frequency columns (4) to (6), and further control variables are added: debt to GDP ratio column and the ECB's PSPP. Standard errors are clustered at country level and bootstrapped by 200 replications. ***, **, and * indicates statistical significance at the 1%, 5%, and 10% level, respectively.

The regression specification is given by $\Delta \log(SOV\ CDS_{it}) = \alpha_i + \zeta_t + \beta \Delta \log(FSD_{it}) + \omega \Delta \log(SOV\ CDS_{it-1}) + \tau_1 BRRD_j + \tau_2 [(BRRD_j * \Delta \log(FSD_{it})] + \delta \Delta \log(X_t) + \varepsilon_{it}$

Δ Log (SOV CDS)		(1) Fixed Effects 2012-2016	(2) Fixed Effects 2012-2016	(3) Fixed Effects 2012-2016	(4) Fixed Effects 2012-2016	(5) Fixed Effects 2012-2016	(6) Fixed Effects 2012-2016
VARIABLES							
Δ Log (FSD)	β	0.203*** (0.0641)	0.203*** (0.0642)	0.253*** (0.0598)	0.215* (0.126)	0.215* (0.126)	0.265* (0.152)
Interaction Term:	τ						
BRRD DUMMY			-0.00335** (0.00161)	-0.00349** (0.00151)		-0.0169 (0.0256)	-0.0152 (0.0265)
(BRRD DUMMY) * FSD				-0.388*** (0.128)			-0.278 (0.296)
Δ Log (PSPP)					1.690 (4.059)	2.086 (4.162)	2.180 (4.381)
Constant		-0.0155 (0.0111)	-0.00942 (0.0119)	-0.0124 (0.0117)	-0.196 (0.168)	-0.204 (0.169)	-0.171 (0.162)
Observations		8,946	8,946	8,946	428	428	428
R-squared		0.300	0.300	0.301	0.544	0.544	0.547
No. Countries		11	11	11	9	9	9
Country FE		YES	YES	YES	YES	YES	YES
Time FE		YES	YES	YES	YES	YES	YES
Lagged Δ Log (BANK CDS)		YES	YES	YES	NO	NO	NO
Δ Log (DEBT / GDP)		NO	NO	NO	YES	YES	YES
CONTROL VARIABLES		TABLE 5	TABLE 5	TABLE 5	TABLE 5	TABLE 5	TABLE 5
DATA FREQUENCY		**DAILY**	**DAILY**	**DAILY**	**MONTHLY**	**MONTHLY**	**MONTHLY**

3.5 Discussion

The results of the benchmark specifications reported in table 3 and 6, and in table 5 respectively for the daily and monthly analysis have shown that a breakdown of the risk-transfer from sovereigns to banks - channel 1 - and from banks to sovereigns - channel 2 - has taken place from 2015 onwards. This structural break has been further investigated to assess whether the BRRD implementation was the source of this phenomenon. On the one hand, by constructing a dummy, which replicates the heterogeneous cross-country implementation of the BRRD's bail-in tool, we have been able to verify that the BRRD

implementation period was the one capturing the source of variation. On the other hand, by interacting the BRRD dummy with the main variable of interest - sovereign CDS for channel 1 - and the financial sector distress for channel 2 - we have quantified the direct effect of the regulation on β, the coefficient capturing the estimates of the structural break reported respectively in table 3 and 6. These results are consistent and robust across different specifications.

According to these findings, the research hypothesis seems to be confirmed. The implementation of the resolution mechanism as defined by the BRRD and comprehended into the broader framework of the EBU was effective in tackling the risk spillovers between the banking system and the fragile sovereign fiscal position, the so called doom loop. These results have important implications, not only for the stakeholders directly involved as here documented, i.e., banks and sovereigns, but also for taxpayers, macroprudential policy regulators, and European institutions.

On the one hand, the effective implementation of the EBU and a more transparent mechanism of losses allocation in case of an entity default have increased the efficiency in the allocation of capital - equity and debt - in the banking sector. On the other hand, it has also contributed to the reduction in the cost of debt-refinancing by governments. Now, the burden of a bank failure has shifted from taxpayers to a well-defined hierarchy of investors, so that the price of a capital asset can properly reflect the risk-return trade-off assigned to the class of bail-in-able instruments.

Moreover, this new set of macroprudential measures represents an alternative to higher equity requirements, which, above certain threshold, may have detrimental effect on the functioning of the lending channel by increasing the rate of interest, and in turn reducing the quantity lent. This factor is especially important if we consider that in the European Union private investment is more tied to bank-loans than equity-financed.

Ultimately, the SSM, SRM, and SRB represent the different faces of the EBU, which strengthen the Euro Area's integration process and allow for common supervisory and resolution criteria to take place across the heterogeneous spectrum of the European banking-financial system. A common regulatory footprint enhances the accountability of European supranational authorities, restores confidence in the financial system, and reduces the idiosyncratic risk of coordination failure at national level.

Overall, the macroprudential domain - policy and regulation - can be viewed as the complement and the alternative in stabilizing the financial system when the other policy domains - monetary and fiscal - are likely to fail.

4. Concluding Remarks

Our investigations of the bank sovereign feedback loop have shown that after the financial crisis and throughout the Euro crisis, a pronounced feedback process between banks and sovereigns was at work. However, our results indicate that with the introduction of the European banking union this relationship has weakened or even disappeared. An important factor in the effectiveness of the EBU seems to be the recent implementation of the Bank Recovery and Resolution Regime. Countries that have implemented the new resolution and recovery framework saw a strong decrease in the risk link between banks and governments. This may indicate that market participants have assessed the banking system's loss absorbing capacity and the shift in responsibility to be sufficient to avoid state intervention in case of banks' default, thereby making the bail-in mechanism credible and effective. This outcome, in turn should have an economically positive impact on the cost of debt refinancing by banks and states. Nevertheless, this current change of direction - to use Haldane's words - may just be temporary, as it was before the Great Financial Crisis, and only an extreme event may definitely test its effectiveness. To this respect, further research should address changes in systemic risk introduced through EBU and shed light on the overall financial stability in Europe. To date, regulators' objective seems to have been achieved; anyway, the Basel II's failure and the subsequent financial meltdown have to remind us that regulation by itself does not prevent such events.

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Footnotes

[1] Merler and Pisani-Ferry (2012: 204) argue that if market participants perceive that there is the risk of a bail-out, yields of government bonds are already affected.

[2] Sgherri and Zoli (2009: 17) verify that the deterioration in fiscal positions led to an increase in the risk premiums of government bonds for most European countries. In particular, they argue that increases in debt levels of sovereigns and concerns about the solvency of national banking systems have caused this increase.

[3] The EBA assesses the importance of banks according to several criteria, important are: size of the balance sheet, the ratio of the size of the balance sheet to the economic activity in the home country and whether the bank has applied for financial support from other European mechanisms.

[4] For instance, Denmark, Switzerland and UK decided to opt-in and apply the reforms stated in the new legislations.

[5] See Toader (2015) for a discussion of the relationship between implicit government guarantees and the introduction of the new bank resolution framework.

[6] Lybeck (2016) provides a critical appraisal of the future of banks' bail-out in the European Union under the Single Resolution Mechanism and the Bank Recovery Resolution Directive.

[7] See figure A1 in the online appendix for a timeline of the European Banking Union.

[8] Although Switzerland is not a member of the European Union, it has implemented a regime with similar characteristics to the BRRD. Nevertheless, this regime was implemented in different steps between 2012 and 2016, and its bail-in tool entered into force in January 2012. For this reason, UBS and Credit Suisse will not be considered for the analysis.

[9] The MREL is only in the phase-in process, and it will be fully operational in January 2020 (ISDA 2016: 37).

[10] We include foreign exposures of a country's banks until we have reached 85% of the total foreign exposure, as this eliminates the need to deal with countries for which a time series of CDS premiums is not available for the sovereign or the largest banks. Then the index is normalized to 100%.

[11] The data selection and cleaning procedure is implemented following Acharya et al. (2014: 2712).

[12] This subdivision is useful in presenting the results and makes them comparable before and after the BRRD implementation. This selection does not drive our results; to this respect we provide estimates for a 1-year rolling window over the entire period. This results justify to split the sample into yearly intervals.

[13] The results of the common residual and time series diagnostics justify our exact estimation specification and can be found in the statistical appendix for the sake of space.

[14] Since we have a large T dimension and a small N the criticism of Nickell (1981), who points out possible biases, does not pose a problem for our estimation.

[15] Results do not change after the inclusion of two interactions terms between bank fixed effects and the CDS market index as well as between bank fixed effects and the volatility index. This technique should be able to take into account the heterogeneity in bank characteristics. Results are provided in the online appendix, table A1.

[16] This finding does not change by using recursive and reversed recursive estimation methods. Furthermore, it is robust to changes in the length of the selected rolling window to 3 and 6 months.

[17] Clearly, the bond purchase program aims at lowering the sovereign yields, that is, it affects the variable in level not in log-changes.

[18] It is important to remark that the timetable for the implementation is different across countries, although the common deadline is 1st January 2016. To this respect, the dummy variable captures the effect of the heterogeneous implementation across countries within the period January 2015-March 2016. See figure 4 for the timetable of the BRRD full-implementation across countries.

[19] As investigated by Toader (2015: 141) the decreasing value of public guarantees might work against our hypothesis. To this end, we want to recall that governments' interventions are still possible under the BRRD resolution framework, but take place after all bail-in-able instruments are converted into new equity. This strongly reduces the likelihood and the amount of government capital injections. "This finding leads us to the conclusion that investors expect lower public support for banks from countries where efforts to implement a resolution mechanism are made. Moreover, results indicate that potential interactions between the sovereign rating and the introduction of resolution mechanism reduce significantly the expectations of public support" (Toader 2015: 142).

[20] Data on the PSPP by country is available only at monthly frequency from the ECB's website. Since Sweden and Denmark do not belong to the Euro Area, the inclusion of the PSPP omits them from the sample.

[21] Data on debt to GDP are collected from the ECB's statistical data warehouse.

[22] For the sake of space and for a better comparison and interpretation of the results at monthly frequency between the two channels, results are place in the appendix.

[23] Data at monthly frequency for channel 2 is only one third (428) of the data available for channel 1 (1256). This is due to the reduction of the cross-sectional data: N - the number of countries - is 9, while N - the number of banks - is 26.

[24] Moreover, results are not driven by the economic recovery. Table A2 in the online appendix report the estimates for both channels at daily frequency. This robustness check verifies that those countries experiencing an economic recovery before the BRRD introduction were still prone to the doom loop, a positive and statically significant β coefficient.
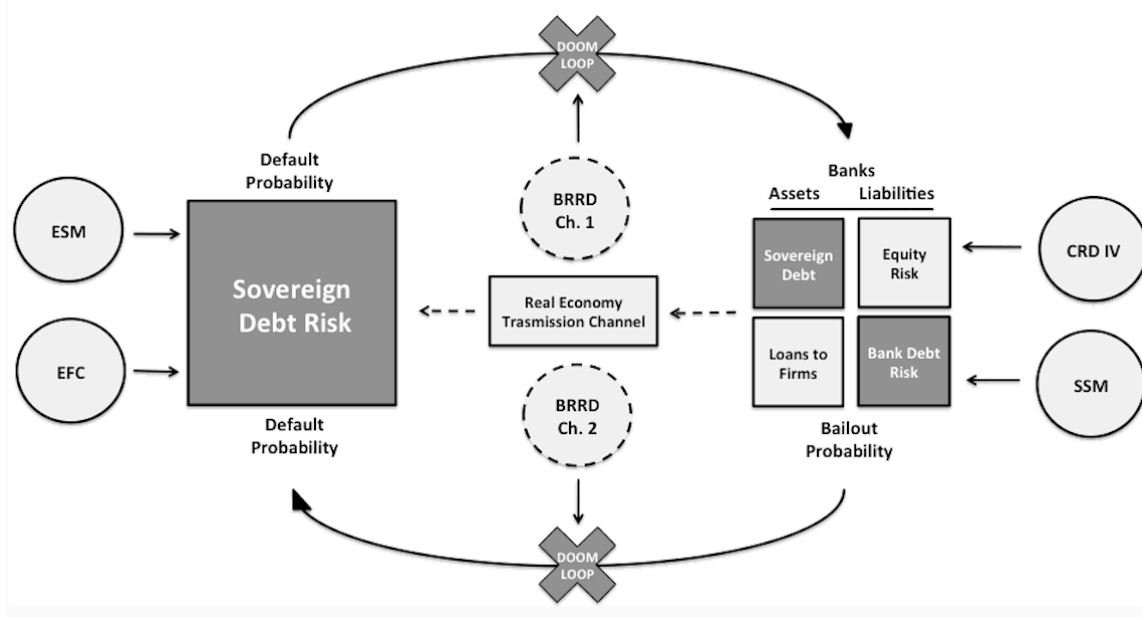
Figure. 1 The Doom-Loop.

Note: This figure shows the doom-loop relationship and the regulations stabilizing the European financial system, i.e. the sovereign side, the banking system and their inter-linkages. The regulatory changes affecting the sovereigns are the European Fiscal Compact (EFC), and the European Stability Mechanism (ESB). On the other hand, those targeting the banking system are the Basel III requirements (CRD IV), and the Single Supervisory Mechanism (SSM). Ultimately the Bank Recovery and Resolution Directive (BRRD) aims directly at breaking the interconnections between the two, i.e. the feedback loop from sovereigns to banks - channel 1 - as well as the feedback loop from banks to sovereigns - channel 2.
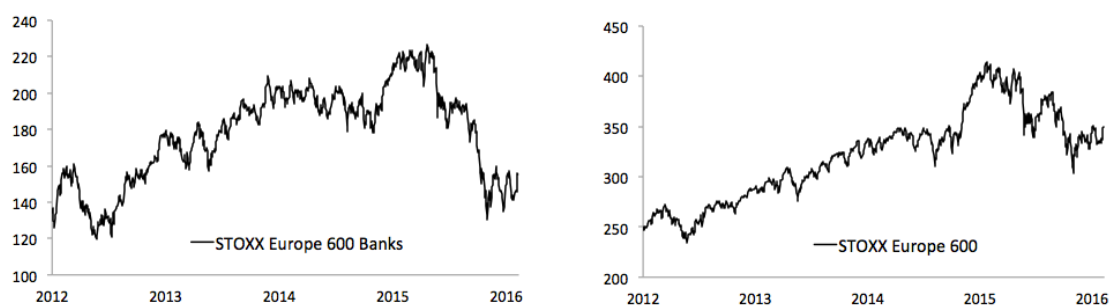
Figure 2. Stock Market Performance January 2012 - March 2016.

Note: this figure shows the evolution of two broad Equity market indexes respectively STOXX Europe 600 banks (LHS) and STOXX Europe 600 (RHS).
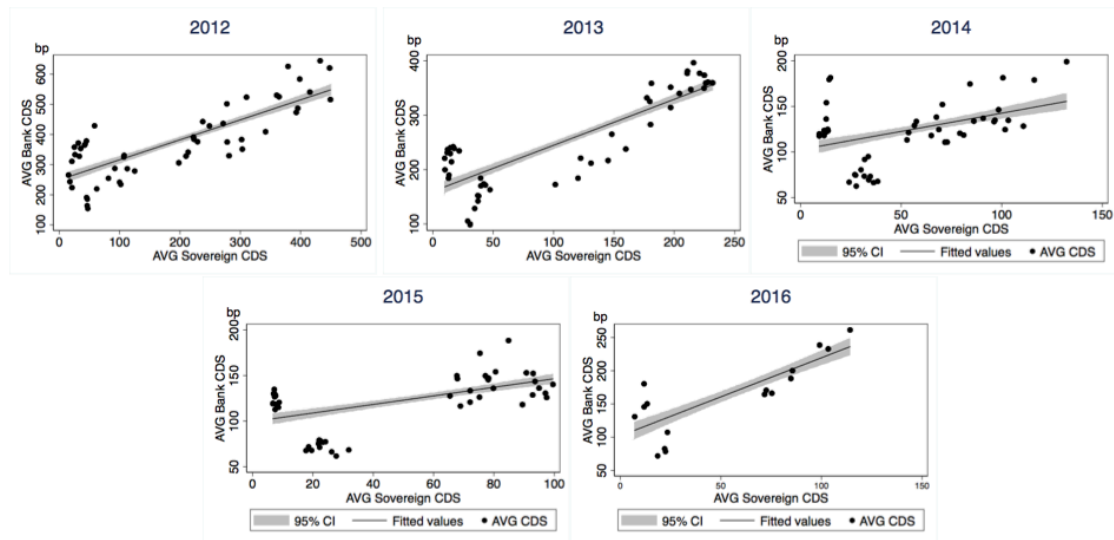
Figure 3. Co-movement of sovereign CDS and bank CDS between 2012 and 2016.

Note: this figure shows a scatterplot of average bank CDS and sovereign CDS by month and country. The sample comprehends the four largest European countries: France, Germany, Italy and Spain.
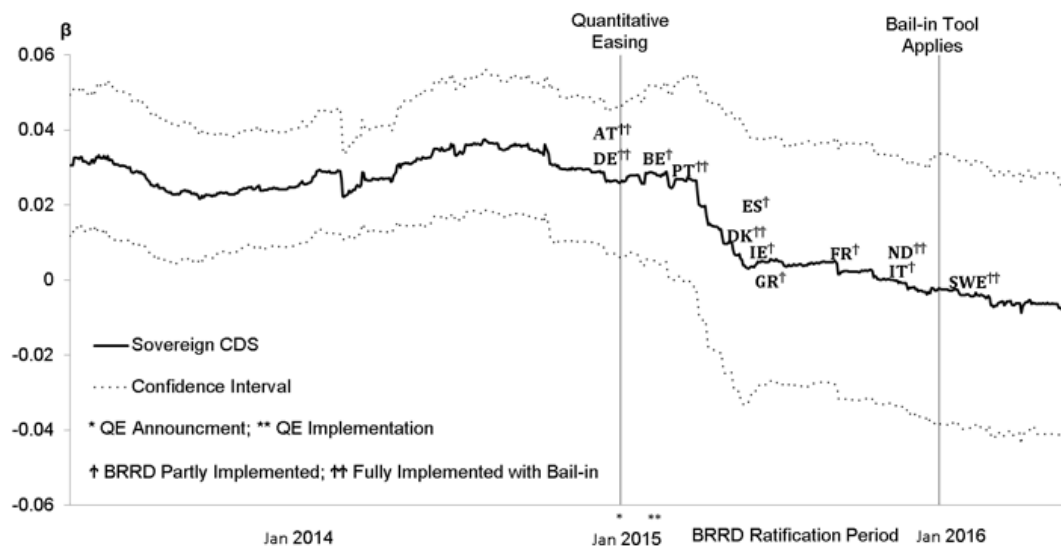
Figure. 4 Sovereign CDS Coefficient Dynamics: One-Year Rolling-estimation Window.

Note: this figure shows the evolution of the sovereign CDS coefficient according to one-year rolling-estimation window with bank and time fixed effects. The regression specification replicates table 3 model's set-up. Results are consistent if we consider a rolling window of three and six month length.

Appendix

Table 7 Bank CDS and Sovereign CDS Explanatory Power: Time and Bank/Country Fixed Effects. This table shows the effect of sovereign credit risk on bank credit risk and vice versa at monthly frequency, before and after the implementation of the BRRD. Standard errors are clustered at the bank/country level and bootstrapped. ***, **, and * indicates statistical significance at the 1%, 5%, and 10% level, respectively.

The regression specification of columns (1) to (3) is given by $\Delta \log(BANK\ CDS_{ijt}) = \alpha_i + \zeta_t + \beta \Delta \log(SOV\ CDS_{jt}) + \gamma \Delta \log(FX_{jt}) + \varphi \Delta \log(SP_{it}) + \delta \Delta log(X_t) + \varepsilon_{ijt}$.

The regression specification of columns (4) to (6) is given by $\Delta \log(SOV\ CDS_{it}) = \alpha_i + \zeta_t + \beta \Delta log(FSD_{it}) + \delta \Delta log(X_t) + \varepsilon_{it}$

Δ Log (BANK CDS) VARIABLES		(1) Fixed Effects 2012-2014	(2) Fixed Effects 2015-2016	(3) Fixed Effects 2015-2016	Δ Log (SOV CDS) VARIABLES		(4) Fixed Effects 2012-2014	(5) Fixed Effects 2015-2016	(6) Fixed Effects 2015-2016
Δ Log (SOV CDS)	β	0.205*** (0.0387)	0.0700 (0.0567)	0.109 (0.0682)	Δ Log (FSD)	β	0.286* (0.158)	-0.0895 (0.156)	-0.101 (0.203)
Δ Log (PSPP)				0.101 (0.791)	Δ Log (PSPP)				2.479 (4.108)
Constant		0.0551*** (0.00792)	0.0793*** (0.00854)	0.0631 (0.0530)	Constant		0.104* (0.0538)	0.142*** (0.0266)	-0.00968 (0.254)
Observations		1,043	435	375	Observations		378	150	120
R-squared		0.649	0.768	0.758	R-squared		0.491	0.422	0.524
No. Banks		30	30	26	No. Countries		11	11	9
Bank FE		YES	YES	YES	Country FE		YES	YES	YES
Time FE		YES	YES	YES	Time FE		YES	YES	YES
Δ Log (X)		YES	YES	YES	Δ Log (X)		YES	YES	YES
Δ Log (FX)		YES	YES	YES	Δ Log (DEBT / GDP)		YES	YES	YES
Δ Log (SP)		YES	YES	YES					
CHANNEL		1	1	1	CHANNEL		2	2	2
DATA FREQUENCY			MONTHLY		DATA FREQUENCY			MONTHLY	

CONCLUSIONS

The thesis has used the Misnky-Kaleckian theory as a guideline to investigate the sources of economic and financial fragility in the Euro Area. It was an attempt to capture the essence of the European Monetary Union, i.e., the most important achievement in modern economic and political history. The EMU has been - first of all - the outcome of political decisions, which exogenously imposed a process of convergence to the European countries. Nevertheless, the European institutional-macroeconomic system was not devised to pursue that aim. The endogenous economic forces were not aligned to the political ones, but they were left flowing with business cycle fluctuations. Although, this choice may work when a set of homogenous countries is pooled together, it doesn't when a high degree of heterogeneity exists among members of a monetary union. In the latter case, counterbalancing mechanisms are necessary to keep and realign countries on a convergence growth path. A fiscal union could embody the transfer mechanism able to offset trade imbalances and asymmetric shocks, and to sustain aggregate demand in time of regional crises. But, it wasn't, and still is not a politically feasible option, since the EMU is based on the principle of subsidiarity which guarantees the protection of political diversity and fiscal decentralization. Therefore, fiscal and political independence is a founding feature of the EMU, and any macro reform needs to comply with it. Nonetheless, the 2008 Great Financial Crisis revealed the flaws of the European architecture, underlining that the current macro system is fine-tuned neither to achieve convergence in tranquil time, nor to restore it during periods of crisis. The willingness in creating convergence among Euro Area members remained exclusively a national duty and was bound by a fixed set of rules, which did not make it economically viable. Within this context, the Euro was created, evolved, and lately changed its nature. The theoretical convergence became actual divergence in the aftermath of the crisis. Two opposing growth models were allowed to endogenously develop within the Euro Area, but no question was addressed to policy makers on the long-term sustainability of such a process, and its macroeconomic impact. The European sovereign and banking crisis gave a clear answer to this question on their behalf. Economic heterogeneity tends to foster economic divergence when the burden of adjustment is left to national member

states. And asymmetric fiscal policies may be useful temporary remedies, but they do not represent the long-term solution to the regional imbalances and differentials. Actually, if fiscal policy is constantly used to offset detrimental regional shocks, sustainability of national public finances will be at risk, weakening further the country's capability to respond to regional shocks. Different economic structures and financial conditions, asymmetric sources and magnitudes of shocks make divergence a self-reinforcing process. To tackle this structural flaw of the system, social and economic cohesion and solidarity among member states need to be strengthened. As Minsky emphasizes a humane economy is the first step toward a human society. In achieving this, economic coordination in terms of wage and trade policies must be the priority of the EMU. Trade imbalances are at the basis of regional shocks, and the absence of regional exchange rates make asymmetric wage policies crucial determinants of regional boom and bust cycles. At the same time, a high degree of labour mobility will still play an important role in smoothing asymmetric shocks, but this should not lead to a regionalization of production and employment. The EMU was created for the convergence in economic performance of its members, and the free movements of goods and people. A regionalization of the production process makes them lose part of their freedom. They are obliged to move, not anymore free to move. Although the creation of the European Banking Union is the right step in the right direction since an unregulated financial sector is conducive to instability, and additional financial integration will follow, it can not represent the only shared field of coordination. Economic systems are complex set of uncertain micro-relationships, and solid and affective institutions ensure that their aggregation into macro-behaviours leads to an equitable and sustainable long-term growth path. Pragmatically, we need to enlarge the EU budget to allow the European Commission play an active pro-convergence role at the Union level. Next, within the EMU, we need to create a Euro Treasury to implement countercyclical-investment policies, and thus allowing the rebalancing of regional asymmetries in productivity. This would alleviate the pressure on national governments, and thus enable the fall in national public debt. Lastly, we need a common vision of the macro-strategy tackling the problem of unemployment, inequalities and sustainable growth: a wage-led full-employment growth model as the alternative solution to the current individualistic profit-led system. This would incentivize and ease the integration process of the EU-28 toward a full-fledged European monetary union, and set the basis for a global Europe.

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This Thesis is dedicated to my godfather, Peppino Prosperi, and to one-million-dollar tutor, who have always believed in me.