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Optimum Currency Areas and the European Experience: An Examination of Diverging Competitiveness among Key EU Nations

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**Optimum Currency Areas and the European Experience: An Examination of
Diverging Competitiveness among Key EU Nations**

by

Karol Aleksander Jablonski

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Submitted in partial fulfillment
of the requirements for
Honors in the Department of Economics

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Abstract

JABLONSKI, ALEKSANDER KAROL. Optimum Currency Areas and the European Experience: An Examination of Diverging Competitiveness among Key EU Nations
Department of Economics

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Now, in its 18th year of existence, the European single currency – the most daring act of integration since the launch of the European integration project – is facing its biggest challenge yet. Greece, Portugal and Ireland are still experiencing economic hardships, even after receiving substantial bailout packages in order to avoid defaulting on their debt. Italy and Spain – the third and fourth largest economies in the Eurozone – are close behind, combining high public debts, large budget deficits, and low growth. Germany and France, considered the most robust economies of the Eurozone, are feeling the strain of supporting their weaker partners, in an attempt to save the euro. The economic importance of this crisis is that the future of Economic and Monetary Union (EMU), the Eurozone, and the European economic integration is at stake.

After a decade of economic preparations and convergence in light of optimal currency area criteria, these Eurozone countries had an extraordinary opportunity to pave the way for rapid economic development and modernization, with sustainable growth rates, and new, open and high quality economic and political institutions after joining this common currency area. Although the economic environment was truly favorable, the ability to exploit these advantages properly for countries, specifically the PIIG countries, was largely based on two major conditions: maintain fiscal discipline and sound finances, while increasing the productivity and the competitiveness of their respective economies. Despite all the PIIG countries failing to maintain fiscal discipline, certain PIIG countries, such as Greece, failed to maintain

competitiveness in international markets through depressing wages and productivity enhancement. After the examination of productivity, unit labor costs, hourly wage rates, and net export performance as a percentage of GDP of Germany, France, and PIIG countries, I find that certain member countries, such as Greece, would be better off leaving the Eurozone, allowing it to regain control over its exchange rate in order to restore its competitiveness in international markets.

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Table of Contents

Abstract.....	ii
Acknowledgments.....	iii
Chapter One: Introduction	1
Chapter Two: Chronology of Deviating Economic Literature exploring OCAs.....	6
2.1 Introduction.....	6
2.2 Traditional Views on OCA Theory.....	6
2.3 Modern Views on OCA Theory.....	13
2.4 Conclusion.....	17
Chapter Three: From the Years of Adjustment to the Crisis.....	19
3.1 Introduction.....	19
3.2 Institutional Background & Convergence Criteria.....	20
3.3 Unfolding the Eurozone Crisis.....	22
3.4 Structural Issues.....	26
3.5 Conclusion.....	28
Chapter Four: Diverging Competitiveness among Key Eurozone Nations.....	29
4.1 Introduction.....	29
4.2 Current Account Balance.....	29
4.3 Productivity, Unit Labor Costs, and Hourly Wage Rates: Germany v. Greece.....	32
4.4 Productivity, Unit Labor Costs, and Hourly Wage Rates: Germany v. Ireland.....	37
4.5 Productivity, Unit Labor Costs, and Hourly Wage Rates of Remaining Countries.....	40
Chapter Five: Conclusion and Considerations for Follow Up	43
References.....	47

List of Tables and Figures

Figures

Figure 3.1: Government Debt as a percentage of GDP.....	23
Figure 3.2: Government Surplus/Deficit as a Percentage of GDP.....	24
Figure 4.1: Current Account Balance as a percentage of GDP.....	30
Figure 4.2: Germany: Unit Labor Costs, Productivity, and Labor Costs per Hour (Normalized).	33
Figure 4.3: Greece: Unit Labor Costs, Productivity, and Labor Costs per Hour (Normalized)...	33
Figure 4.4: Germany: Productivity and Unit Labor Costs.....	34
Figure 4.5: Greece: Productivity and Unit Labor Costs.....	34
Figure 4.6: Germany: Unit Labor Costs, Productivity, and Labor Costs per Hour (Normalized).	37
Figure 4.7: Ireland: Unit Labor Costs, Productivity, and Labor Costs per Hour (Normalized)...	38
Figure 4.8: Germany: Productivity and Unit Labor Costs.....	38
Figure 4.9: Ireland: Productivity and Unit Labor Costs.....	39

CHAPTER ONE

Introduction

The Economic and Monetary Union (EMU) and euro was the dream of many a politician in the years following WWII. This dream soon became a reality through Europe's bold experiment in kick starting a long, slow process that ultimately led to the creation of the EMU. It is important to note that long before the EMU and euro was even developed, the theory of optimum currency areas was brought into the world of economics through Mundell (1961). His theory of optimum currency areas argues the optimal area for a system of fixed exchange rates is on that is highly economically integrated. More specifically, economic integration means free flows of trade, labor, as well as both financial and physical capital.

Optimal currency area theory has evolved expansively since Mundell coined this theory. Much of the literature came before the Eurozone had actually taken place, demonstrating that traditionalist scholars, such as McKinnon (1963) and Kenen (1969), developed their arguments and suggested criteria in forming an optimal currency area without a functioning model. The three influential traditional scholars introduced economic conditions, such as labor mobility and wage and price flexibility, varying level of developments, such as economic production structures, or differing sector diversification regarding trade, all of which are considered relevant attributes for judging the optimality of a currency area. Moreover, once the European Union embarked on a monetary unification process, modern scholars have contributed to optimal currency literature by trying to fill in the gaps left by traditionalist scholars in determining whether the benefits of the Eurozone will outweigh the costs in the long run. Since the majority of existing literature has addressed theory of optimal currency areas in lack of practical implications, as well as in response to the development of the Eurozone, limited work has been

produced in examining whether or not the Eurozone is operating as an optimal currency area concerning the current crisis.

The EMU project was the most decisive step in the process of European integration and cooperation. The Maastricht Treaty of 1992 established this EMU project, as well as set the criteria for its implementation. This treaty outlined convergence criteria integration regarding achieving exchange rate stability, price stability, and maintaining a restrictive fiscal policy for EU countries in becoming an EMU. The goal behind these convergence criteria was the smooth adoption of the new common currency, which required a significant harmonization of economic policies and macroeconomic conditions in the countries that wanted to participate in the EU. Moreover, the Stability and Growth Pact (SGP) was established thereafter in 1997 to ensure that the Maastricht Convergence Criteria would continue to apply once the common currency was launched. This pact was meant to ensure that no single member state, once a member of EMU, could free ride the system, for instance, by incurring high deficits and debt. It also aimed to enforce budget discipline and sound public finances among the countries participating in the euro. It is important to note that some EU members have not ratified all of the clauses before entering the Eurozone, indicating the weaknesses in the Maastricht Treaty, as well as the Stability and Growth Pact. Despite the fiscal and monetary harmonization in the late 1990s, large economic, structural and institutional disparities were still in place, and continued to exist after the creation of the Eurozone, which we will discuss in further detail in Chapter Three. Finally, after years of adjustment and convergence, the euro was adopted on January 1, 1999.

Furthermore, after the birth of the euro, economists believed that reforms pertaining to improving labor market, wage, and price flexibility, would emerge from participation in a shared common currency area with a fixed exchange rate. Though Eurozone nations did show promise

in positively converging towards meeting several of the optimal currency area criteria, specifically with respect to trade, certain nations were not able to implement adequate labor market reforms, despite undertaking competitive real exchange rates that they had no control of. The reasoning behind this lack of responsiveness was due to the unaccounted excessive pressures from political economy forces, distorted incentives, as well as the “dependency on the perception of unlimited capacity to borrow based on implicit euro zone guarantee” according to Wihlborg (2010, p. 25). Therefore, incentives for not only maintaining fiscal discipline, but also more importantly, productivity reforms were very weak, especially in the case for Greece.

Deciding to join the Eurozone also resulted in fixed exchange rates between all participating countries. The costs of entering the EU for these countries was forging an independent exchange rate and no longer having an independent monetary policy, where sovereign governments can no longer manage the exchange rate so as to address the country’s international competitiveness issues nor can they influence the money supply so as to address aggregate demand and/or inflation/deflation problems. These member states can therefore only compete in international markets with their fixed exchange rates where adjusting unit labor costs is their main option. To be more specific, in order to address international competitiveness issues, the only two options left under the Eurozone are wage decreases and/or productivity enhancements.

Moreover, in this thesis, we will be examining the four variables to determine if sufficient, positive economic convergence and performance in terms of international competitiveness under the uniform policy of the ECB occurred for Germany, France, and PIIG countries since joining the Eurozone. It is important to understand of the relationship between the following under a fixed exchange rate regime like the Eurozone: (1) productivity, (2) unit

labor costs, (3) export price indices, and (4) net export performance as a percentage of GDP. To begin, the relationship between productivity and unit labor costs is that if unit labor costs rate is growing faster than rate of productivity, we have a competitiveness problem. This indicates that the unit labor costs are too expensive for that country to be competitive in international markets as the per unit labor cost exceeds the per unit productivity. Now, for example, say workers in Region A are less competitive than workers in Region B via productivity rates, Region A can turn to depress their worker's wages and/or productivity enhancement in order to reduce its cost of production to restore its competitiveness in the international market. It is important to note that no currency devaluation can be performed since the country is under a fixed rate regime (e.g. the Eurozone). Furthermore, the decrease in wages causes unit labor costs to decrease, making the nation's export price indices more competitive, or a decrease in its export price, and therefore increasing its net export performance as a percentage of GDP. However, as we will see later on in this thesis, a nation left with only the adjustment mechanisms of wage depression and/or productivity enhancement may not always be sufficient in maintaining and/or increasing its net export performance as percentage of GDP given its membership in a fixed rate regime.

This thesis will be structured as follow. Chapter Two will review prior literature pertinent to the traditional views on the optimal currency area theory, followed by the modern views on the optimal currency area theory. This chapter demonstrates that a nation's cost and benefits from joining a fixed exchange rate regime such as the EMU depend on how integrated its economy is with those of potential members. Chapter Three will introduce the institutional background and convergence criteria leading up to the Eurozone, followed by an examination of the fiscal conditions and structural issues after its implementation. Chapter Four will present an analysis of the current account balances, productivity, unit labors costs, and hourly wage rates in

Germany, France, and the PIIG countries under the Eurozone. Chapter Five will provide concluding remarks and considerations for follow up.

CHAPTER TWO

Chronology of Deviating Economic Literature exploring OCAs

2.1 Introduction

This chapter reviews the wide range of literature to the theory of optimum currency areas. Subsection 2.2 addresses the traditional views on the optimal currency area theory, followed by the modern views on the optimal currency area theory in subsection 2.3. The traditional contributors have developed relevant approaches in determining the way attributes of countries' economies can influence the monetary efficiency gain of forming, or joining, an optimal exchange-rate regime. The modern contributors further developed research in light of the creation of European Union embarked on a monetary unification process, trying to fill in the gaps left by traditionalist scholars in determining whether the benefits of the Eurozone will outweigh the costs in the long run.

2.2 Traditional views on the OCA Theory

The Economic and Monetary Union (EMU) and euro was the dream of many a politician in the years following WWII. Long before the EMU and euro were even developed, the theory of optimum currency areas was coined into the world of economics through Mundell. Before Mundell (1961) shed light on this topic, each country, traditionally, has sustained its own independent, national currency. It is important to note that the time period during which Mundell's paper was written characterized by the Bretton Woods exchange rate regime, in addition to limited international capital mobility. Friedman (1953) played a significant role in spurring interest with respect to optimal currency areas, as he addressed the commonly debated

topic on the benefits and shortcomings of floating exchange rates. Friedman strongly argued for floating exchange rates because they serve as an adjusting mechanism in bringing the balance of crisis in the light of changes in aggregate demand, “averting the balance of payments crises that [he] believed were an inherent feature of fixed- but adjustable rate” as quoted in Dellas and Tavlas (2009, p. 8). He continued to observe that choosing a fixed exchange allows each country to pursue its own independent monetary policy, safeguarding each country in being wrapped in the monetary mistakes of others. Finally, Friedman (1953, p. 157-8) points out that fixed exchange rates hinder international trade, while floating exchange rates allow countries to remove exchange controls quickly, therefore promoting international trade and the wealth created by the multilateral division of labor. Friedman’s work about the choice of exchange rates, in strong favor of a floating regime, in the early 1950s played a significant role in reviving interest in optimum-currency-area analysis.

The primary contributor to the optimal currency area academia is Mundell (1961), who tried to not only refute Friedman’s argument for floating exchange rates, but also explores the characteristics of a country’s economy to determine whether or not countries should have separate currencies. Mundell begins by describing an optimum currency area as an optimal region for a common currency that is highly integrated with regards to free flows of goods and services, assets and physical capital, as well as labor mobility. It is important to note that optimal currency areas have costs and benefits for countries deciding whether to adhere to them. Mundell states that a region is considered optimal if its monetary efficiency gains exceed the costs of sharing a common currency. One significant monetary efficiency gain that occurs when an economy joins an optimal currency area is the low transaction costs. In joining a common currency area, Mundell demonstrates that countries avoid the uncertainty and international

transaction costs that incur when doing business transactions that different floating exchange rates involve. Therefore, since transaction costs are greatly reduced, trade becomes extensive between the member countries in the optimal currency area.

Furthermore, Mundell's developed theory addresses the fact that the monetary efficiency gain of joining a common currency area depends on the amount of economic integration. Taking a step back, Mundell's objective was to indicate what criteria would make the abandonment of a floating exchange rate regime less costly in the long run than suggested by Friedman. The distinguishing difference between Mundell and Friedman was that Mundell emphasized factor mobility integration as a necessary criterion to achieving an optimal currency area. The reason for this factor mobility, especially labor mobility, is that it serves as the adjustment mechanism in maintaining internal and external balance in the face of changes in inflation and employment due to shift of demand of products between regions. However, Mundell (1961, p. 659) points out that "the optimum currency area is not the world", indicating that this adjustment mechanism only effectively works when national borders are redrawn to create optimal geographical regional areas with high labor mobility. Therefore, as stated by Broz (2005, p 55), the greater the labor mobility, when wages and prices are not flexible, within a region, "then that region should have a fixed exchange rate within its borders and flexible exchange rate" with each optimal regional area.

Finally, Mundell proposed the criteria of wage and price flexibility on top of labor mobility among the members in a common currency area. The importance of this attribute regarding an optimum currency area presented by Broz (2005, p. 55) is shown in simplified scenario where the assumptions of two regions "which are not defined by national producers but as a group of producers that produce only homogenous products." In this setup, if there is an

increase demand in for products from one region, let's call it region A, to another region, let's call it region B, then region A would increase wages as a response, leading to decrease in aggregate supply and an increase in price level. Region B would see a decrease demand, and experience the inverse of the chain of reactions given its membership in the common currency. Both regions would buy fewer products in Region A, while more products in Region B, thus demonstrating that the flexibility of wages and prices makes it easier to restore stability in the incident of asymmetric shocks in a common currency area. On the other side of the spectrum, if there is internal labor immobility, as well as wage and price stickiness, Mundell argues for a flexible exchange rate mechanism and autonomous monetary policies in those two particular areas. The relevance of this case is that Mundell identifies the incidence of asymmetric shocks in exchange of the variables previously mentioned in judging whether it is optimal for two regions to form a common currency area.

Mundell's important contribution to the theory of optimum currency areas spurred McKinnon (1963) and Kenen (1969) to further identify characteristics when countries, or regions, are considering joining a fixed rate regime. McKinnon (1963) identified additional key criteria on top of Mundell's work that economies of the members of the common currency area should possess in order to for the benefits to outweigh the costs of joining a fixed exchange rate system. The traditionalist scholar states that the openness of the economy in terms of the ratio of tradables to non-tradeables is extremely important with regards to adapting a fixed exchange rate. McKinnon (1963, p. 57) justifies this through examining how "when there is a higher degree of openness in the economy, the likelihood that foreign prices of tradables to the domestic cost of living is higher." This demonstrates that fluctuations in nominal exchange rates will lead to influential offsetting changes in wages and prices in an open economy, depriving the floating

exchange rate of its effectiveness in changing the terms of trade in addition to its function as an adjustment mechanism.

The bottom line from McKinnon's examination is that the more open the economy is, the more arguments there are for joining a fixed exchange rate. The emphasis of the openness criteria leads to his point that open economies should pursue a fixed exchange rate. He suggests that open economies that frequently trade with each other should form a common currency area, since the monetary efficiency gain from the safeguarding of exchange rate fluctuations in this closed region would outweigh the costs of joining this regime.

Moreover, McKinnon addresses that a smaller economy would benefit more in joining a large common currency area than large economy. The reasoning behind this is that the smaller economy is more likely to be open due to the fact that it not as self-sufficient as a larger economy. It is important to note that a small economy typically produces goods it has a comparative advantage in, while engaging in international trade for the rest of the goods it needs. Since a large part of its GDP is engaged in foreign trade, it displays how variations in the exchange rate influence a large portion of its economy. Overall, McKinnon's contribution not only emphasizes the role of the size of an economy in forming an optimal currency area, but also demonstrates that the benefit forming a common currency area with fixed exchange rates is that it buffers the effects of exchange rate fluctuations.

The final significant contributor to the development of the optimum currency area was Kenen (1969). This traditionalist scholar proposed that the product diversification of the economy is extremely important attribute with regards to forgoing an independent monetary policy and adjustable exchange rate regime for an optimal fixed exchange rate regime. Kenen (1969, p. 49) argues that the degree of product diversification, "the number of single-product

regions contained in a single country, may be more relevant than labour mobility” with regards to optimal currency area criterion. It is important to note he introduced this new reason in the light that he did not believe that perfect labor mobility exists. Kenen’s examination of this tenet is that if a single-product economy, which also exports its only product, experiences a negative demand shock in a fixed-rate regime, it does not have the luxury of depreciating its exchange rate in order to address the fall in export revenue. The adjustment to this situation under a fixed exchange rate regime would have to be unfavorably tackled through a reduction of wages and prices, or even increase unemployment, since currency devaluation is not an option. Hence, Kenen argues that an optimal exchange rate regime is more attractive to highly diversified economies rather than single, or limited, diversified economies. The reasoning behind this as stated by Della and Tavlas (2009, p. 19) is that “diversification provides some insulation from effects of sector-specific or industry-specific shocks, forestalling the need of frequent terms-of-trade via the exchange rate.”

Kenen furthers his point of view by arguing that highly diversified economies should be supplemented with a diversified export sector. Extending on McKinnon’s (1963) size of the economy criterion, Kenen demonstrates that highly diversified export economies are usually large economies due to their self-sufficient nature, while less diversified export economies are typically smaller economies. It is important to note that smaller, less diversified export economies need a higher degree of openness concerning importing goods in demand, and then exporting goods in return to be able to pay for their imports. Thus, Broz (2005, p. 59) points out “Kenen’s diversification criterion can be transformed into McKinnon’s openness criterion.”

Kenen also adds onto Mundell’s argument that economies vulnerable to asymmetric shocks should pursue flexible exchange rates, as the costs of forgoing an independent monetary policy are higher the lower the association of shocks is between the regions. He explores the fact

that, given a high degree of labor mobility, it is optimal for two economies, which have similar production characteristics, to form a common currency union, as they are likely to experience similar industry specific shocks. Kenen also believes that fiscal integration should be a characteristic in assessing the optimality of two economies participating in common currency area. Furthering his point of view, Della and Tavlas (2009, p. 18) state that if an asymmetric shock hits a single currency area, the higher the levels of fiscal integration between regions, and “the greater the ability to smooth asymmetric shocks through fiscal transfers from a low-employment region to a high-unemployment region.” On top this important viewpoint; Kenen ultimately demonstrates his ability to develop the insights of both Mundell and McKinnon in his argument pertaining to his most important attributes regarding optimum currency areas.

Mundell (1961), McKinnon (1963), and Kenen (1969) are consistently viewed as the most important traditionalist scholars on the optimum currency area theory. These traditional contributors have developed relevant approaches in determining the way attributes of countries’ economies can influence the monetary efficiency gain of forming, or joining, an optimal exchange-rate regime. Mundell addressed the degree of labor mobility, wage and price flexibility, as well as the incidence of asymmetric shocks as the most important variables for judging whether it is optimal for two economies to form a currency union. McKinnon, on the other hand, argued the degree of openness in addition to the size of the economy were crucial factors in forming a common currency area. Kenen soon after identified characteristics pertaining to the degree of product diversification, similarity of production structures, and the level of fiscal integration that potential economies should ideally possess in forming a common currency area. With all this being said, the framework developed by these three authors was neither thoroughly developed nor consistent.

2.3 Modern views on the OCA Theory

The theory of optimum currency areas was more of an academic question, as these three authors developed their works in a time characterized by the Bretton Woods exchange rate regime in addition to limited international capital mobility. Mundell (1961, 657) even mentioned that this theory was more of an academic question, “since it hardly appears within the realm of political feasibility that national currencies would ever be abandoned in favor of any other arrangement.” Nonetheless, the theory has evolved since these three influential papers, and a second wave of contributor renewed interest into the optimal currency area field since the European Union embarked on a monetary unification process. Following a period of stagnation in optimal currency area literature from the second half of 1970s to early 1990s, more recent scholars have developed research in light of this practical example, trying to fill in the gaps left by traditionalist scholars in determining whether or not the benefits of the Eurozone will outweigh the costs in the long run. Modern scholars typically recognize the possibility of the reverse occurring, where the costs of participating in a common currency area outweigh the benefits, yet they still propose solutions for further monetary integration.

A good place in examining what issues recent optimal currency literature deals with is starting with the importance of labor mobility. Even though Mundell (1961) was the first to address the significance of labor mobility, Paul De Grauwe (2003) furthers this discussion by demonstrating the significance of different labor institutions with regards to optimal currency areas. De Grauwe points out that there could be three types of labor market centralization: (1) labor markets in which highly centralized unions dominate, (2) labor markets with intermediate union centralization, and (3) labor markets where unions are decentralized. Broz (2005, p. 68)

further demonstrates De Grauwe's viewpoint by explaining that in markets where centralized unions dominate, or where there is wage bargaining centralization, "a supply shock will not lead to an excessive increase in nominal wages, since unions know that excessive wage increases will lead to more inflation, making real wages the same as before." The same outcome goes for labor markets where unions are decentralized, as market unions at company level will not start the wage bargaining process when a supply shock hits due to the same logic.

Labor markets that have intermediate union centralization, on the other hand, have different approach to supply shocks. According to Broz (2005, p. 69), a labor union in this market starts the wage bargaining process in light of a supply shock, since all the unions will be taking the same route, even though each unions knows that "its actions will have but a small effect on aggregate inflation." It is important to note the members will end up with lower real wages than its counterparts will if its labor union does not push for higher wages. The excessive increase in nominal wages will lead further nominal inflation, making real wages the same as before. The acknowledgment of this criterion by De Grauwe demonstrates that it will be harder to adjust to a similar shock in a similar way in a common currency area when differences in labor market institutions exist. This is important because the difference between labor market institutions can cause the need for a different approach to the monetary policy.

In determining whether to enter a common currency area, Alesina, et al., addressed the attributes of correlation of shocks in addition stabilization policy. They argue that the higher the association of shocks between a potential member of a common currency area, or client, and the so-called anchor, the more attractive joining a common currency area is for the client. This relationship suggests that the policy selected by the anchor will be suitable for the client when it is hit by a shock. Alesina, et al., (2002, p. 309) go on to discredit the importance behind the

similarity of shocks, emphasizing the “variance of the client’s country’s output expressed as a ratio to the anchor country’s output.” This viewpoint demonstrates that even though a small country may be highly correlated in terms of output with an anchor, such as the European Monetary Union, if its variance of output is much greater than the anchors, then the cost of losing its independent monetary policy in exchange of joining a shared currency might not be worth it. The monetary policy of the anchor, or the European Central Banks, might not be suitable for the client when facing a shock. This analysis ultimately deemphasize Kenen’s (1969) argument that it is optimal for two economies, which have similar industry characteristics, to form a common currency union, as they are likely to experience correlated shocks.

Additionally, the viewpoint by Kenen (1969) that the higher the degree of fiscal integration between regions in an optimal currency area, the greater the ability it has in mitigating the asymmetric shock through fiscal transfers has proven to be too simplistic in practical terms. De Grauwe (2007) begins refuting this notion of a flexible fiscal adjustment through pointing out the unintended consequences of using fiscal transfers in response to a permanent shock hitting a common currency area. The unintended consequence of this situation is that the fiscal transfers would permanently shift the resources to the affected region, preventing necessary adjustment. It is important to note that issues pertaining controlling debt may arise through the continuous use of fiscal transfers. These two reasons also demonstrate that constraints may arise in the future from the use of fiscal transfers in the present. Dellas and Tavlas (2009, p. 24) demonstrate that De Grauwe addresses the situation where “a country with large fiscal deficits and a high debt-to-GDP ratio that is in a monetary union can create negative spillover effects for the rest of the union, driving the union’s interest rate upwards and increasing the burden of financing government debts in the other members of the union.” De Grauwe’s

argument supports implementing fiscal rules, instead utilizing fiscal transfers, in containing the size of budget deficits and government debt of weaker countries within a common currency area, as it reduces the negative spillover effects.

Additionally, Mundell (1961), McKinnon (1963), and Kenen (1969) discussed the attributes, such as, labor mobility and the openness of the economy, regarding optimal currency areas, but did not address if a single monetary policy can handle the asymmetric economic developments within different countries once they share a common currency area. Kroger and Redonnet (2001) explain the consequences of having asymmetric developed economies in a shared common currency area through an example where one country is a mature economy with high per capita income, while the other country is at an early stage of development with low per capita income. If a regional bank has been tasked with obtaining price stability, given that these two countries have formed a common currency area, the country at the early stage of development could face low interest in addition to high-expected rates of return on investment. These factors alongside free capital mobility according to Dellas and Tavlas (2009, p. 24) can lead to “overly-optimistic income expectations, a “wrong” incentive structure of investment (i.e., investment in high-risk projects that would not have been undertaken in the absence of low interest rates) and excessive domestic demand; and in light of the above, the economy concerned may eventually be faced with the need to undergo a prolonged deflation in order to regain competitiveness.” This argument emphasizes the use of real convergence criteria as a means of determining prospective members into a common currency area, since different developed economies might be more suitable under a regime of an autonomous monetary policy.

Finally, whereas the traditional framework on the theory of optimal currency area addressed the criteria an economy should meet before joining a common, while modern scholars

focused on changes in economic structure that may result from participation in a shared common currency area. This topic that recent scholars have addressed is called endogenous optimum-currency area theory. Frankel and Rose (1997) demonstrate that not only is there a positive relationship between trade integration and income correlation, but also that increased trade in common currency area leads to more highly correlated business cycles. This relationship between trade integration and business synchronization exists due to the high accounts of intra-industry trade or common demand shocks. Since countries forming a common currency have highly correlated business cycles, they will not need flexible exchange rates as an adjustment mechanism. This endogenous optimum-currency area theory demonstrates that participating in a common currency area outweighs the benefits of independent monetary policy since it reduces the frequency of asymmetric shocks, instead of focusing on the incidence of shocks as a criterion for entering a common currency by the traditionalist framework.

2.4 Conclusion

After 55 years since the Mundell's (1961) paper, the optimal currency area theory has evolved. Much of the literature came before the Maastricht Treaty, and before the Eurozone had actually taken place, demonstrating that scholars developed their arguments and suggested criteria in forming an optimal currency area in light of no practical examples. The three influential traditional scholars introduced economic conditions (such as labor mobility and wage and price flexibility), varying level of developments (such as economic production structures and size of the economy), or differing sector diversification with regards to production and exports, all of which are considered relevant attributes for judging the optimality of a currency area. Modern scholars have contributed to optimal currency literature through identifying the gaps that

traditionalist scholars have overlooked. With the luxury of a working model, these scholars addressed the limits of fiscal policy, differences in the level of economic developments between countries, various labor institutions, correlation of shocks, as well as endogenous optimum-currency area theory. Given that existing literature has addressed theory of optimal currency areas in lack of practical implications, as well as in response to the development of the Eurozone, limited work has been produced in examining whether or not the Eurozone is operating as an optimal currency area with regards to the current crisis.

CHAPTER THREE

From the Years of Adjustment to the Crisis: Understanding the Root Causes

3.1 Introduction

After 3 years of working with the euro as “book money” alongside national currencies, euro coins and banknotes were launched on January 1st, 2002 and the biggest cash changeover in history took place. The economies of the Eurozone enjoyed matching low interest rates and stable economic growth for almost a decade after the euro was officially launched on January 1st, 1999. However, as the fallout of the global economic crises escalated in 2009, European markets became susceptible to the frightening levels of public debt in Portugal, Ireland, Italy, and Greece, skyrocketing interest rates, and fears of sovereign debt defaults. Now, in its 16th year of existence, the European single currency – the most daring act of integration since the launch of the European integration project – is facing its biggest challenge yet. Greece and Portugal are still experiencing economic hardships, even after receiving substantial bailout packages in order to avoid defaulting on their debt. Moreover, Italy and Spain – the third and fourth largest economies in the Eurozone - are also experiencing high public debts, large budget deficits, and low growth. Germany and France, considered the most robust economies of the Eurozone, are feeling the strain of supporting their weaker partners, in an attempt to save the euro. The economic importance of this crisis is that the future of Economic and Monetary Union (EMU), the Eurozone, and the European economic integration is at stake.

3.2 Institutional Background & Convergence Criteria

It has taken more than 30 years to create the Economic and Monetary Union (EMU) and Eurozone. The EMU project was the most decisive step in the process of European integration and cooperation. This long, slow process ultimately led to the creation of a single monetary policy, a new European Central Bank, and a new single currency. To begin, the Maastricht Treaty of 1992 paved the way for the introduction of the euro in 1999 and the circulation of euro notes and coins in 2002. The treaty established the EMU project and set the requirements for the gradual implementation of the EMU. This major step forward was largely based on the objectives of maintaining peace, stability, and prosperity in the early 1990s. The goal behind this convergence was the smooth adoption of the new common currency, which required a significant harmonization of economic policies and macroeconomic conditions in the countries that wanted to participate in the EU. Participating in this core European integration project was largely seen as the most appropriate pathway for economic prosperity.

More specifically, the Maastricht Treaty outlined convergence criteria for the third stage of integration regarding achieving exchange rate stability, price stability, and maintaining a restrictive fiscal policy for EU countries in becoming an economic and monetary union according to Krugman (2015, p. 564). It is important to note that major economic problems and imbalances in one country could bring about problems to other countries. For this reason, the convergence policy period was the preparation stage for the countries. The several macroeconomics criteria included: (1) inflation of no more than 1.5 percentage points above the average rate of the three EU member states with the lowest national inflation rates among EU members over the previous year, (2) long term interest rates that should be no more than 1.5 % points above the rate in the three EU countries with the lowest inflation over the previous year,

(3) a national government deficit at or below 3% of GDP, and (4) a national government debt not exceeding 60% of GDP, although a country with a higher level of debt can still adopt the euro provided its debt level is falling steadily. And finally, the European Central Bank with the authority to exercise the monetary policy for the entire EMU was established, where the independent monetary policies no longer would be available after the adoption of the euro currency.

Furthermore, the Stability and Growth Pact (SGP) was established thereafter in 1997 to ensure that the Maastricht Convergence Criteria would continue to apply once the common currency was launched. This pact was meant to ensure that no single member state, once a member of EMU, could free ride the system, for instance, by incurring high deficits and debt. It also aimed to enforce budget discipline and sound public finances among the countries participating in the euro. The SGP also was to govern the “excessive” debt and deficit procedure, which would be triggered by the national government deficit breaching 3% of GDP or national government debt nearing 60% of GDP. If countries did not follow these criteria, the SGP allowed for financial penalties on countries with “excessive” deficits or debts.

The significance behind the macroeconomic convergence criteria, the strict control of high public debts, as well the further addition of the SGP was that low-inflation countries, such as Germany and France, wanted to assurance that other EMU counterparts would not only learn to prefer an environment of fiscal discipline, but also not exert excess inflationary pressure on the entire European economy. This environment was encouraged in hopes of preventing the euro in becoming a weak currency, not falling prey to the types of policies that fueled inflation in several European countries since the early 1970s. Having a controlled debt and deficit would also prevent the continuation of borrowing that may lead to decreased demand for its bonds.

Moreover, even as the euro launch came closer in 1997, the German public was opposed to the euro because of the opinion that strong, cautious governments in the EMU would face pressures to purchase debt from governments that borrowed more than they could afford to repay. The German government insisted that the criteria outlined in the Maastricht Treaty alongside the SGP's criteria post-implementation of the Eurozone would prevent this from happening, fostering an environment with low inflation and fiscal restraint.

Ironically, by the mid-1990s it became apparent that many countries, including the largest - and economically most important – Germany and France, were finding it difficult to meet the convergence criteria. At first, it was decided that only Austria, Denmark, Portugal, the Netherlands and Spain fulfilled the convergence criteria, while France and Germany did not fulfill the criteria. It was inconceivable to launch EMU without the two strongest economies. In the run-up to 1998, a facade of similarity and congruence between member states' economies struggling to fulfill the criteria occurred. EU countries, such as Germany and France, through the means of “cooking the books” and using creative accounting squeezed their government budget deficits to within the 3% of GDP criteria by the Maastricht treaty. On other hand, countries, such as Italy and Greece, had levels of debt and deficit relative to GDP well above the limit of the treaty. The treaty, nonetheless, dismissed these circumstances given the fact that these countries were demonstrating that the level of debt was declining. Eventually, in May 1998, the Council decided 11 countries were ready to join.

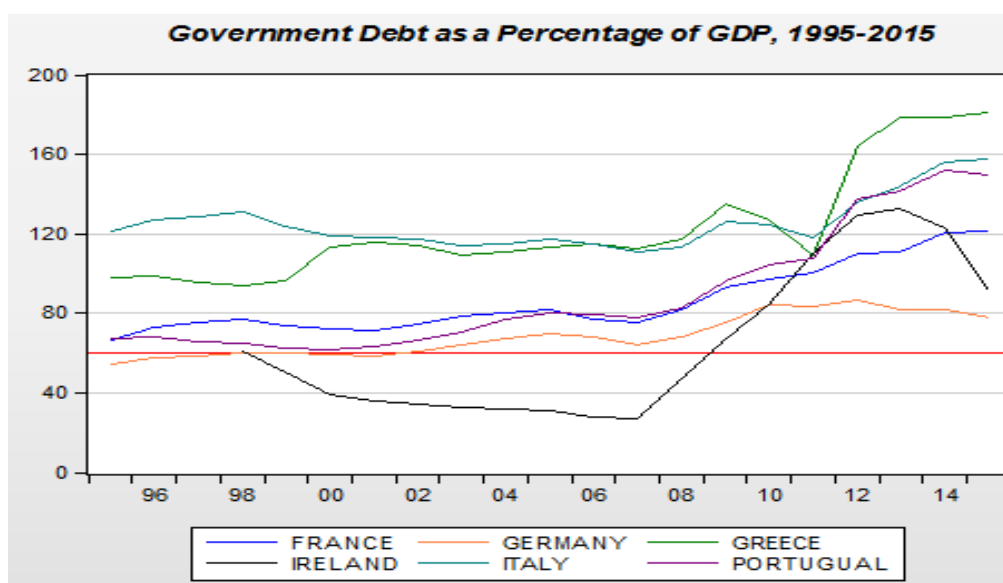
3.3 Unfolding the Eurozone Crisis

The creation of the euro was once again largely stimulated by political consideration in addition to economic policy priorities extricably linked to the fulfillment of the Maastricht

Criteria. Main economic trends in the post euro period-included poor governance and fiscal expansion, which were supposed to be supervised by the European Commission. This demonstrated that the greatest weakness of the SGP was the fact that a qualified majority of Eurozone members in its ECOFIN Council was required in order to approve any further procedural steps. The weakness meant that countries that were in violation of the criteria retained the right to vote and needed only a few additional countries to block such steps, hence incentivizing countries with high levels of deficits “to vote against sanctions for fear that these would be applied against themselves” according to Ngai (2012, p. 2).

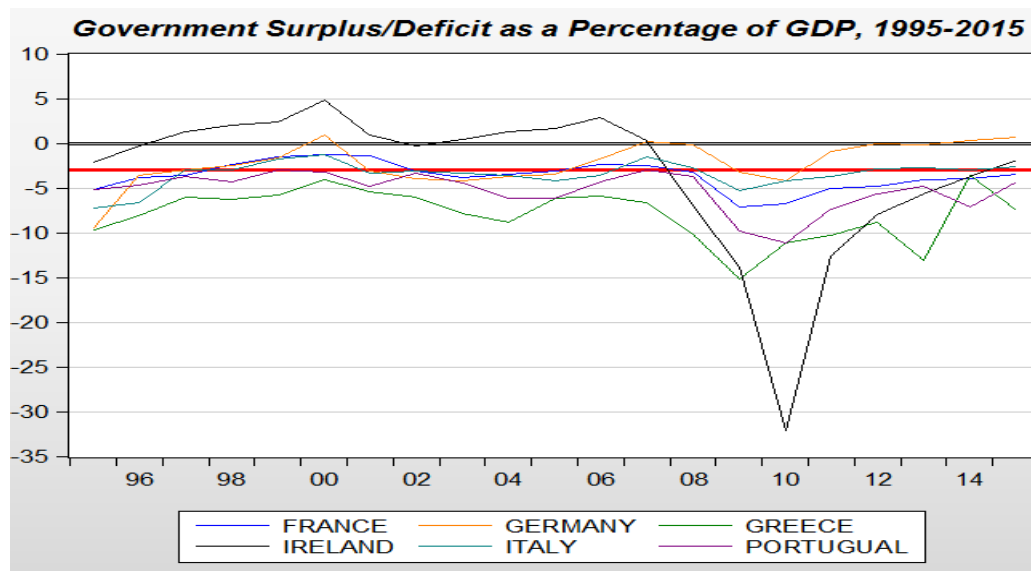
The EC not only failed to impose the appropriate penalties, but also set a negative precedent, a bad signal that there were no effective rules on budget deficits in the EMU. Despite the SGP obligations, especially running fiscal deficits no more than 3% of GDP, there was a significant fiscal deterioration for the PIIG countries from the early 2000s onwards after entering the common currency area. These observations can be seen in Figure 3.1 and 3.2:

Figure 3.1



Source: OCED (See Appendix 1 for more detail)

Figure 3.2



Source: OCED (See Appendix 2 for more detail)

These graphs clearly show that the SGP failed to impose strict requirements to member states. Instead of a gradual convergence, divergence emerged since there were good performers and laggards in the Eurozone. Moreover, the fiscal relaxation was not only strictly an economic reality in the PIIG countries, but also among stronger Eurozone economies like Germany and France. The negative precedent set by both Germany and France led to undercutting the effectiveness of the SGP, which helped foster an environment of fiscal irresponsibility in several countries, especially Greece, according to Wihlborg (2010, p. 22).

The EC's failing to impose the appropriate penalties, as well as negative precedent set by Germany and France, were indeed significant factors contributing to increases of the public debt and deficit of the PIIG countries. However, as these factors did contribute to the fiscal irresponsibility of these countries, it is important to note that the massive public debt was also largely fueled by European funds from private and central banks in the low interest rate environment. But more importantly, PIIG countries were investing in an unsustainable growth

model, which will be discussed in the following section. The whole system could have worked properly as long as PIIG countries had the opportunity to refinance its debt, yet the PIIG economies remained institutionally weak and vulnerable. The global financial crisis of 2007-2008 would reveal these weaknesses.

Once the financial crisis of 2007-08 hit the Eurozone, Germany took on further debt in order to provide for further fiscal stimulus. The increased fiscal stimulus in return would increase public spending to ease the effects of the financial crisis. Numerous EU countries imitated this plan of action. Unlike Germany, the majority of these countries did not have the financial standing to do so, since they were more deeply indebted. As the fallout of the global economic crisis was escalating, the European Commission was very concerned Greece's spiraling public debt, as it began to affect the stability of the euro. The Commission was also particularly concerned about levels of public debt in Ireland, Spain, Italy and France.

More specifically, Greece –as the weakest link in the Eurozone – rapidly became the target of aggressive speculation, as many saw an opportunity to benefit from volatile markets dealing with sovereign credit default swaps. Rating agencies subsequently started to downgrade Greek bank and government debt. Over time, international investors and lenders became increasingly nervous that the Greek government's public debt was unsustainable and that it would default on its debt. Thus, they started demanding higher interest rates for buying and holding Greek bonds, which drove up Greece's borrowing costs (see Appendix 3 for more detail), exacerbated its debt levels, and caused Greece to veer towards default. This would cause the debt crisis to spiral out of control, engulfing not only Portugal and Ireland, but also much larger economies such as Spain and Italy, all of which were on the periphery with similar near-unsustainable public finances.

3.4 Structural Issues

Policy makers adopted a very short-term perspective. Every country, which wanted to participate in the EMU, had to comply with monetary and fiscal economic targets. Even though a “strict” mechanism of implementing macroeconomic conditions was in place, a specific mechanism for the coordination of the implementation of structural reforms did not exist. Policy makers built a common currency area without an adequate economic governance to harmonize and coordinate economic policies across the EMU. They did not predict the economic and institutional implications of a future debt-crisis. Actually, they believed that this was impossible to happen, and did not proceed further in the political union to establish common economic policies and common economic institutions.

Furthermore, these policy makers clearly did not address the concerns of both traditionalist and modern optimal currency area economists regarding meeting the criteria for an economically efficient common currency area. Wihlborg (2010, p. 4) points out that one of the most important criteria based on Mundell (1961) is that “economies in a currency area should have considerable flexibility in terms of factor mobility and/or wage and price flexibility in order to allow economic adjustments without provoking recessions in the absence of the ability to change national exchange rates and, thereby, relative costs.” As previously mentioned, Kroger and Redonnet (2001) emphasized the use of using real convergence criteria, like factor mobility and/or wage and price flexibility, in addressing if a single monetary policy can handle asymmetric economic developments within different countries once they share a common currency area. This criterion, nonetheless, was not included in the Maastricht Treaty or the SGP, and hence, was not satisfied by a several of the entering Eurozone members.

Once economists recognized that this real convergence was not included, they assumed changes in economic structure would emerge from participation in a shared common currency area. The endogenous OCA theory was right in demonstrating that the conditions after, not before, the formation of the Eurozone was more relevant to its successful operation as a common currency area, partially refuting Kroger and Redonnet's (2001) argument. The Eurozone members did positively converge towards meeting several of the optimal currency area criteria, specifically with trade, however they had more problematic issues with regards to more flexibility in labor markets and asymmetric economic developments. It is important to note that the convergence "movements needed to be strong enough to substantially improve the workings of the internal adjustment process and reduce the generation of disturbances for which adjustment would be needed", according to Wihlborg (2010, p. 4). The reasoning behind this lack of convergence was the unaccounted excessive pressures from political economy forces and distorted incentives. The threat of not being able to join the euro area, which led to an initial success with fiscal consolidation in Europe, was also no longer there. Thus, almost as soon as the euro had been introduced, consolidation fatigue set in, and not only fiscal policies, but more importantly, structural reforms were relaxed.

With bullish markets in addition to easy financing, the PIIG countries, especially Greece, fell to the threats of excessive pressures from the traditional economic sectors, the use of easy access to credit to finance domestic private and public consumption, neglect the requirements of sustainable growth, and more importantly, the idea that the single currency was the adequate condition for economic convergence without more structural effort in direction of high productivity and competitiveness. Furthermore, the European structural funds and borrowed funds were not channeled into productive investments that would generate future growth and

increase competitiveness of the economy. Instead, those capital flows and the easy access to credit were used to fund public and private consumption. Germany and France, on the other hand, stayed fairly disciplined competitively than most Eurozone countries, and thus were able to ease the effects of the financial crisis through taking “the injunction that joining an area of fixed exchange rates greatly increased the need for improving the internal flexibility of economies”, according to Wihlborg (2010, p. 22).

3.5 Conclusion

The Eurozone countries had an extraordinary opportunity to pave the way for rapid economic development and modernization, with sustainable growth rates, and new, open and high quality economic and political institutions after joining the common currency area. This economic environment was truly favorable. More specifically, the macroeconomic conditions, the hard currency, the high investors’ confidence, and the opportunity to access international capital markets for cheap credit were the most appropriate requirements. Nonetheless, the ability to exploit these advantages properly for certain countries, specifically the PIIG countries, was largely based on two major conditions: maintain fiscal discipline and sound finances, while increasing the productivity and the competitiveness of their respective economies. Despite all the PIIG countries failing to maintain fiscal discipline, certain PIIG countries, such as Greece, failed to maintain competitiveness in international markets. It would have been sufficient, if they had used the borrowed funds to spur production capacity, including the export sector.

CHAPTER FOUR

Diverging Competitiveness among Key Eurozone Nations

4.1 Introduction

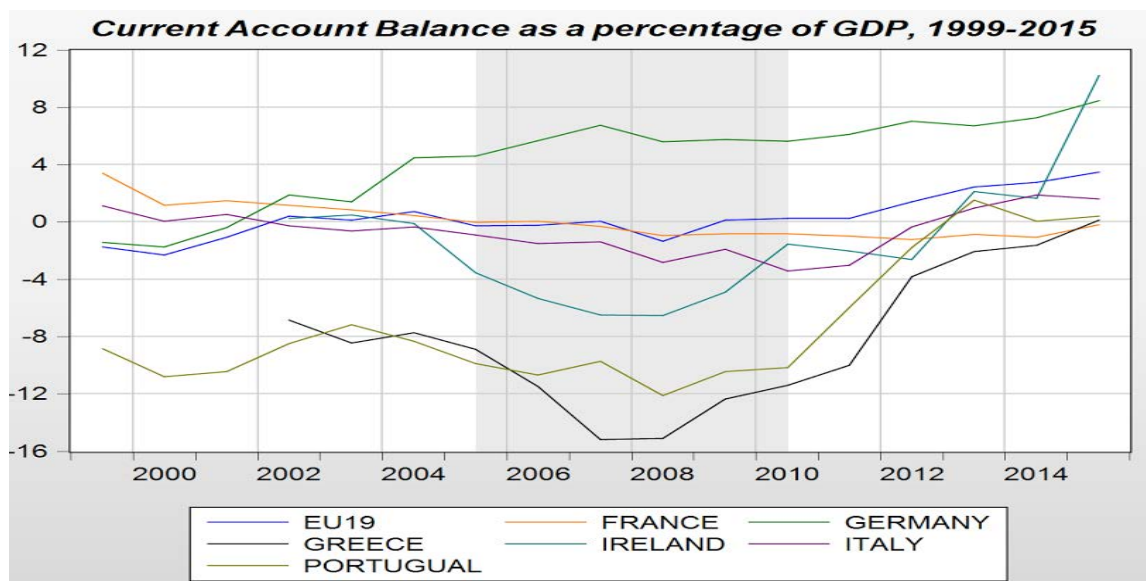
Certain PIIG countries within the Eurozone had the idea that the common currency was an adequate condition for economic convergence without more structural effort in direction of high productivity and competitiveness. The costs of entering the EU for these countries was forgoing an independent exchange rate and no longer having an independent monetary policy, where sovereign governments can no longer manage the exchange rate so as to address the country's international competitiveness issues nor can they influence the money supply so as to address aggregate demand and/or inflation/deflation problems. These member states can therefore only compete in international markets with their fixed exchange rates where adjusting unit labor costs is their main option. More specifically, in order to address international competitiveness issues, the only two options left under the Eurozone are wage decreases and/or productivity enhancements. In this chapter, we will start by examining the current account balances of Germany, France, and the PIIG countries in subsection 4.2. We will then turn to an examination of the unit labor costs, productivity, and hourly wage rate between Germany and Greece in subsection 4.3, followed by Germany and Ireland in subsection 4.4. An examination of these variables will also be done with the remaining select Eurozone countries in subsection 4.5.

4.2 Current Account Balance

Although it is widely acknowledged that Eurozone's elites need to address unsustainable fiscal conditions in deficit countries, they must also address their lack of competitiveness. This

lack of competitiveness can be observed through examining the current account balances of select Eurozone countries, as Figure 3 and Current Account Balance Table show.

Figure 4.1



Source: OECD (Refer to Appendix 4)

Current Account Balance as a percentage of GDP, 2005-2010							
	Portugal	Italy	Ireland	Greece	France	Germany	EU19
2005	-9.9	-0.9	-3.5	-8.9	-0.02	4.6	-0.3
2006	-10.7	-1.5	-5.3	-11.5	0.04	5.7	-0.2
2007	-9.7	-1.4	-6.5	-15.2	-0.3	6.7	0.0
2008	-12.1	-2.8	-6.5	-15.1	-1.0	5.6	-1.3
2009	-10.4	-1.9	-4.9	-12.3	-0.8	5.7	0.1
2010	-10.1	-3.4	-1.5	-11.4	-0.8	5.6	0.2

Source: OECD (Refer to Appendix 4 for additional data)

In assessing the current account balances of France and Germany, these countries have substantially improved their current account balance, especially Germany, since the creation of the euro. Moreover, Germany running a big surplus can be attributed to not only its industrial

nature, but also its initiative in reducing manufacturing costs, according to Krugman (2015, p. 576).

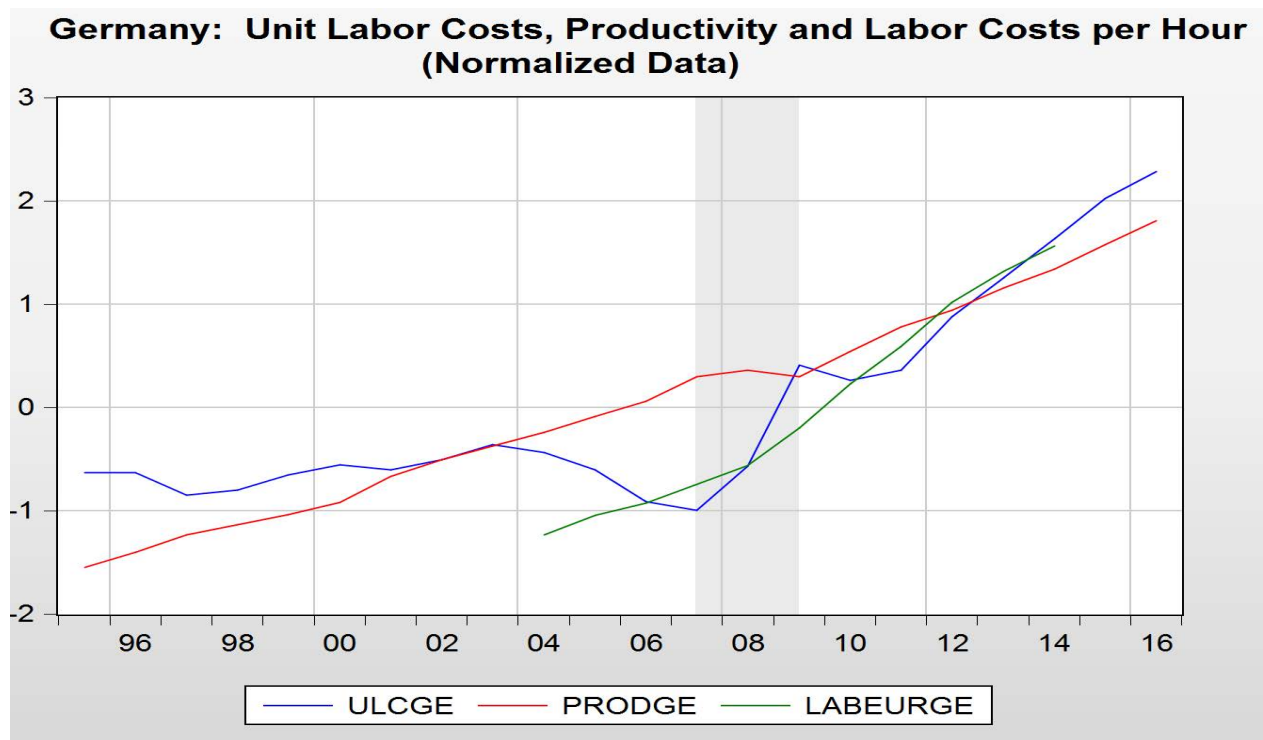
In contrast, current account deficits expanded, and in some cases to staggeringly large levels for Greece and Portugal. By 2008, Greece and Portugal respectively reached the unprecedented deficit of 15.1 and 12.1 percent of their output. The slowly improving, yet staggering current account deficit levels of Greece and Portugal raised flags, indicating their export prices were too high in terms of international competitiveness. It is important to understand that Portugal and Greece under the fixed euro currency would have to turn to decreasing its respective unit labor costs through depressing wages and/or improving its productivity in an effort to restore their export price indices competitiveness. This situation in which Portugal and Greece experienced a negative demand shock in a fixed-rate regime and its consequences is mentioned in Kenen's (1969) examination of degree of product diversification. He points out the undesirable effects that may occur for a single-product economy if it experiences a negative demand shock in a fixed-rate regime. Kenen goes on to demonstrate that the adjustment to this fall in export revenue under a fixed exchange rate regime would have to be unfavorably tackled through a reduction of wages and prices, since currency devaluation is not an option. Hence, Kenen argues that being a member of a common currency area with a single product economy is not as attractive and/or beneficial as it seems. Finally, the fact that Greece, a limited, diversified economy, experienced similar unfavorable consequences to that of a single-product after experiencing a negative demand shock strengthens Kenen's argument.

Productivity, Unit Labor Costs, and Hourly Wage Rates: Germany v. Greece

To begin, labor productivity rates among the selected Eurozone countries are another important aspect that needs to be assessed. Similar rates of labor productivity are important for Eurozone countries because if they have diverging rates, then there is very limited action that the EMS can take to ease these disparities. Without an independent monetary policy, sovereign nation-states no longer have the luxury of devaluing its currency in order to restore competitiveness. Therefore, those members of the Eurozone must turn to wage decreases and/or productivity enhancement as a result.

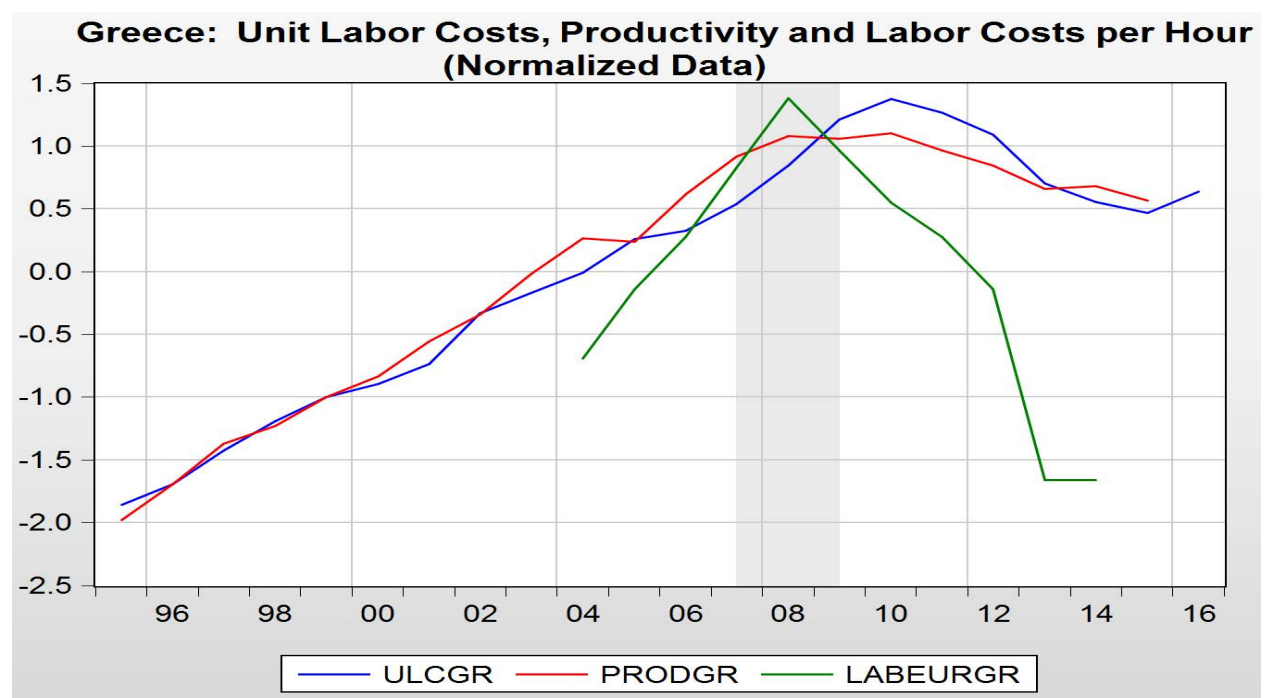
Furthermore, in assessing the correlation and trends between unit labor costs, productivity, and labor costs per hour between select Eurozone countries, one will be able to notice if there are any notable divergences in labor productivity trends. It is important to note that certain figures below contain normalized data. This normalized data has a clarity element to it compared to actual data. Moreover, I presented the normalized data because they are unit free, allowing one to look at the correlation and trends between unit labor costs, productivity, and labor costs per hour. The way the data is normalized for each data series in EViews is in the following equation: $\frac{X_t - \bar{x}}{S}$, where X_t is the actual observation of the respective variable for each year, \bar{x} is the average of all observations of the respective variable for the sample period, and S is the standard deviation of all observations of the respective variable for the sample period. The normalized data allows for compiling data that have different units and/or are on different scales. Now, we will examine the trends in the factors mentioned above between Germany and Greece in the following charts.

Figure 4.2



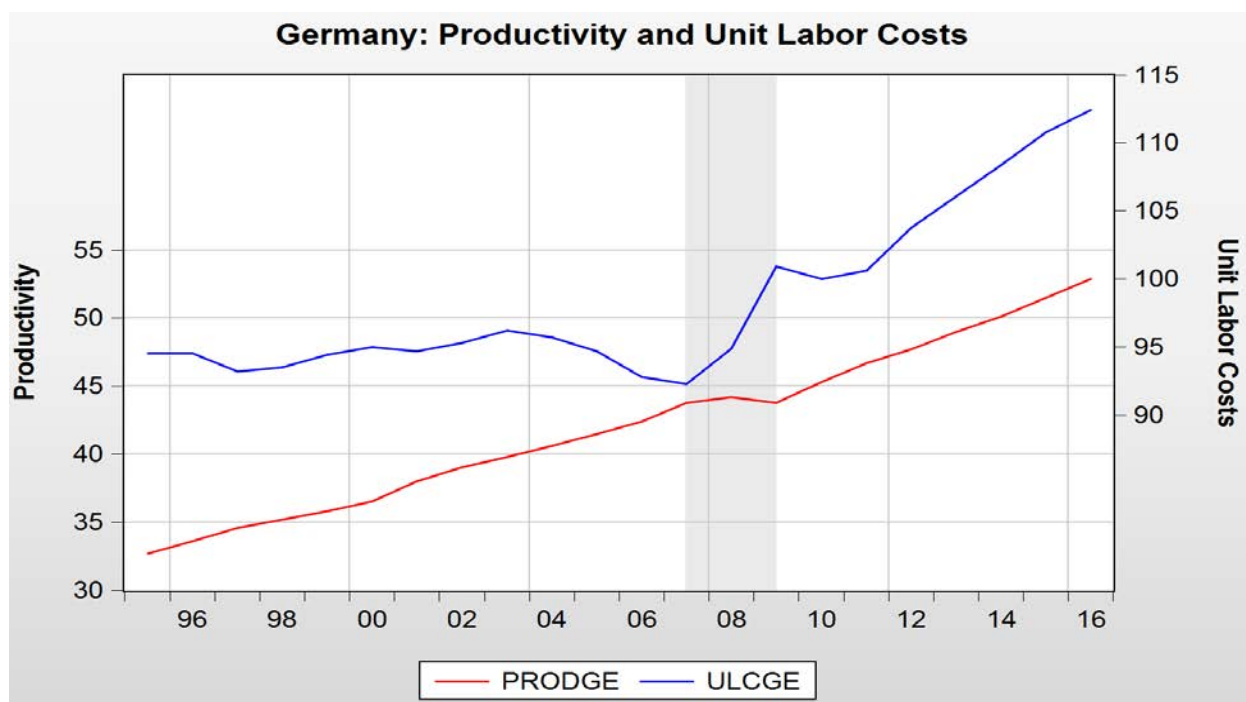
Source: OECD, Eurostat, and Haver Analytics

Figure 4.3



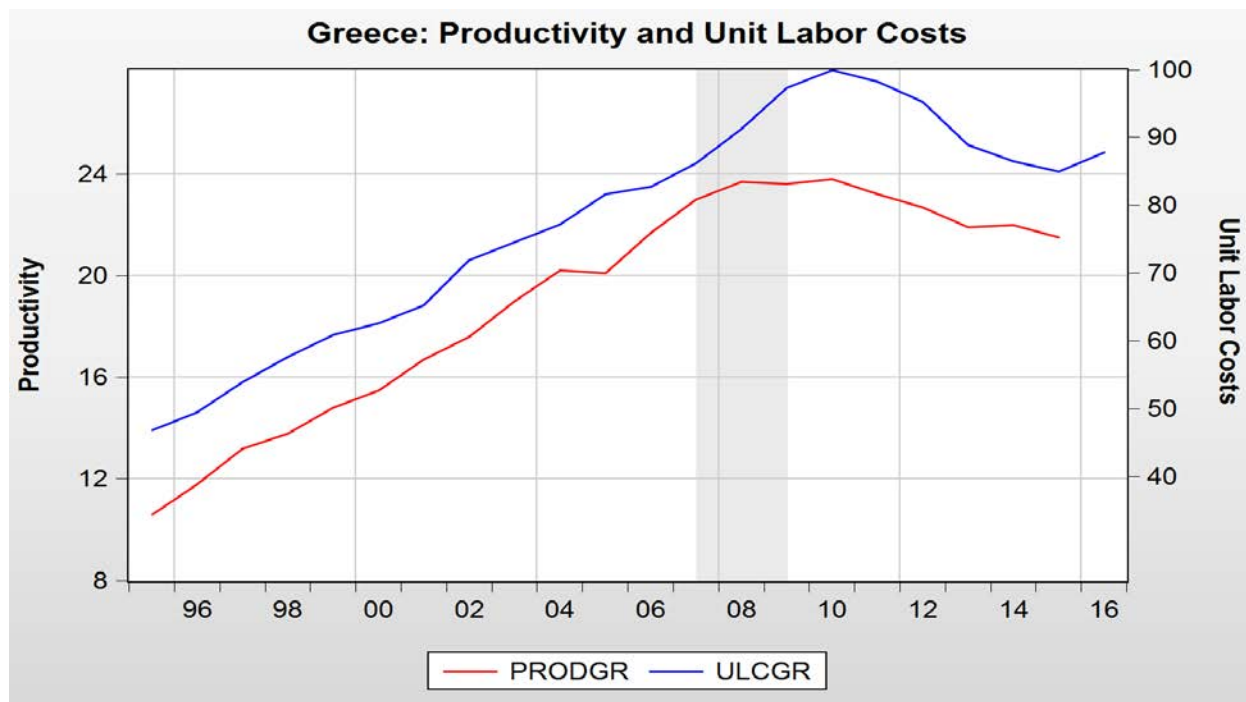
Source: OECD, Eurostat, and Haver Analytics

Figure 4.4



Source: OECD, Eurostat, and Haver Analytics

Figure 4.5



Source: OECD, Eurostat, and Haver Analytics

In Figure 5, Germany shows a steady upward trend in productivity growth, while its unit labor costs took a dip between 2003 and 2009. Turning to Figure 4, the nation's hourly wage rate has also steadily increased since 2004 until the end of the Global Financial Crisis, and then increased up until 2016. It can also be noted that once Germany approximately entered the Eurozone, its productivity started to trend above its unit labor costs for the majority of its time, right up until 2012. Even though its units labor costs rate rose higher than its productivity after 2012, which could be considered a threat to Germany's competitiveness, its hourly wage rate stayed aligned with its productivity growth.

Greece, on the other hand, showed a rapid increase in productivity growth from 1995 until 2009, where it slightly more than doubled its level of productivity from approximately 11 to 24 GDP per hour worked in euros according to Figure 7. The nation's unit labor cost quickly increased from 1995 until 2010, where it also slightly more than doubled from approximately 47 to 100. The alignment of both the rapid productivity and unit labor cost rates were also cyclical, depicted in Figure 5. The catch, nonetheless, is that Germany increased its level of productivity at a sizeable, yet gradual rate from approximately 33 to 52 GDP per hour worked in euros, while simultaneously having a moderate growth in unit labor costs when compared to Greece in the span of 1995 until 2015.

Additionally, Greece's hourly wage rate skyrocketed from 2004 until 2008. It is important to note that its hourly wage growth was roughly aligned with productivity up until 2008. After 2008, a steady decline in both productivity and unit labor costs occurred in Greece. More importantly, the unit labor costs was above its productivity rate for the majority of this decline, indicating a strong threat to its cost competitiveness, if other costs were not adjusted in compensation. Greece's hourly wage rate also immediately plummeted afterward, nowhere near

being aligned with the declining trends of productivity and unit labor costs after the Financial Crisis. Besides a dive in hourly wage growth a few years after the financial crisis for Portugal (refer to Appendix 6B), the significant wage decreases that Greece experienced did not occur in neither Germany, France, or its other PIIG peers.

An important observation from this comparison is the steady trend in productivity growth in Germany, and a decline in productivity in Greece starting around 2008. This is a crucial problem according to OCA literature because countries sharing a common currency should maintain similar productivity rates, since there is very limited action that the EMS can take to fix this misalignment. It is important to understand that if Greece had its own currency in the situation, it could have devalued its currency to maintain competitiveness. However, lacking its independent monetary policy, it went through a painful period of wage decreases from 2008 until 2014 in trying to maintain its competitiveness. Therefore, it seems that the wage decreases, while contributing to a decline in current account deficit as a percentage of GDP (e.g. from -15.2 in 2007 to -11.4 in 2010), was not sufficient. This is because productivity declines did not help, and of course, no currency devaluation could be performed.

Furthermore, Mundell (1961) proposed labor mobility, wage and price flexibility, as well as the incidence of asymmetric shocks as the most relevant attributes for judging the optimality of a currency area. Wihlborg (2010, p. 4) also points out how Mundell states “economies in a currency area should have considerable flexibility in terms of factor mobility and/or wage and price flexibility in order to allow economic adjustments without provoking recessions in the absence of the ability to change national exchange rates and, thereby, relative costs.” More specifically, Mundell outlines an ideal situation of wage and price flexibility in which a region, such as Germany, has an obligation to increase its domestic demand at a greater rate to assist

with the adjustment of imbalances for another region, such as Greece, within the Eurozone. This adjustment by Germany would result in fewer products being bought in its own nation, while more products being bought in Greece, therefore providing evidence of wage and price flexibility restoring stability in the incident of asymmetric shocks in a common currency area.

However, in the examination of data of Germany and Greece, Germany went from a current account balance of 4.6 in 2005 to 5.6 in 2010, while Greece went from a current account balance of -8.9 in 2005 to -11.4 in 2010 after undergoing the Great Recession. This situation between Germany and Greece indicates wage and price stickiness in the Eurozone, since neither a decrease in Germany's current account balance nor an increase in Greece's current account balance occurred to restore stability in light of an asymmetric shock. Therefore, Mundell argues that not only wage and price flexibility fails to exist in the Eurozone, but also suggests that these existing members are not making this common currency area as stable as it seems.

Productivity, Unit Labor Costs, and Hourly Wage Rates: Germany v. Ireland

Now, we will examine the trends in the factors mentioned above between Germany and Ireland in the following charts.

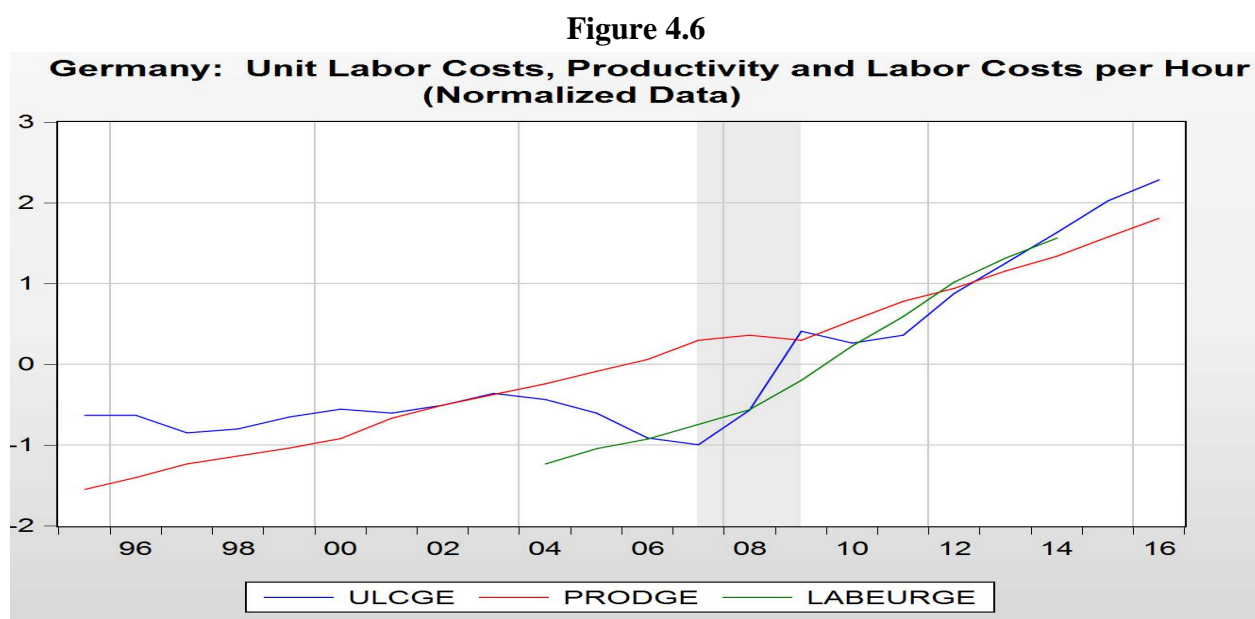
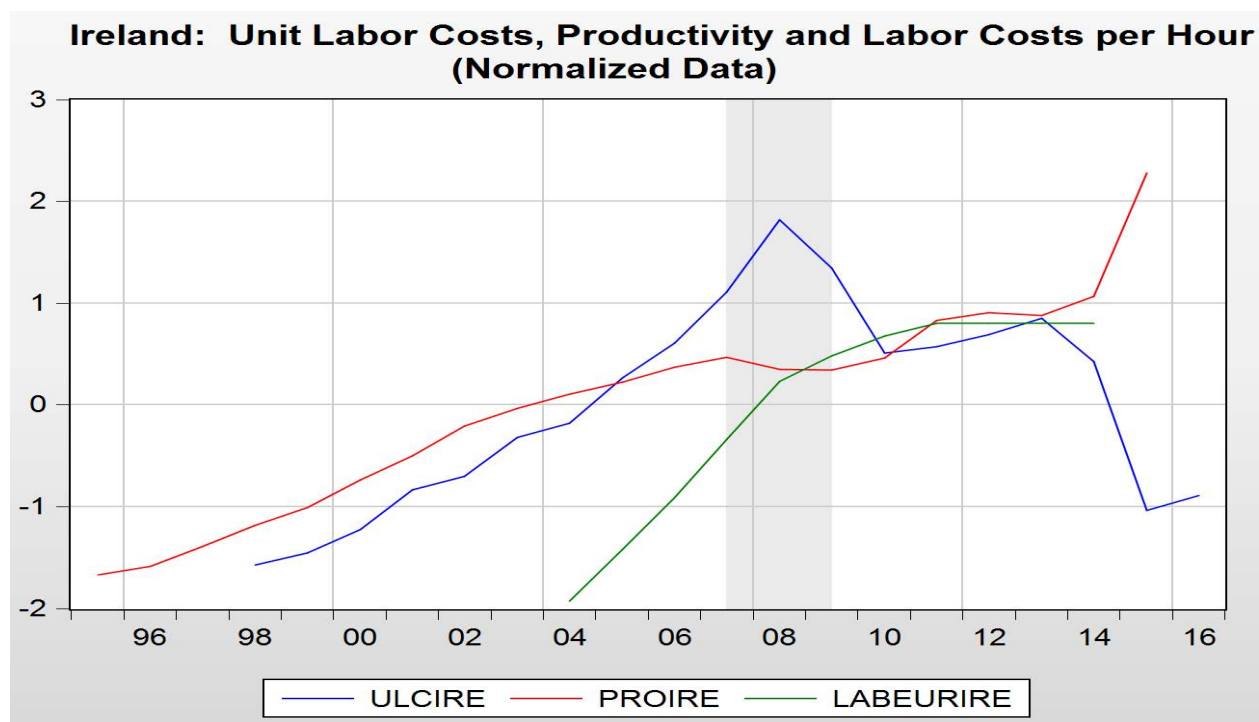
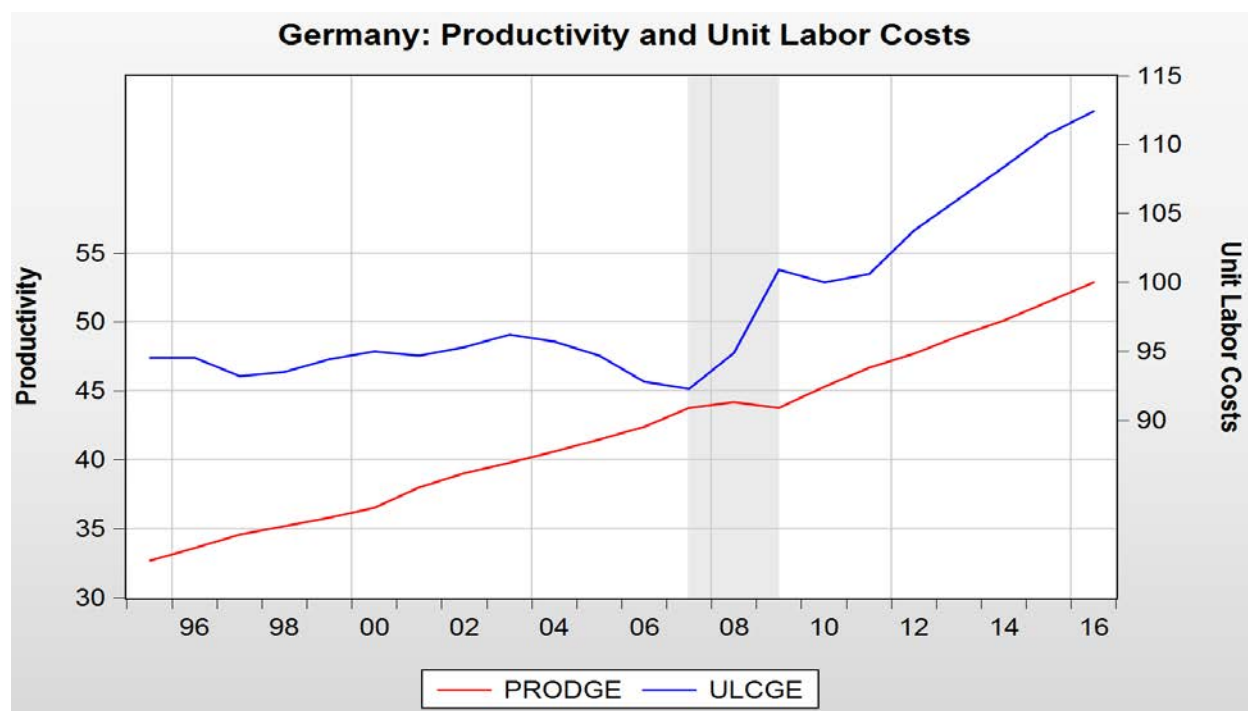


Figure 4.7



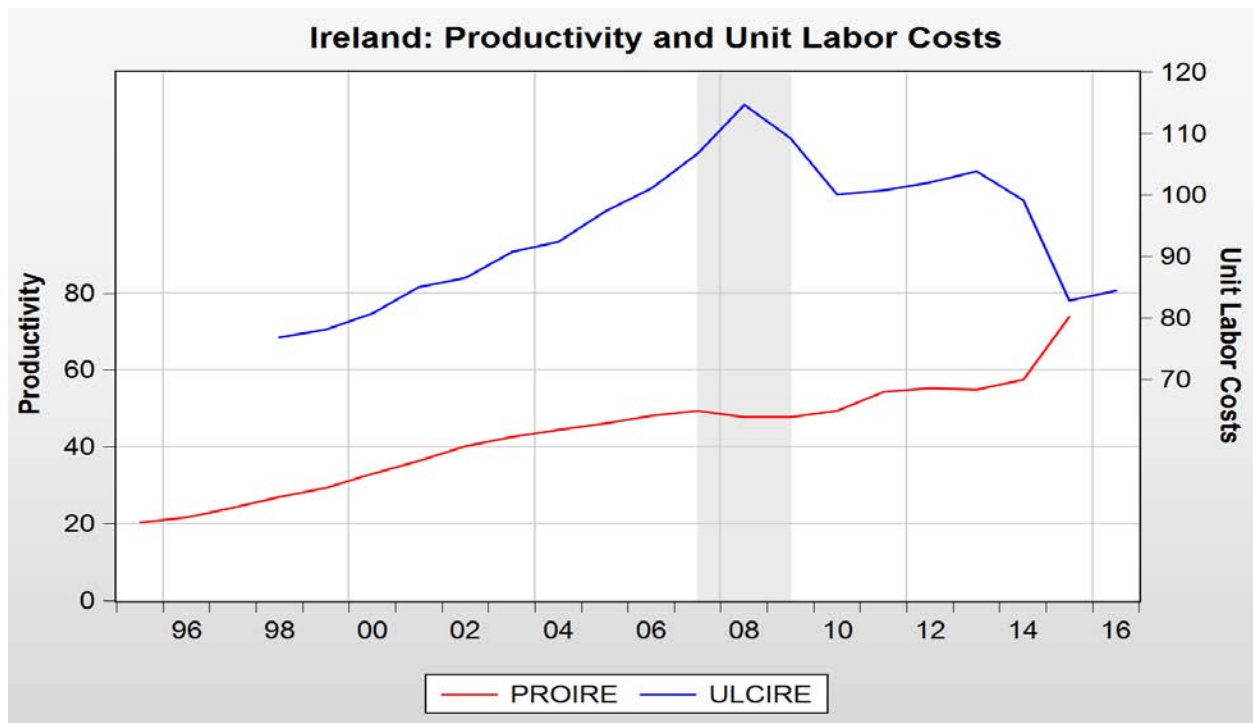
Source: OECD, Eurostat, and Haver Analytics

Figure 4.8



Source: OECD, Eurostat, and Haver Analytics

Figure 4.9



Source: OECD, Eurostat, and Haver Analytics

Ireland has an interesting relationship concerning its rate of productivity, unit labor costs, as well as current account balance compared to its fellow PIIG countries. This Eurozone member state beginning from 1995 until around 2005 had steady upward trends in both productivity and unit labor costs rates, where the rate of productivity was slightly above the rate of unit labor costs according to Figure 8. In the following years from 2005 until 2008, the unit labor costs significantly spiked up, which was also accompanied by widening current account deficit from -3.5 to -6.5 percentage of GDP. The reasoning behind this decrease in Ireland's competitiveness was that its increasing unit labor costs made the nation's export price indices less competitive, or an increase in its export price, in international markets and hence decreasing its exports, which is demonstrated through its declining current account balance. Furthermore, the rate of productivity, on the other hand, during the Great Recession slightly dipped, but more importantly

has steadily risen since 2009 until 2015. It is interesting to note that Ireland's level of productivity in the span of 1995 to 2015 increased approximately from 20 to 74 GDP per hour worked in euros according to Figure 10. Ireland's sizable increase in its productivity capacity was not only larger than Germany's, but also significantly more than any of its PIIG peers from this time span.

In addition to the rate of productivity increasing, Ireland has an interesting trend in that its unit labor costs decreased dramatically compared to its PIIG peers since 2009. It is important to note that this significant decrease in its unit labor costs was also supplemented with significant increase in its current account balance, which went from a deficit of -6.5 percentage of GDP in 2008 to a surplus of 10.2 percentage of GDP in 2015. Moreover, given the high output Ireland's economy receives relative to its wages, alongside its increasing productivity rates, the nation promoted a sufficient growth model based on productivity enhancement in restoring its competitiveness in the international market. The significant increase in Ireland's current account balance from 2008 to 2015 provides further evidence that Ireland's productivity enhancement was sufficient in producing goods at a competitive export price in international markets without the need to devalue wages.

Productivity, Unit Labor Costs, and Hourly Wage Rates of Remaining Countries

The remaining countries that need to be examined include France, Portugal, and Italy. First off, France is quite comparable to Germany, as the nation shows a strong, steady upward trend in both productivity and unit labor costs rates. Once France approximately entered the Eurozone, its productivity started to trend above its unit labor costs up until around 2009, and then the respective variables aligned cyclically thereafter (refer to Appendix 6A). More

specifically, France increased its level of productivity at a sizeable, yet gradual rate from approximately 32 to 54 GDP per hour worked in euros, while simultaneously having a moderate growth in unit labor costs from 1995 until 2015 (refer to Appendix 7A). The Eurozone member state's hourly wage rate rapidly increased from 2004 until 2012, and eventually aligned just below both productivity and unit labor costs after 2012. France overall demonstrates relatively uniform shifts in productivity, unit labor costs, as well as hourly wages to Germany, maintaining its international competitiveness.

Turning to Portugal, the nation exhibits steady growth trends in both its productivity and unit labor costs. Unlike France, Germany, and Italy, once Portugal approximately entered the Eurozone, its unit labor cost rate rose higher than its productivity rate up until 2011. This indicates that Portugal's unit labor costs are too expensive to be competitive in international markets, as the per unit labor cost exceeds the per unit productivity. The trend was also accompanied by its hourly wage rate increasing from 2004 to 2012, where it eventually surpassed Portugal's productivity rate in 2012 (refer to Appendix 6B). Since Portugal workers are less competitive via productivity rates, the nation turned to depressing their worker's wages (e.g. from 2012 to 2014 in Appendix 6B) in an effort to reduce the cost of production to restore its competitiveness in the international market. Even though we do see wages decline in Portugal, since the nation could not devalue its currency under the Eurozone, Portugal's productivity rate steadily increased, quite noticeably above its unit labor costs since 2012. Nonetheless, Portugal's restoration of its export price competitiveness through its adjustments mentioned remains uncertain after examining its current account balance (e.g. -1.8 in 2012 to 0.4 2015).

The last selected Eurozone country of examination is Italy, which displays upward trends for both productivity and unit labor costs. Once Italy entered the Eurozone, its productivity started to trend above its unit labor costs up until around 2009, and then the respective variables aligned cyclically thereafter (refer to Appendix 6C). Moreover, the nation's hourly wage rate rapidly increased from 2004 until 2012, and eventually aligned just below both productivity and unit labor costs after 2012. Italy's trends overall demonstrate that the adjustment in its productivity enhancement, alongside forgoing wage decreases, while contributing to a rise in current account balance as a percentage of GDP (e.g. from -2.8 in 2008 to 1.9 in 2014), was sufficient in maintaining its competitiveness in international markets.

CHAPTER FIVE

Conclusion and Considerations for Follow Up

Optimal currency area theory provided me with a useful framework for determining whether a Eurozone member nation should continue being a part of the common currency area. The results from my findings in Chapter 4 showed us that the euro would best serve the economic interests of each of its members if steady trends in productivity growth were accompanied by competitive wages and moderate growth in unit labor costs. In the case of Germany, France, and Italy from the PIIG nations, these countries demonstrated that the loss of monetary independence and flexible exchange rate were not high costs for these key countries. It is important to note that steady trends in productivity growth, which were also growing faster than their respective rates of unit labor costs for the majority of the period, occurred in these countries from the beginning of the euro until 2015. Therefore, the trends in Germany, France, as well as Italy, demonstrate that the adjustment in their productivity enhancements, alongside forgoing wage decreases, while contributing to increases in their respective current account balances as a percentage of GDP, was sufficient in maintaining competitiveness in international markets.

Furthermore, Ireland has a unique case, where its unit labor costs significantly spiked up, which was also accompanied by widening current account deficit from 2005 until 2008, after experiencing steady productivity rate trends in its early membership in the euro. The reasoning behind this decrease in Ireland's competitiveness was that its increasing unit labor costs made the nation's export price indices less competitive in international markets and thus decreasing its exports, which is demonstrated through its declining current account balance. Soon enough, nonetheless, Ireland's rate of productivity recovered and then increased significantly, while its

unit labor costs have simultaneously decreased dramatically since 2009. These trends in Ireland's economy demonstrate how the nation implemented a sufficient growth model based on productivity enhancement in restoring its competitiveness in the international market. The significant increase in Ireland's current account balance after the Great Recession provides further evidence that Ireland's productivity enhancement was sufficient in producing goods at a competitive export price in international markets without the need to devalue wages.

After the examination of productivity, unit labor costs, hourly wage rates, and net export performance as a percentage of GDP of Germany, France, Italy, and Ireland, I argue that there is sufficient, positive economic convergence and performance in terms of international competitiveness under the uniform policy of the ECB for these countries since joining the Eurozone. Moreover, I conclude that these countries should continue being members of Eurozone, since these countries could compete with their fixed euro, while simultaneously increasing their export price competitiveness in international markets through productivity enhancement, forgoing the depression of wages. Moreover, they benefit from the positive aspects of a monetary union.

On the other hand, trends in Portugal, and especially Greece, indicated that both countries have an underlying structural deficit in comparison to Germany, France, Italy, and Ireland. The reasoning behind this underlying structural deficit is that consolidation fatigue quickly set in these countries after joining the Eurozone, resulting in stagnant structural efforts towards using borrowed funds to spur their production capacities, especially their export sectors. Unlike the previously mentioned countries, both Greece and Portugal experienced unit labor costs growing at a faster rate than productivity rates, indicating international competitiveness issues, such as export products becoming too expensive in international markets.

Furthermore, I reiterate the fact that Greece is in a far worse economic position compared to Portugal, as it went through a painful period of wage devaluation from 2008 until 2014. Both members of the EMU turned to depressing wages in expectations of unit labor costs to decrease, making the nation's export price indices more competitive and therefore increasing its net export performance as a percentage of GDP. It is important to recap that Greece and Portugal could not turn to devalue their individual currency since they are both members under the euro where they no longer have control over their exchange rates. Hence, the only two options left as adjustment mechanisms for them are wage decreases and productivity enhancements.

However, in the case of Greece, even though we do see wage declines, we do not see productivity enhancements and we do not see a dramatic improvement in its current account balance. Therefore, all the above facts, support that the conclusion that Greece would be better off leaving the Eurozone, and as a result, regaining control over its domestic monetary policy, such as performing exchange rate devaluation, making its export price indices more competitive and thus increasing its net export performance as a percentage of GDP. In the case of Portugal, even though we do see wages decline, not nearly to the same extent as Greece, we do see productivity enhancements, but do not see a drastic improvement in its net export performance as a percentage of GDP. Thus, as of right now, it seems reasonable for Portugal to remain in the Eurozone, since it has observed a steady increase in its productivity rate, quite noticeably above its unit labor costs since 2012. Portugal's needs to focus on significantly improving its current account balance through great productivity enhancement and/or reasonable wage depression in the immediate future in order to avoid Greece's future path.

Apart from the current account balances, productivity, unit labor costs, and hourly wage rate evidence that I provided in this paper, an interesting and relevant avenue of future research would be to examine the export price indices for the select Eurozone countries in my sample. Examining export price indices would provide further valuable insight because it correlates with two sides of this study. On the one hand, export price indices would correlate with both productivity and unit labor costs trends, providing evidence as to whether or not decreases in this variable are attributable to lower unit labor costs within the country. On the other hand, export price indices might correlate with current account balances, providing evidence regarding the strength of the relationship between export prices and net current account performance. The results from this examination would be further evidence as to whether or not a member state in the Eurozone should reconsider regaining its control over domestic monetary policy, forgoing the euro and the common currency area.

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Appendixes

Appendix 1

General Government Debt Levels as a percentage of GDP, percent per year (1995-2015)						
	Portugal	Italy	Ireland	Greece	France	Germany
1995	67.5	121.2	-	97.8	66.6	54.2
1996	68.0	127.1	-	99.0	72.6	57.3
1997	66.0	128.7	-	95.5	75.2	58.8
1998	65.3	130.7	61.3	93.9	77.0	60.5
1999	62.5	123.7	50.4	96.6	73.5	60.4
2000	62.0	119.0	38.7	113.0	71.9	59.4
2001	63.5	118.1	35.6	115.8	71.0	58.6
2002	66.8	117.0	34.1	114.3	74.6	61.0
2003	70.6	114.3	32.9	109.2	78.5	64.4
2004	76.7	114.7	31.5	111.0	80.0	67.5
2005	80.0	117.4	31.3	113.3	81.7	70.0
2006	79.4	115.0	27.6	115.2	76.9	68.1
2007	78.1	110.7	27.4	112.8	75.6	64.1
2008	82.8	113.0	47.4	117.5	81.5	67.9
2009	96.1	126.0	67.7	135.0	93.2	75.3
2010	104.1	124.9	84.1	127.1	96.8	84.5
2011	107.8	117.9	109.7	109.2	100.7	83.9
2012	137.1	136.2	129.2	164.5	110.4	86.6
2013	141.4	143.7	132.7	178.8	111.0	81.6
2014	151.7	156.0	122.9	179.0	120.4	82.0
2015	149.6	157.6	91.5	181.2	121.0	77.8

Source: OCED

Appendix 2

General Government Deficit Levels as a percentage of GDP, percent per year (1995-2015)						
	Portugal	Italy	Ireland	Greece	France	Germany
1995	-5.2	-7.3	-2.1	-9.7	-5.1	-9.4
1996	-4.7	-6.7	-0.3	-8.2	-3.9	-3.5
1997	-3.7	-3.0	1.3	-6.1	-3.6	-2.9
1998	-4.4	-3.0	2.0	-6.3	-2.4	-2.5
1999	-3.0	-1.8	2.4	-5.8	-1.6	-1.7
2000	-3.2	-1.3	4.9	-4.1	-1.3	0.9
2001	-4.8	-3.4	1.0	-5.5	-1.4	-3.1
2002	-3.3	-3.1	-0.3	-6.0	-3.1	-3.9
2003	-4.4	-3.4	0.4	-7.8	-3.9	-4.2
2004	-6.2	-3.6	1.3	-8.8	-3.5	-3.7
2005	-6.2	-4.2	1.6	-6.2	-3.2	-3.4
2006	-4.3	-3.6	2.8	-5.9	-2.3	-1.7
2007	-3.0	-1.5	0.3	-6.7	-2.5	0.2
2008	-3.8	-2.7	-7.0	-10.2	-3.2	-0.2
2009	-9.8	-5.3	-13.8	-15.1	-7.2	-3.2
2010	-11.2	-4.2	-32.1	-11.2	-6.8	-4.2
2011	-7.4	-3.7	-12.6	-10.3	-5.1	-1.0
2012	-5.7	-2.9	-8.0	-8.8	-4.8	0.0
2013	-4.8	-2.7	-5.7	-13.2	-4.0	-0.2
2014	-7.2	-3.0	-3.7	-3.6	-4.0	0.3
2015	-4.4	-2.6	-1.9	-7.5	-3.5	0.7

Source: OCED

Appendix 3

Long-term Interest Rates for Eurozone countries, percent per year (1998-2016)							
	Portugal	Italy	Ireland	Greece	France	Germany	EU19
1998	4.9	4.9	4.7	8.5	4.6	4.6	4.7
1999	4.8	4.7	4.8	6.3	4.6	4.5	4.7
2000	5.6	5.6	5.5	6.1	5.4	5.3	5.4
2001	5.2	5.2	5.0	5.3	4.9	4.8	5.0
2002	5.0	5.0	5.0	5.1	4.9	4.8	4.9
2003	4.2	4.3	4.1	4.3	4.1	4.1	4.2
2004	4.1	4.3	4.1	4.3	4.1	4.0	4.1
2005	3.4	3.6	3.3	3.6	3.4	3.4	3.4
2006	3.9	4.0	3.8	4.1	3.8	3.8	3.9
2007	4.4	4.5	4.3	4.5	4.3	4.2	4.3
2008	4.5	4.7	4.6	4.8	4.2	4.0	4.4
2009	4.2	4.3	5.2	5.2	3.6	3.2	4.0
2010	5.4	4.0	6.0	9.1	3.1	2.7	3.8
2011	10.2	5.4	9.6	15.7	3.3	2.6	4.3
2012	10.5	5.5	6.0	22.5	2.5	1.5	3.0
2013	6.3	4.3	3.8	10.1	2.2	1.6	3.0
2014	3.8	2.9	2.3	6.9	1.7	1.2	2.3
2015	2.4	1.7	1.1	9.7	0.8	0.5	1.3
2016	3.2	1.5	-	8.4	0.5	0.1	0.9

Source: OCED

Appendix 4 (Numbering Continued From Chapter 3)

Current Account Balance as a percentage of GDP, per year (1999-2015)							
	Portugal	Italy	Ireland	Greece	France	Germany	EU19
1999	-8.8	1.1			3.4	-1.4	-1.7
2000	-10.8	0.1			1.2	-1.7	-2.3
2001	-10.4	0.5			1.5	-0.4	-1.1
2002	-8.5	-0.3	0.2	-6.8	1.2	1.9	0.4
2003	-7.2	-0.6	0.5	-8.5	0.9	1.4	0.1
2004	-8.3	-0.3	-0.1	-7.7	0.4	4.5	0.7
2005	-9.9	-0.9	-3.5	-8.9	0.0	4.6	-0.3
2006	-10.7	-1.5	-5.3	-11.5	0.0	5.7	-0.2
2007	-9.7	-1.4	-6.5	-15.2	-0.3	6.7	0.0
2008	-12.1	-2.8	-6.5	-15.1	-1.0	5.6	-1.3
2009	-10.4	-1.9	-4.9	-12.3	-0.8	5.7	0.1
2010	-10.1	-3.4	-1.5	-11.4	-0.8	5.6	0.2
2011	-6.0	-3.0	-2.0	-10.0	-1.0	6.1	0.2
2012	-1.8	-0.4	-2.6	-3.8	-1.2	7.0	1.4
2013	1.5	1.0	2.1	-2.0	-0.9	6.7	2.5
2014	0.1	1.9	1.7	-1.6	-1.1	7.3	2.8
2015	0.4	1.6	10.2	0.1	-0.2	8.5	3.5

Source: OECD

Appendix 5A

Level of GDP per capita and productivity, GDP per hour worked in national currency (current prices), 1995-2015							
	Portugal	Italy	Ireland	Greece	France	Germany	Euro Area
1995	10.4	24.2	20.4	10.6	32.2	32.7	26.1
1996	10.8	25.4	21.6	11.8	32.9	33.6	27.1
1997	11.5	26.5	24.2	13.2	33.9	34.6	27.6
1998	12.0	27.1	27.0	13.8	35.1	35.2	28.2
1999	12.7	27.7	29.4	14.8	35.8	35.8	29.0
2000	13.3	29.1	33.1	15.5	37.7	36.5	30.2
2001	13.9	30.1	36.3	16.7	38.9	38.0	31.4
2002	14.6	30.9	40.2	17.6	41.0	39.0	32.5
2003	15.2	31.6	42.6	19.0	42.2	39.8	33.4
2004	15.9	32.7	44.5	20.2	43.2	40.6	34.4
2005	16.6	33.6	46.1	20.1	44.6	41.5	35.4
2006	17.4	34.2	48.0	21.7	46.8	42.4	36.7
2007	18.2	35.0	49.4	23.0	48.0	43.8	37.9
2008	18.7	35.6	47.8	23.7	48.7	44.2	38.6
2009	18.8	35.5	47.7	23.6	48.5	43.8	38.6
2010	19.5	36.5	49.3	23.8	49.7	45.3	39.9
2011	19.8	37.2	54.3	23.2	50.8	46.7	40.9
2012	19.9	37.6	55.3	22.7	51.5	47.7	41.8
2013	20.6	38.4	54.9	21.9	52.7	49.0	42.8
2014	20.5	38.8	57.5	22.0	53.4	50.1	43.4
2015	21.0	38.9	73.9	21.5	54.0	51.5	44.3

Source: OECD

Appendix 5B

Level of GDP per capita and productivity, GDP per hour worked in national currency (current prices), Annual Growth Rate % 1996-2015									
	Portugal	Italy	Ireland	Greece	France	Germany	Euro Area		
1996	4.2	4.7	5.6	11.4	2.1	2.6	3.8		
1997	6.0	4.5	12.1	11.8	3.1	2.9	1.8		
1998	5.0	2.4	11.5	4.6	0.0	1.8	2.2		
1999	5.7	2.3	9.0	7.0	0.0	1.7	3.1		
2000	4.5	4.8	12.4	5.1	0.1	2.1	4.0		
2001	4.8	3.5	9.6	7.7	0.0	4.0	3.8		
2002	5.0	2.5	10.9	5.2	0.1	2.6	3.5		
2003	3.9	2.4	6.1	8.0	0.0	2.0	2.8		
2004	4.6	3.5	4.4	6.2	0.0	2.1	3.1		
2005	4.5	2.5	3.5	-0.7	0.0	2.1	2.9		
2006	5.0	1.9	4.2	7.9	0.1	2.2	3.6		
2007	4.6	2.4	2.9	6.1	0.0	3.2	3.5		
2008	2.3	1.8	-3.2	2.9	0.0	1.0	1.7		
2009	0.8	-0.3	-0.2	-0.1	0.0	-0.9	0.0		
2010	3.9	2.6	3.2	0.6	0.0	3.2	3.3		
2011	1.1	2.0	10.2	-2.5	0.0	3.1	2.6		
2012	0.6	1.1	1.8	-2.3	0.0	2.2	2.0		
2013	3.5	2.1	-0.7	-3.2	0.0	2.8	2.4		
2014	-0.2	1.1	4.7	0.3	0.0	2.2	1.4		
2015	2.2	0.4	28.5	-2.3	0.0	2.8	2.1		

Source: OECD

Appendix 5C

Unit labor costs, By persons employed (Total Economy), 2010=100, 1995 – 2016								
	Portugal	Italy	Ireland	Greece	France	Germany	EU19	
1995	64.5	-	-	46.8	77.8	94.5	79.6	
1996	66.9	75.8	-	49.5	78.9	94.5	80.8	
1997	69.6	76.0	-	53.9	79.1	93.2	81.1	
1998	72.5	74.4	76.8	57.7	79.3	93.5	81.5	
1999	75.0	74.8	78.1	60.9	80.3	94.4	82.5	
2000	78.3	73.8	80.7	62.6	81.4	95.0	83.3	
2001	81.3	75.7	85.0	65.2	83.4	94.7	84.9	
2002	84.5	78.7	86.5	71.9	85.9	95.3	87.0	
2003	87.3	82.3	90.8	74.6	87.7	96.2	88.9	
2004	88.4	84.3	92.3	77.2	88.5	95.7	89.5	
2005	91.9	86.3	97.3	81.6	90.2	94.7	90.8	
2006	93.1	87.2	101.1	82.7	91.8	92.8	91.6	
2007	94.6	88.3	106.7	86.2	93.3	92.3	92.9	
2008	97.4	92.5	114.6	91.2	96.1	94.9	96.4	
2009	100.4	101.2	109.3	97.3	99.2	100.9	100.7	
2010	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
2011	98.1	101.2	100.7	98.2	100.6	100.6	100.6	
2012	94.4	104.9	102.0	95.3	102.6	103.8	102.6	
2013	96.6	106.3	103.8	88.9	103.4	106.1	103.8	
2014	96.0	106.6	99.1	86.5	104.1	108.4	104.5	
2015	96.6	106.6	82.8	85.0	104.2	110.8	104.8	
2016	98.7	107.0	84.4	87.8	105.1	112.4	-	

Source: Haver Analytics

Source (EU 19): OECD

Appendix 5D

Unit labour costs, By persons employed (Total Economy), Annual Growth Rate %, 1996 – 2016								
	Portugal	Italy	Ireland	Greece	France	Germany	EU19	
1996	3.7	-	-	5.7	1.4	0.1	1.5	
1997	4.0	0.3	-	8.9	0.2	-1.4	0.3	
1998	4.2	-2.1	-	7.0	0.2	0.3	0.4	
1999	3.4	0.6	1.6	5.6	1.3	1.0	1.3	
2000	4.4	-1.4	3.3	2.8	1.3	0.6	1.0	
2001	3.8	2.6	5.4	4.0	2.6	-0.3	1.9	
2002	3.9	3.9	1.7	10.3	3.0	0.6	2.4	
2003	3.4	4.6	5.0	3.8	2.1	0.9	2.2	
2004	1.3	2.4	1.7	3.4	0.9	-0.5	0.7	
2005	4.0	2.4	5.4	5.7	1.9	-1.0	1.4	
2006	1.2	1.0	3.9	1.4	1.8	-2.0	0.9	
2007	1.6	1.2	5.6	4.2	1.6	-0.5	1.5	
2008	3.0	4.8	7.4	5.8	3.0	2.8	3.8	
2009	3.0	9.4	-4.6	6.7	3.2	6.3	4.4	
2010	-0.3	-1.2	-8.5	2.7	0.8	-0.9	-0.7	
2011	-1.9	1.2	0.7	-1.9	0.7	0.6	0.6	
2012	-3.7	3.6	1.2	-2.9	2.0	3.2	2.0	
2013	2.3	1.3	1.8	-6.7	0.8	2.2	1.1	
2014	-0.6	0.3	-4.6	-2.8	0.6	2.2	0.7	
2015	0.7	0.0	-16.4	-1.7	0.1	2.1	0.3	
2016	2.2	0.4	1.9	3.4	0.9	1.5	-	
2004-2008	2.5	2.4	5.6	4.3	2.1	-0.2	1.9	
2008-2012	-0.8	3.2	-2.9	1.1	1.6	2.3	1.6	
Source: Haver Analytics								
Source (EU19): OECD								

Source: Haver Analytics

Source (EU 19): OECD

Appendix 5E

Labor costs per hour in euro, whole economy (excluding agriculture and public administration), 2004-2014									
	Portugal	Italy	Ireland	Greece	France	Germany	EU19		
2004	11.3	22.4	25.5	15.3	28.2	26.8	23.0		
2008	12.2	25.2	28.9	16.8	31.2	27.9	25.3		
2012	13.3	27.7	29.8	15.7	34.3	30.5	28.3		
2013	13.2	28.1	29.8	14.6	34.3	31.0	28.7		
2014	13.1	28.3	29.8	14.6	34.6	31.4	29.0		

Source: Eurostat

Appendix 5F

Labor costs per hour in euro, whole economy (excluding agriculture and public administration), Annual Growth Rate %, 2004-2014									
	Portugal	Italy	Ireland	Greece	France	Germany	EU19		
2004-2008	1.9	3.0	3.2	2.4	2.6	1.0	2.4		
2008-2012	2.2	2.4	0.8	-1.7	2.4	2.3	2.8		
2012	-	-	-	-	-	-	-		
2013	-0.8	1.4	0.0	-7.0	0.0	1.6	1.4		
2014	-0.8	0.7	0.0	0.0	0.9	1.3	1.0		

Source: Eurostat

Appendix 5G

Comparison: ULC Index Growth Rate % Versus Labor Costs per Hour in Euro Growth Rate %								
Time	Data Description	Portugal	Italy	Ireland	Greece	France	Germany	EU19
2004-2008	ULC Index Growth	2.5	2.4	5.6	4.3	2.1	-0.2	1.9
	Labor Costs in Euro Growth	1.9	3.0	3.2	2.4	2.6	1.0	2.4
2008-2012	ULC Index Growth	-0.8	3.2	-2.9	1.1	1.6	2.3	1.6
	Labor Costs in Euro Growth	2.2	2.4	0.8	-1.7	2.4	2.3	2.8
2013	ULC Index Growth	2.3	1.3	1.8	-6.7	0.8	2.2	1.1
	Labor Costs in Euro Growth	-0.8	1.4	0.0	-7.0	0.0	1.6	1.4
2014	ULC Index Growth	-0.6	0.3	-4.6	-2.8	0.6	2.2	0.7
	Labor Costs in Euro Growth	-0.8	0.7	0.0	0.0	0.9	1.3	1.0

Source: Eurostat & OECD

Appendix 5H*

Labor costs per Hour in Euro, whole economy (excluding agriculture and public administration), 2004-2014*								
	Portugal	Italy	Ireland	Greece	France	Germany	EU19	
2004	11.3	22.4	25.5	15.3	28.2	26.8	23.0	
2005	11.5	23.1	26.3	15.7	28.9	27.1	23.6	
2006	11.7	23.8	27.1	16.0	29.7	27.3	24.1	
2007	12.0	24.5	28.0	16.4	30.4	27.6	24.7	
2008	12.2	25.2	28.9	16.8	31.2	27.9	25.3	
2009	12.5	25.8	29.3	16.5	31.9	28.5	26.0	
2010	12.7	26.4	29.6	16.2	32.7	29.2	26.8	
2011	13.0	27.1	29.8	16.0	33.5	29.8	27.5	
2012	13.3	27.7	29.8	15.7	34.3	30.5	28.3	
2013	13.2	28.1	29.8	14.6	34.3	31.0	28.7	
2014	13.1	28.3	29.8	14.6	34.6	31.4	29.0	
*Interpolated								

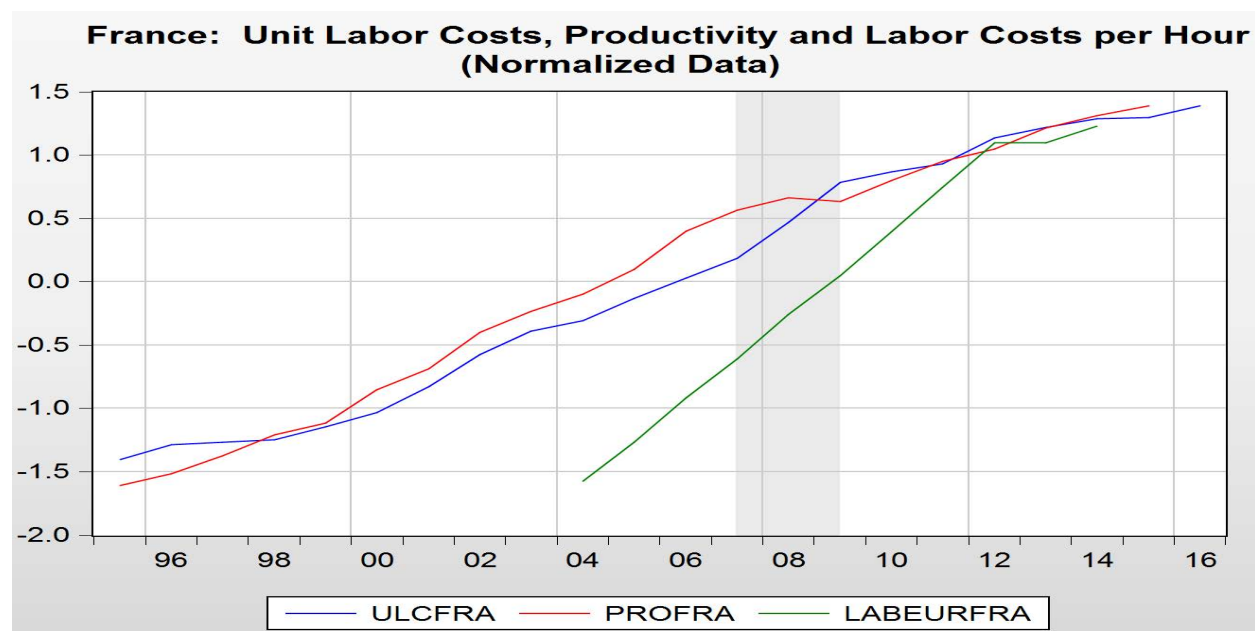
Source: Eurostat

*Methodology:

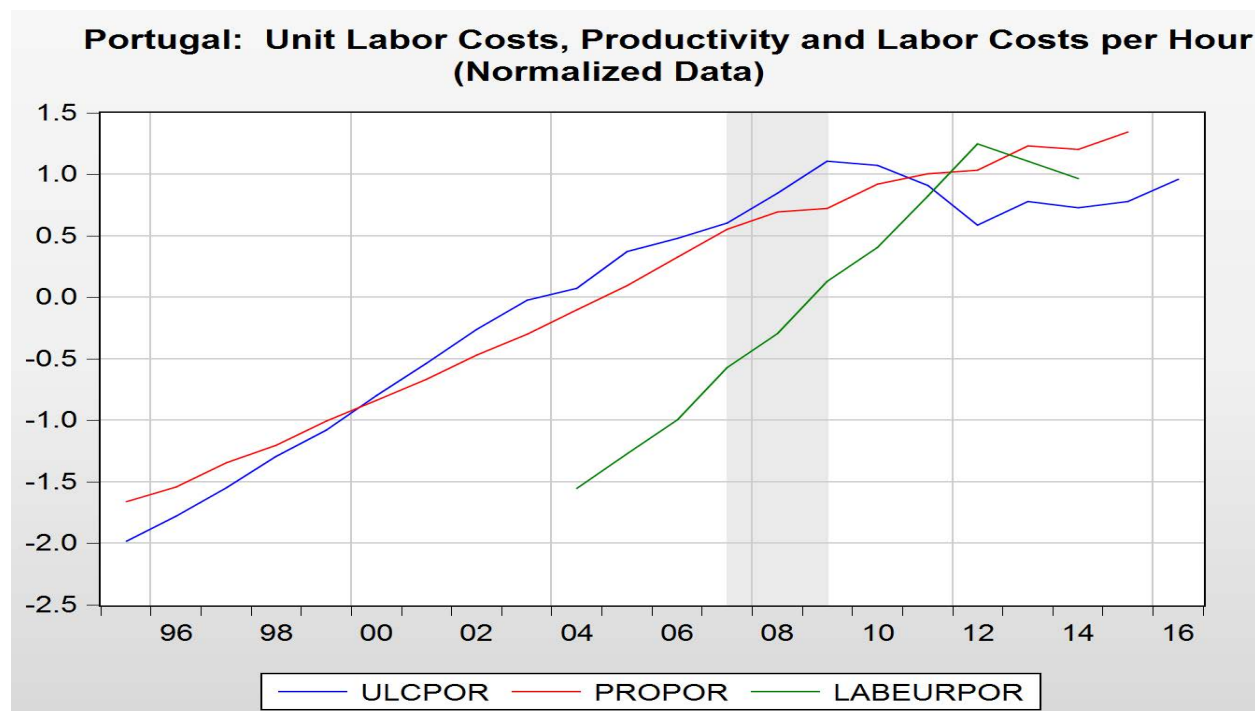
After calculating the annual growth rate percentages for both ULC Index and Labor Costs per Hour in Euro, I determined that the annual percentages in Appendix 5G were comparable. Afterwards, I took the annual growth rates that I have calculated in Appendix 5F, and then did an interpolation between 2004-2008 and again for 2008-2012 for each country and EU19.

More specifically, in the case of Greece, starting from 2004, which 15.3 is the labor costs per hour in euro in Appendix 5E, and then applied the growth rate of 2.3657 (respectively under Greece's column for the 2004-2008 row in Appendix 5f). This allowed me to interpolate the approximate hourly wage rate of 15.7 for Greece in 2005. I followed this procedure over and over to fill in the gaps until I reached 2008. From 2008, I applied the growth rate of -1.6787%, and proceeded with the same steps. Finally, I continued this procedure for each of remaining countries.

Appendix 6A

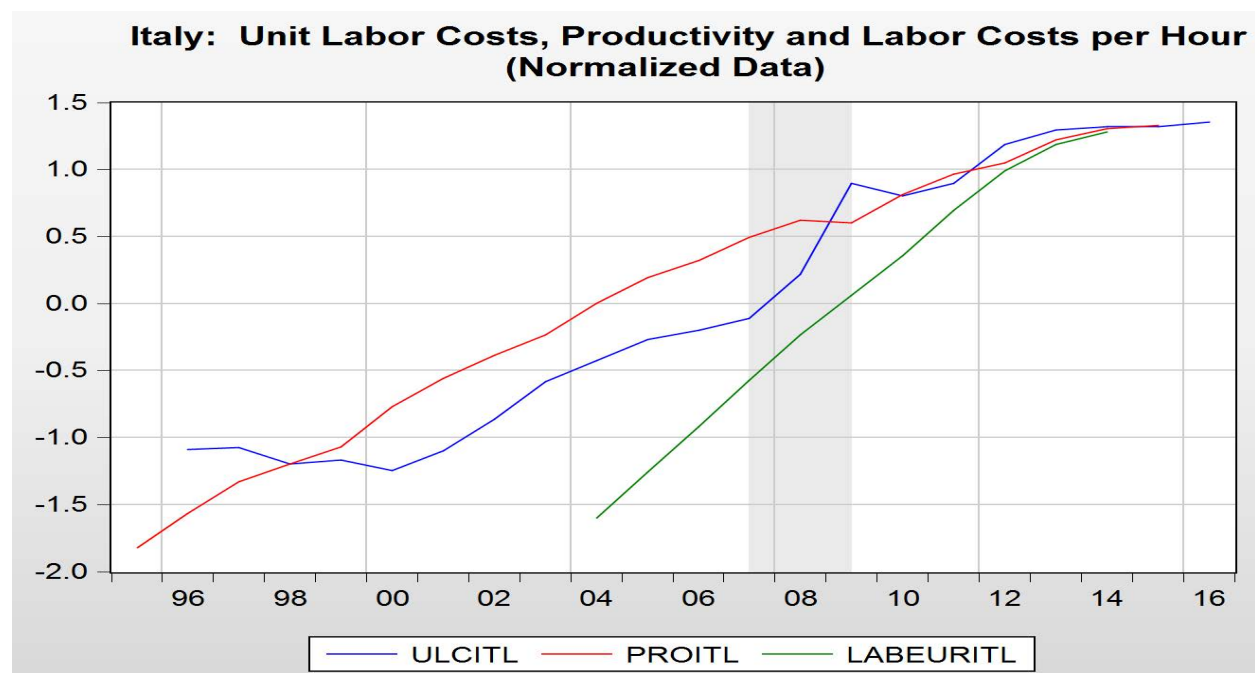


Source: (OECD, Eurostat, and Haver Analytics)
Appendix 6B



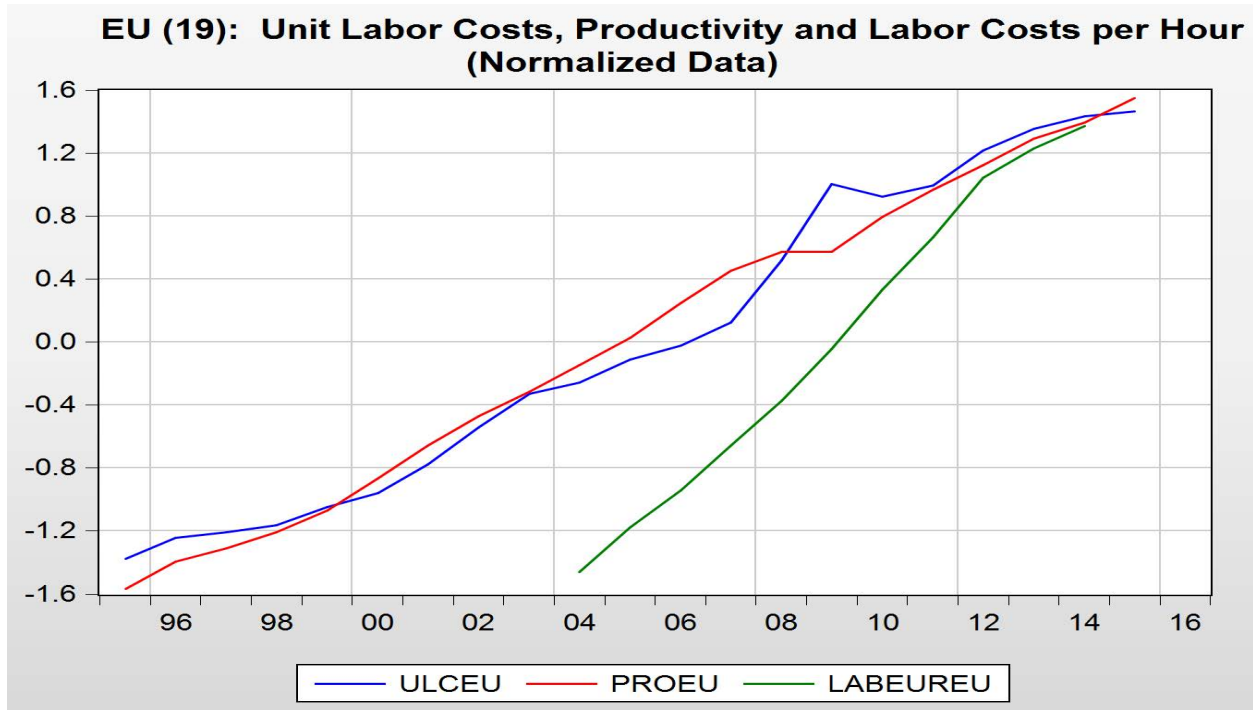
Source: (OECD, Eurostat, and Haver Analytics)

Appendix 6C



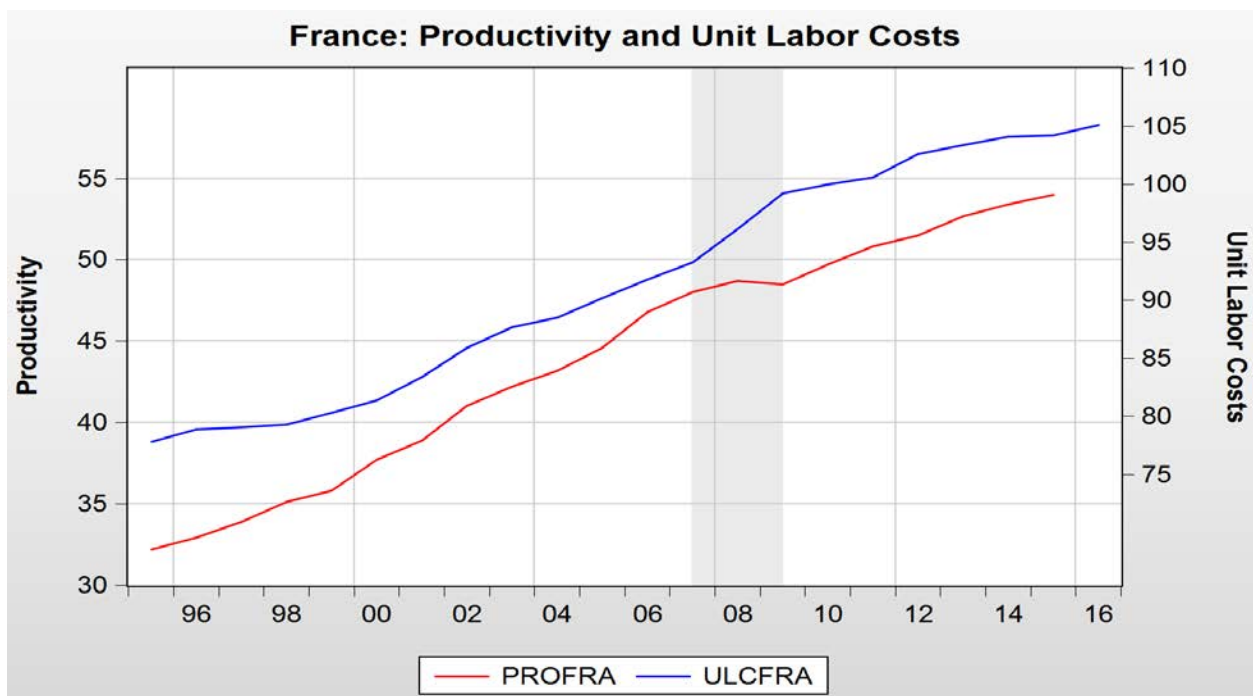
Source: (OECD, Eurostat, and Haver Analytics)

Appendix 6D



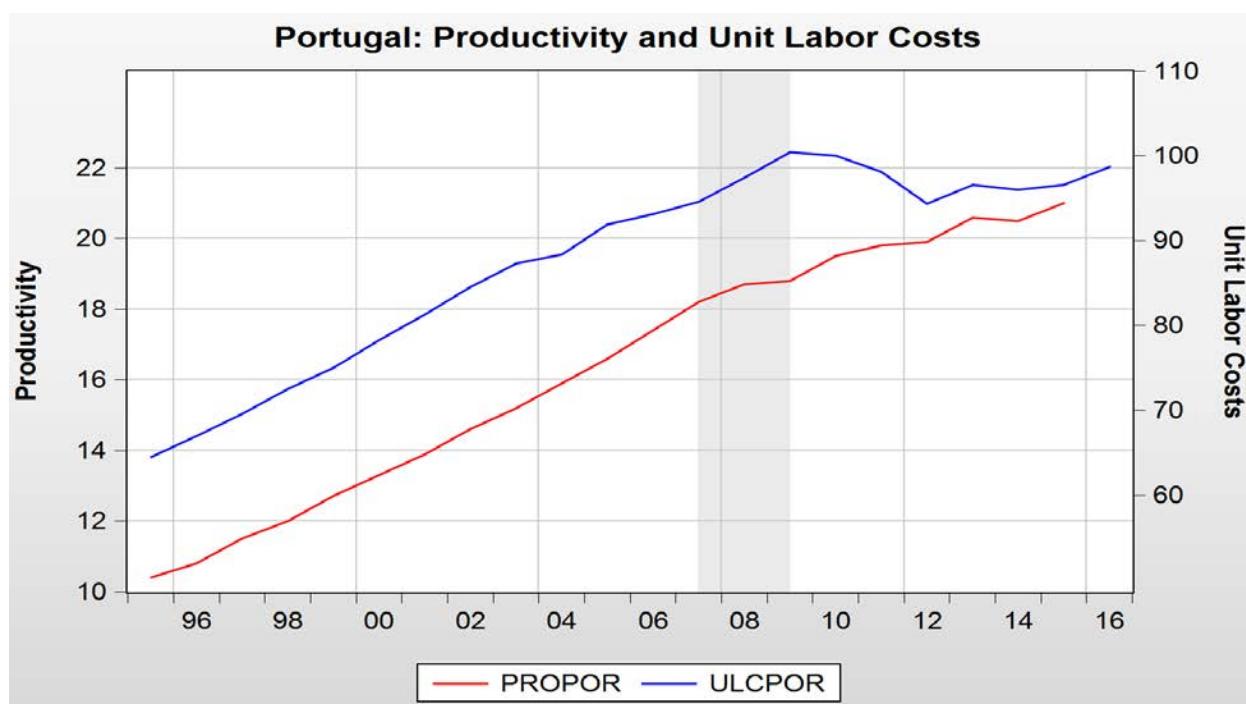
Source: (OECD, Eurostat, and Haver Analytics)

Appendix 7A



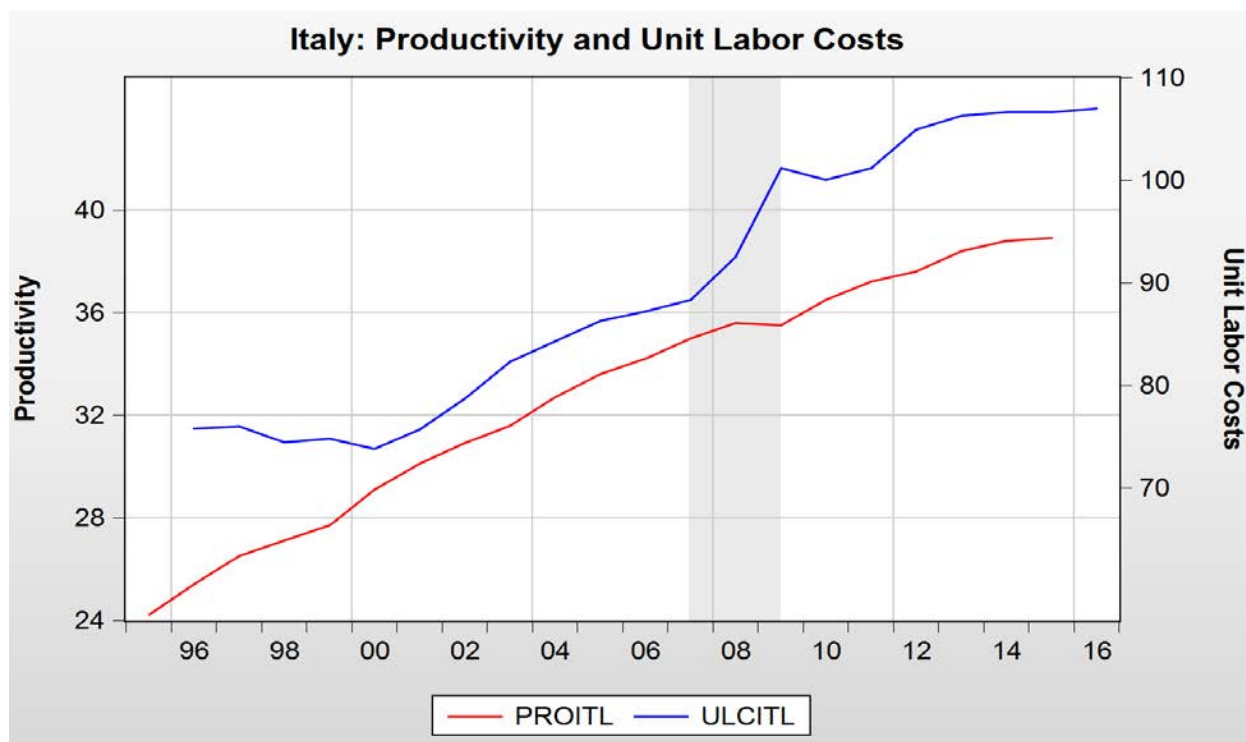
Source: (OECD, Eurostat, and Haver Analytics)

Appendix 7B



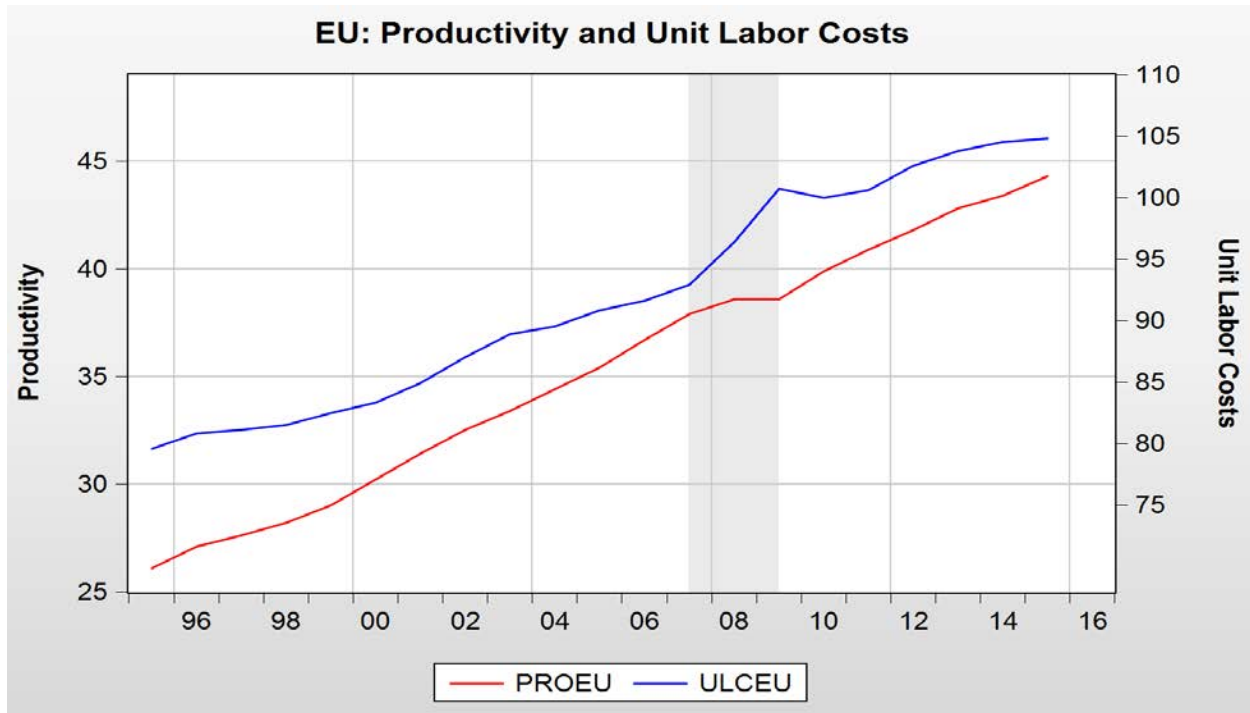
Source: (OECD, Eurostat, and Haver Analytics)

Appendix 7C



Source: (OECD, Eurostat, and Haver Analytics)

Appendix 7D



Source: (OECD, Eurostat, and Haver Analytics)

Data Description

CODE	Data Description	Source
COUNTRY ACRONYM GE → Germany GR → Greece ITL → Italy IRL → Ireland FRA → France EU → Eurozone (19)		
PRO“COUNTRY ACRONYM”: PROGE; PROGR; PROITL; PROIRE; PROFRA; PROPOR; PROITA; PROEU	Level of GDP per capita and productivity, GDP per hour worked in national currency (current prices), 1995-2015	OECD
ULC “COUNTRY ACRONYM”: ULCGE; ULCGR; UCLITL; ULCIRE; ULCFRA; ULCPOR ULCITA; ULCEU	Unit labor costs, By persons employed (Total Economy), 2010=100, 1995 – 2016	Haver Analytics
LABEUR “COUNTRY ACRONYM”: LABEURGE; LABEURGR; LABEURITL; LABEURIRE; LABEURFRA; LABEURPOR; LABEURITA; LABEUREU	Labor costs per Hour in Euro, whole economy (excluding agriculture and public administration), 2004-2014	Eurostat