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BREAKING UP IS HARD TO DO: A BLEAK PORTRAIT OF GREEK EUROZONE
WITHDRAWAL

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ABSTRACT

Since the European Union's earliest incarnations were formed, there has been recurrent skepticism about the idea of a supranational organization to which the countries of Europe have surrendered sovereignty. In the wake of a crippling sovereign debt crisis and the United Kingdom's 2016 vote to exit the bloc, the futures of the EU and its Eurozone currency union have increasingly been called into question. The rise of populist politicians skeptical of the EU's ever-growing influence have been especially critical of its handling of its structurally weakest members, particularly Greece, during the sovereign debt crisis.

Some politicians have gone so far as to argue that by exiting the Eurozone and re-adopting its national currency, Greece would have better prospects for economic recovery and long-term stability. According to economic theory, the new currency could be devalued against the euro, thus improving the trade balance between Greece and its EU partners. Leaving the Eurozone would also allow Greece to implement its own monetary policy, one more in line with the needs of Greece than the Eurozone as a whole. A Greek Eurozone exit would save the European Union hundreds of billions of euros in future stabilization funding, while in theory still allowing Greece the ability to stabilize and recover in a future crisis.

This thesis finds that, based on observations of Greece's historical economic data, devaluation of a new Greek drachma would fail to sufficiently achieve the intended economic recovery, likely leaving Greece worse off than if it had remained in the Eurozone. While stability and growth could potentially be achieved in the long-run, the short-term consequences would be harsh. Long-run success is also contingent on greater Greek fiscal discipline, which Greece has

proven incapable of in the past. Without the governing mechanisms put in place by the EU, Greece would have even less incentive to adhere to debt control and monitoring.

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Chapter 1

Introduction

In the aftermath of the second World War, the leaders of Europe conceived of a grand plan to ensure that the continent would never again be subject to the darkness of division. British Prime Minister Winston Churchill went so far as to call for a “United States of Europe.” The first step, the creation of the European Coal and Steel Community in 1951, was far less ambitious. A simple proposition agreed to by six countries to ensure the fair use of two key components of war sparked the beginning of a supranational organization of twenty-seven members across the continent: the European Union (EU).

The EU and the European Communities that preceded it have seen many expansions (and one possible subtraction) in nearly seven decades. As the EU has grown, so has its power over the domestic affairs of its member states. The European Economic Community (EEC) that was founded in 1957 joined its six members in a customs union, dropping internal tariffs but also taking away member states’ abilities to level country-specific external duties. The birth of the Schengen Area in the 1980s made visa- and passport-free travel possible within the EU’s borders, eliminating costly border checkpoints and creating a boon for tourism. At the same time, labor mobility has been attacked for allowing illegal immigration and terrorism due to a recent surge in migrants seeking asylum. The completion of the single market for goods and services in the early 1990s helped make the EU an economic powerhouse, but some member states have been skeptical of the value they earn in exchange for sizable contributions to the EU budget. In

short, many of remarkable achievements of European integration have been met with their fair share of detractors.

Perhaps the most contentious subject in the development of the European Union was also the one that saw the most sovereignty transferred away from member states: the adoption of a common currency. The creation of the euro area (commonly referred to as the Eurozone) was a response to the potential weight of exchange rate volatility on the economic success of the EU. Previous attempts to peg the various currencies of EEC member states had varying levels of success, reducing fluctuations but unable to completely eliminate exchange rate risk. As the EEC became the EU with the signing of the Treaty on European Union in Maastricht in 1992, all but two member states agreed to drop their sovereign currencies and enter into a currency union utilizing a single currency: the euro. Monetary policy was transferred from member states' central banks to the European Central Bank (ECB) in Frankfurt, with one monetary policy for twelve economies with some significant structural differences. The decision was fraught with concerns for many. The United Kingdom and Germany had substantial reservations about dropping their established and globally respected currencies that carried messages of strength and stability, and the United Kingdom (UK) refused to adopt the euro altogether.

When the transition was made to the euro by participating member states in 2002, the project seemed to be a subjective success. Coupled with the Schengen Area of free movement across European borders, citizens of Europe could travel easily throughout the continent without passports or costly currency exchanges. Companies operating in multiple European countries were free from concerns of currency risk (at least within the EU). Member states' economies benefitted greatly; from 2002 to 2008, the combined GDP of the Eurozone grew by \$1.39 trillion inflation adjusted US dollars, a 12% increase ("DataBank").

By the close of the decade, however, years of economic success turned to turmoil. A financial crisis precipitated by the housing market crisis in the United States made its way to Europe. Over the course of the recession, five Eurozone states (Portugal, Ireland, Italy, Greece, and Spain) were forced to seek financial assistance from the EU and the International Monetary Fund (IMF) or face sovereign default. Soon, the voices of Euroscepticism once again questioned the logic of integration in Europe. The ECB, unable to act as a lender of last resort like the US Federal Reserve, was scrutinized as an institution; could one central bank set one monetary policy that served the needs of every Eurozone economy? Did richer Eurozone states err in offering “easy credit” to poorer ones that could not afford to pay it back? Perhaps the EU flaunted optimal currency theory altogether; by working to unite the EU as an economic force to the outside world, did it ignore fundamental differences amongst its member states by joining them in a currency union (DeGrauwe 5)?

Eurosceptics used these questions to target Greece, the country hit hardest by the onset of the crisis. Upon entering the Eurozone in 2002, Greece’s economy performed well. With the exception of 2005 and 2008, Greece’s GDP growth outpaced that of the entirety of the Eurozone in the aforementioned period from 2002 to 2008 (“DataBank”). However, as the global economy crashed, Greece’s lack of fiscal discipline became apparent. For years, its government revenues were overrepresented, resulting in ballooning deficits and ultimately unsustainable public debt. By 2008, Greece’s debt-to-GDP ratio had reached 117.4% despite promising to reduce the level in exchange for being allowed to join the Eurozone on time (“General Government Data”). During the recession, Greece experienced six consecutive years of economic contraction from 2008 to 2013, and it has failed to achieve a sustainable recovery since (“DataBank”). Funding from the IMF and the EU on the condition of budgetary austerity measures have stabilized

Greece's situation, but the path forward remains uncertain. Because of this, the idea of a "Grexit," or Greek Eurozone exit, have often been floated as a tool for a more sustainable economic recovery.

The idea, posed by both EU politicians and Eurosceptic scholars, holds that outside the Eurozone, Greece could have more control over its economic recovery and economic future. A sovereign currency could be devalued competitively against the euro, allowing Greece to increase exports and reduce imports, improving GDP. Doing this would also restore Greece's monetary independence, allowing it to set monetary policy more in line with its needs rather than those of the Eurozone as a whole. The goal of this thesis is to quantify the former argument.

In the first portion of this thesis, the foundations of this debate will be further contextualized. After a discussion of Greece's modern economic history, the process that brought about a common currency in Europe will be examined. Existing literature on the topics of Eurozone design failures, currency union exits, alternative theories on the Eurozone's future, and the potential outcomes of a "Grexit" will be analyzed. In the latter portion, this thesis will attempt to quantify the impact of Greece's Eurozone exit based on its historical economic data using a linear regression model. After presenting the results of this model, some qualitative conclusions will be offered along with potential areas for future research. Based on the data analyzed, it appears unlikely that Greece's economy would benefit from a currency union exit, especially absent substantive economic reforms.

Chapter 2

Brief Overview of Greece's Economy After World War II

2.1 Emerging from World War II and Civil War

Greece emerged from Axis occupation in the second World War only for fighting to begin once again several months later. Communist guerilla factions claimed a provisional government in a challenge to Greece's exiled king in late 1944 and staged a rebellion that was quickly quashed with the aid of the United Kingdom. After elections restored the king to power, communists took the civil war underground before launching a guerilla war against royalist forces in late 1946. The UK and later the United States further backed Greece, and the communist threat was neutralized by October of 1949 ("Greek Civil War"). With a fully-entrenched monarchy restored, Greece made further advances towards the West, and the country joined the North Atlantic Treaty Organization (NATO) in 1952 ("Europe: Greece").

On the economic side, Greece entered a period referred to as its "economic miracle." From 1960-1973, sustained economic growth averaging about 8% annually outpaced many of Greece's comparable peers in Europe's periphery (Romei). Inflation was relatively low over the course of this period as well, with an average of 3.7% in the 1960s ("DataBank"). Labor productivity grew as Greece became an attractive target for high-return, low-risk investments with fairly low taxes. While much of Europe also grew over this period, Greece led the pack in many respects (Romei).

2.2 Democratization and Global Crisis

Respectable economic success was accompanied by domestic political turmoil. A 1967 military coup forced the king from power, leading to seven years of military dictatorship. While Greece's growth was resilient to this regime change, it began to falter when the dictatorship collapsed in 1974 ("Europe: Greece"). Global economic turbulence combined with Greece's domestic uncertainty forced a contraction of nearly 6.5% in 1974 and inflation at a staggering level of 26.56% ("DataBank"). Greece has never since attained the levels of GDP growth seen in the 1960s.

The fall of the military dictatorship in Greece and the abolition of the monarchy ushered in a new democratic constitution in 1975. A parliamentary republic was established by popular referendum, and Greece subsequently applied for membership in the European Economic Community in 1975 ("Europe: Greece"). Despite working to ensure economic alignment with the EEC, which it ultimately joined in 1981, recession hit Greece in 1979. Nearly a decade of stagnation ensued that caused net neutral economic growth and falling GDP per capita. At this point, cracks in Greece's economy that would lead to catastrophe in 2008 were beginning to form. Easy, deficit-driven fiscal policy led to growing public debt and high inflation while failing to stimulate productivity or growth. Additionally, Greece made its tax code more and more complex, leading to tax evasion that contributed to less-than-sufficient government revenues (Romei).

2.3 Into the Euro: A Reversal of Fortunes

With a common currency a critical goal of the newly-reorganized European Union, Greece found itself with a reason to get its fiscal act together. Greece reversed course on years of debt-driven fiscal policy, aiding in a reduction of inflation from 20.43% to 2.64% over the course of the 1990s (“DataBank”). Nonetheless, Greece struggled to meet the convergence criteria mandated by EU treaties. At the decade’s close, government debt was still at 96.8% of GDP, significantly higher than the required 60% ratio (“General Government Debt”). On promises of continued fiscal prudence, Greece was permitted to join the Eurozone in 2001, ahead of the euro’s 2002 debut, despite not fulfilling the requirements.

Greece’s Eurozone entry coincided with a new period of consumption-driven economic growth. The government leaned into the boom, returning to previous patterns of deficit spending at a faster pace than its Eurozone partners. Still, Greece’s growth made the fiscal concerns easy to ignore; GDP grew every year from 1994 to 2007, its longest period of sustained growth since the 1960s. These concerns would not be ignored for long.

2.4 Collapse and Rebuilding

As the subprime mortgage crisis began in the United States, triggering a global banking crisis, Greece started to feel the heat. The crisis and ensuing bailouts worldwide drove up the costs of borrowing, and Greece was suddenly unable to deal with its steadily mounting debt. When George Papandreou gained the Greek premiership in late 2009, a review of Greece’s books revealed that budget deficits would soon eclipse 15.4% of GDP. Concerns about Greece’s ability to service its debt caused credit rating agencies to drop Greece to “junk” status early the

following year. In exchange for €30 billion in promised budget cuts, Greece was forced to request and receive a combined €110 billion bailout from the IMF and the EU (“Greece’s Debt”).

The austerity measures, while necessary to impose fiscal restraints on a struggling Greece, were painfully felt by its citizens. Discussions of a second bailout sparked a proposed referendum on its approval. Though this referendum was dropped, Mr. Papandreou was forced from his position and was replaced by Lucas Papademos as the leader of an emergency unity government. The second joint bailout, worth €130 billion, was approved in February of 2012. With it, Greece received a debt write-down of 53.5% of private bonds in exchange for an agreement to cut its debt-to-GDP ratio to 120% by 2020 (“Greece’s Debt”)¹.

In elections several months later, Greek voters rebuked their country’s political establishment, supporting Eurosceptic parties opposed to the continued austerity provisions of the bailouts. While the center-right was restored to power in new elections with bailout-supporting Antonis Samaras assuming power, the rumbles of Euroscepticism had been heard. The government secured revisions to the second bailout in late 2012 that reduced its interest rates. Greece’s parliament doubled down on austerity in 2013 but at a high public cost; 25,000 Greek civil servants were laid off, and the wages of remaining government employees were slashed. Nonetheless, the situation in Greece seemed to be taking a turn for the better. The country issued €3 billion worth of bonds on April 10, 2014 with five-year maturities and a yield of less than 5%, far lower than expected given the country’s situation (“Greece’s Debt”). Greece’s economy grew in 2014, at a rate of 0.74%, for the first time since 2007 (“DataBank”).

¹ In 2017, the most recent year for which data is available, Greece’s GDP ratio was 188.73%, 24.62 points higher than it was when the second bailout was agreed to (“General Government Debt”).

Uncertainty returned to Greece in 2015, however. Elections in January led to victory for the Syriza party, a left-wing group opposed to austerity. Upon taking office, new Prime Minister Alexis Tsipras promised a renegotiation of Greece's bailout terms and expressed openness to leaving the Eurozone altogether absent a "better deal." In June, the IMF bailout expired, and Greece missed a payment of €1.6 billion. Capital flight became a significant concern, and capital controls constraining bank withdrawals to €60 per day were put into place. After a series of tense negotiations with the EU, Mr. Tsipras secured a third bailout package (without IMF support). The package was overwhelmingly rejected in a July referendum in Greece, though the package was accepted in parliament anyway. The third bailout, worth €86 billion, was approved in August. Debt service remained tenuous as time passed. By 2017, the IMF cautioned further debt restructuring or relief as Greece's economic growth was hampered by several waves of harsh fiscal austerity. The economy's structural weakness contributed to rising poverty, putting pressure on Mr. Tsipras as he continued to double down on austerity ("Greece's Debt").

When Greece exited its third bailout program in August of 2018, the EU declared the process a success. Nonetheless, Greece's economy in 2017 was more than 25% smaller than it was at its peak in 2007 ("DataBank"). Greek unemployment, though falling, still tops the EU at 20%, and the country owes about €290 billion to the EU and the IMF ("Greece's Debt").

Fiscal austerity and the possibility of even more debt relief in the future raises doubts about Greece's prospects for a true, healthy economic recovery. While austerity has been harsh, its necessity arose from several periods in Greece's recent economic history that have highlighted its inability to adhere to fiscal discipline. While prevailing theory suggests that balanced budgets aren't necessary for long-term fiscal health, it also states that it is better for governments to avoid deficit spending in periods of sustained growth. Doing so promotes easy

credit, and subsequently debt accumulation. Finally, in a period of recession, a country should opt for deficit spending to promote economic recovery. When recession hit Greece, deficit spending was highly ineffective and greatly threatened the quality of its sovereign debt. Therefore, in the last ten years, both deficit spending and fiscal austerity were necessary in Greece, and austerity in exchange for bailouts won out. Eurosceptic parties capitalized on anger in the Greek population over what they perceived as the Greek government “kicking them while they were down” with budget cuts in a period of severe recession. This has created the opening for, and several near misses with, Grexit. As subsequent chapters will suggest, the European Union will seek to solve the crisis and those that follow as it historically has: with further integration of the European continent, rather than the divergence some have sought.

Chapter 3

A History of Economic and Monetary Union in Europe

3.1 The Werner Report to EMS: The Beginning of Currency Integration

Achieving currency stability across the member states of the European Communities was a long-standing goal from the earliest stages of integration. The years immediately following World War II proved fruitful for this goal, with the Bretton Woods system replacing the gold standard as the principal system of currency security. Following the well-known collapse of Bretton Woods in the late 1960s, European leaders again turned their attention to stabilizing currencies across its growing union of countries. They commissioned a report, agreed to in 1971, by Luxembourg Prime Minister Pierre Werner to discern the feasibility of establishing an Economic and Monetary Union (EMU) in Europe.

Werner's report was presented in three stages to be completed over the course of ten years. The first stage commenced in 1971 with the goal of narrowing fluctuations between the currencies of member states. Global economic instability in the 1970s made the first-stage targets difficult to implement ("The History of the Euro"). While the initial framework proposed by the Werner Report was abandoned, the principles it set out are broadly viewed as the first steps towards the adoption of a common currency in Europe.

Further debate over the future of EMU continued throughout the 1970s. An ambitious plan proposed by then-European Commission President Roy Jenkins in 1977 was met with criticism. Discussions over a scaled-back plan continued, and a plan with the support of France

and Germany went into effect in 1979 as the European Monetary System (EMS) (“A History of European Monetary Integration” 3). EMS was based in two newly created components. The first was the European Currency Unit (ECU), a weighted average of a basket of currencies of member states. The second was the Exchange Rate Mechanism (ERM), which set an exchange rate target for each member state using the ECU as a base “currency.” Convergence under the EMS took off in 1983, when France chose to bring its monetary policy in line with Germany’s, bringing inflation and interest rates down.

3.2 A Community Becomes a Union: An Appetite for Integration

The economic power of the EEC was waning as the 1980s opened. The addition of Greece in 1981 grew the EEC to ten member states from its original six. Despite the growth in size, the bloc was inhibited by the continued presence of protectionist trade practices among individual states, hurting its global competitiveness. The UK, who saw its application for membership effectively vetoed twice by France before being admitted, held a referendum on whether or not to leave it in 1975 after joining just two years earlier. While choosing to remain, British skepticism led to the pursuit of an ambitious rebate program by Conservative Prime Minister Margaret Thatcher, further damaging the EEC’s ability to wield global power. In the wake of this weakening, European leaders agreed that ambitious and unprecedented further integration was necessary to restore Europe’s competitiveness in the global economy.

The result was the Single European Act of 1986, which resolved to create a Community-wide “single market” for goods and services. Fully implemented by 1992, the plan abolished nearly all barriers to trade within members of the EEC and further strengthened its ability to

negotiate trade agreements as a bloc with other countries of the world. In the wake of this new wave of integration, it became apparent that currency instability remained the most significant obstacle to a truly complete single market. Thus, under the leadership of then-European Commission President Jacques Delors, the idea of Economic and Monetary Union was revisited in a more serious way. He returned a report in 1989 that defined a new three-stage plan, described in Table 1, for completing EMU.

Table 1. The Three Stages of EMU (“The History of the Euro”)

<i>First Stage (1990-1994)</i>	Completed the single market, including the critical introduction of free movement of capital
<i>Second Stage (1994-1999)</i>	Developed the framework for the European Central Bank (ECB)
<i>Third Stage (1999-present)</i>	Exchange rates fixed, euro introduced as an accounting currency, and finally as consumer currency in 2002

As the Berlin Wall and the Soviet Union fell, feelings of unity on the European continent surged, and the countries of Europe bound themselves even more tightly together. In late 1991 in the Dutch city of Maastricht, the leaders of the member states approved the Treaty on European Union (TEU). The treaty reflected an appetite for integration, and began steps that gave what then became the European Union more influence over policy areas traditionally reserved for the governments of member states. On the economic front, the treaty strongly endorsed the Delors Plan for EMU. By enshrining the plan in one of the bloc’s functioning treaties, EMU and the creation of a single currency would finally become a reality (“The History of European Monetary Integration” 4).

The Treaty on European Union also added further detail to the role of centralized monetary policy and defined the convergence criteria for countries adopting the euro. The European Central Bank’s primary goal would be to ensure price stability, in contrast with the US

Federal Reserve's dual mandate of price stability *and* low unemployment. The convergence criteria were determined with the purpose of ensuring the stability of the new currency, as Table 2 affirms.

Table 2. Convergence Criteria (TEU)

<i>Price Stability</i>	Prices of member state cannot exceed by more than 1.5% those of the three best-performing member states in terms of price stability
<i>Government Finances</i>	Amount of government deficit cannot exceed 3% of GDP, and amount of government debt cannot exceed more than 60% of GDP
<i>Exchange Rates</i>	Member state must hold currency within fluctuation constraints of European ERM and cannot devalue against currency of any other member state
<i>Long-Term Interest Rates</i>	Nominal long-term interest rates cannot exceed by more than 2% those of the three best-performing member states in terms of price stability

As the launch of the euro grew closer, skepticism regarding the creation of the Eurozone persisted. Countries with strong currencies worried over stability. The United Kingdom secured an opt-out from the euro to protect the pound sterling, while Denmark opted out in order to ensure that TEU could be ratified (a first referendum on ratification failed before the treaty was ultimately accepted). For the first time, European integration began progressing on two different tracks, opening windows for other member states to attempt to pick and choose provisions in which to participate.

Concerns about whether the convergence criteria could actually be met were also present. In 1997, only three member states- Finland, Portugal, and Luxembourg- had met the convergence criteria. Germany, another member with a strong currency and a history of fiscal discipline, expressed concerns about stability. Conversely, growth-oriented countries like France and Spain expressed doubts that Germany's conservative approach would be conducive to future growth. To quell these issues, both grievances were addressed in the 1996 Stability and Growth

Pact. Crucially, the pact committed member states to maintaining the economic targets set by the convergence criteria even after joining the euro (“A History of European Monetary Integration” 5). As the sovereign debt crisis over a decade later would indicate, several countries would fail to keep this commitment.

Further preparations for the completion of EMU continued, and exchange rate worries stabilized. On January 1, 1999, the euro officially came into existence as an accounting unit, operating alongside national currencies that remained in circulation². The third stage of EMU was completed on January 1, 2002, when euro coins and banknotes entered circulation. National currencies were phased out entirely by the end of February 2002, completing the largest currency changeover in history. The transition was relatively seamless due to the public’s interest in the euro project; 9 billion national banknotes and 107 billion national coins were exchanged for 14 billion euro notes and 52 billion euro coins (“The History of the Euro”). Six waves of Eurozone expansion occurred between 2007 and 2015. Of the EU’s twenty-eight member states, nineteen are members of the Eurozone (Table 3), seven are prospective members that have joined the EU since TEU and can join after fulfilling the convergence criteria, and two (Denmark and the UK) have permanent opt-outs.

Table 3. Eurozone Membership

<i>Year of Entry</i>	<i>Member States Entering</i>
1999	Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain
2001	Greece
2007	Slovenia
2008	Cyprus, Malta
2009	Slovakia
2011	Estonia
2014	Latvia
2015	Lithuania

² Germany began circulating euro coins and notes in 1999 and phased out all deutsche marks, three years ahead of other member states.

3.3 The Euro in Peril

The crisis in the Eurozone began much like how the global economic crisis developed. Economic “bubbles” had been growing throughout the 2000s, particularly in construction in the case of the Eurozone (“A History of European Monetary Integration” 6). These bubbles generated revenue for the governments of member states that were essentially artificial. In turn, governments boosted spending levels on the basis of false revenues. When the bubbles “burst,” the reality of ballooning government debt became apparent. At the onset of the crisis in 2008, debt-to-GDP ratios were at 117% in Greece and 113% in Italy, nearly double the 60% required by the convergence criteria and Stability and Growth Pact (“General Government Debt”).

Flaws in credit management and lending were also exposed by the crisis. Credit rating agencies drastically underpriced the risk of debt in Eurozone countries, causing euro area sovereign bond yields to converge. The cost of credit was also cheaper than warranted, perpetuating a “negative feedback loop” of banks lending to countries in the Eurozone periphery that had weak prospects for repayment (“A History of European Monetary Integration” 6).

It should be noted that the sovereign debt crisis was fundamentally misdiagnosed by European leaders. In all cases except Greece, the issue stood with private debt accumulation rather than public. When private sector debts grew to an unsustainable level, banks, firms, and households were forced to deleverage by reducing their levels of debt. As private entities deleveraged by selling assets, asset prices fell, putting other private entities at risk of default. A deflationary spiral ensued, which can only be stopped by governments voluntarily taking on more debt. The EU’s policy of imposed budgetary austerity thus damaged economic recovery and exacerbated the crisis (De Grauwe 12).

No matter the cause, the results of the crisis were devastating (Figure 1). The aggregate gross domestic product (GDP) of the Eurozone declined 4.5% from 2008 to 2009. The recovery was slow and bumpy; after an initial climb from 2009 to 2011, the Eurozone contracted again from 2011 to 2013 before entering a more sustained recovery (“Data Bank”)

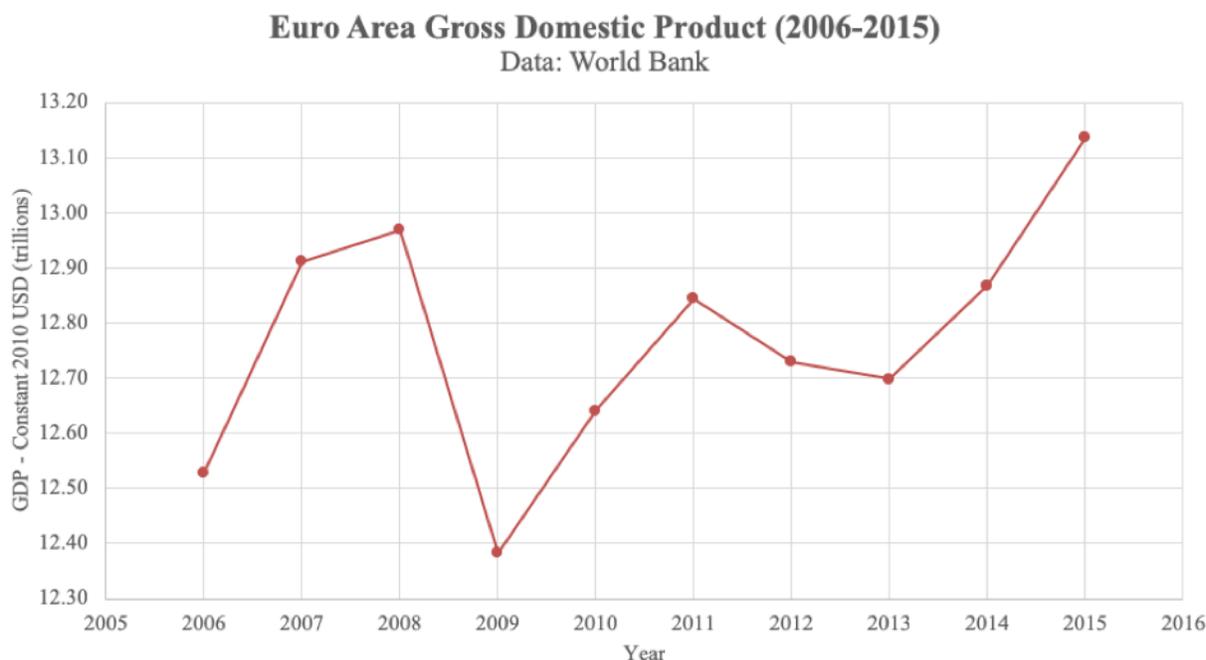


Figure 1. Euro Area GDP 2006-2015 (trillions of 2010 USD)

3.4 Integrating or Disintegrating? The Future of the Euro

In its aftermath, the financial crisis reignited the passions of scholars and politicians who were skeptical of the results of European integration. The Eurozone became an easy target for so-called Eurosceptics as a critical example of the overreach of supranational power in traditionally domestic affairs. Nonetheless, the EU has remained committed to its long-term goals, including the promotion of stability within the Eurozone. In responding to the crisis, new institutions were created with the goal of creating a roadmap for the future.

In June of 2010, the EU formed the European Financial Stability Facility (EFSF) as an emergency “backstop” for distressed Eurozone members, directing support to Ireland, Portugal, and Greece. The EFSF issued bonds in order to finance assistance to member states. EFSF was succeeded by the European Stability Mechanism (ESM), a permanent institution for economic assistance, in October of 2012. The assistance provided by the ESM is accompanied by strict economic reform requirements. Together, these institutions provided €250 billion during the financial crisis (“About Us”).

Eurosceptics have taken issue with the permanence of the ESM. Despite the fact that no taxpayer funds are used for bailout funding, many are uneasy about the level of risk assumed through debt issuance. Additionally, as Chapter 3 noted, the ESM further entrenched the EU into the affairs of its member states. Throughout its three-year recovery program, the ESM has disbursed €61.9 billion to Greece and now holds over half of its public sector debt; only €2 billion has been repaid to date (“Greece”).

Indeed, Euroscepticism has gained traction in European politics, putting the future of the Eurozone in doubt. In the most recent elections in 2014 to the European Parliament (EP), the EU’s directly-elected body of representatives from all twenty-eight member states, three Eurosceptic coalitions earned 170 of 751 seats, a dramatic uptick (Archick). Such coalitions as the European Conservatives and Reformists Group (ECR) have directly advocated for Greece’s withdrawal from the Eurozone.

The idea for this thesis was drawn from the political viewpoints of Dr. Bernd Lucke, a Member of European Parliament (MEP) from Germany. Dr. Lucke’s party, Liberal-Konservativen Reformer (LKR), is a member of the ECR coalition in the European Parliament.

LKR's Eurosceptic ideas for the future of the euro are immediately apparent upon viewing their website (translated from German):

The euro is an inappropriate currency for Europe. The richer euro countries are growing because the euro is undervalued for them. The poorer euro countries are no longer competitive in the euro. The desire for more and more redistribution to preserve the euro system will lead to a split. ("Startseite")

Ideas such as Dr. Lucke's plan for Greece to leave the Eurozone have continued to gain traction in the European Parliament, but appetite for them amongst the citizens of Europe will be tested again in the upcoming 2019 EP elections.

Optimistic, pro-EU politicians have offered different solutions for the future of the euro. French President Emmanuel Macron has offered ambitious ideas to strengthen the structure of the Eurozone, answering calls that the currency union is unlikely to succeed without further integrating its fiscal and monetary functions. President Macron has suggested equipping the Eurozone with its own parliament and bureaucratic structures, including a Eurozone finance minister to shepherd a Eurozone-wide budget. He also suggested a unified Eurozone tax policy to reduce inequality, a universal minimum wage, and an aid-funding international transaction tax. Some scholars such as Paul DeGrauwe that have suggested that only fiscal integration will save the Eurozone have advocated similar proposals. With Macron's ambitions come significant headwinds; even fellow pro-EU politicians such as German Chancellor Angela Merkel have expressed uncertainty about further losses of fiscal sovereignty, a critical ideal for Germans (Chrisafis and Rankin).

The European Union travelled a long and difficult path en route to monetary integration, as it did in many other areas of its jurisdiction. The resulting euro currency has aided in the

completion of the EU's single market, reduced exchange rate risk and transaction costs, and improved ease of travel for European citizens. Nonetheless, structural failures in the Eurozone's design, irresponsible public and private debt accumulation, and countries failing to follow and maintain the convergence criteria have caused considerable peril in the wake of the most recent recession. While the future is far from certain, one thing is: those who fail to learn from history and adapt from past failures are doomed to repeat it.

Chapter 4

Review of Existing Literature

A comprehensive review of existing literature on the subject of a potential Eurozone exit provides a strong foundation for the objective of this thesis. Several studies have examined Argentina's exit from a currency board and the signals the event may indirectly offer for Greece, while others have argued for and against a so-called "Grexit" directly. The foundational element of this debate, the rising tide of Eurosceptic populism in the last decade, has also been analyzed in depth in existing literature. A brief discussion in this section of Euroscepticism among European politicians and their constituents is necessary to contextualize the debate over Eurozone secession. Finally, the merits of existing qualitative and quantitative literature regarding the impacts of a currency union exit both on the exiting country and those that remain must be debated and discussed.

An April 2018 analysis by Pirro et. al. attributes the recent convergence of Euroscepticism and populism to three distinct crises in the European Union (EU): the migrant crisis, the "Great Recession," and the United Kingdom's decision to withdraw from the EU. The authors argue that while left-wing populist parties have long crusaded against the negative socioeconomic impacts of the EU, right-wing populist parties have capitalized on the recent crises by attacking the EU as a body that deprives members of national sovereignty to form an illegal, supranational system of governance. Different parties have also had varying levels of success in diffusing their Eurosceptic beliefs. For example, the UK Independence Party's (UKIP) electoral success put pressure on the governing Conservative Party to call a referendum on the

country's EU membership. In this paper, Pirro et. al. presents a strong, multi-faceted analysis of the recent prevalence of Euroscepticism. By capitalizing on one of the three current crises (the Great Recession), Eurosceptic politicians have gained relatively strong popular and electoral success, and their voices have grown louder.

In 2015, Lanzavecchia et. al. wrote a more targeted attack on the euro itself as a “purely political project” that shrinks democracy (135). The authors portray the single currency as a means to an end of creating a federal “United States of Europe.” Indeed, efforts have been launched in the last several years to more deeply integrate the economies of Eurozone member states. French President Emmanuel Macron's plan, described in Section 3.4, is a good example of this notion. This idea is cheered by some academic circles, including in a 2017 article authored by Hans Geeroms. Geeroms favors an ambitious plan for a Eurozone budget and other macroeconomic reforms to be implemented by a centralized finance minister, as well as the completion of planned banking and capital markets unions. Lanzavecchia et. al. would likely denounce the Geeroms plan as an attack on the national sovereignty of member states. In their view, such a proposal would abandon the democracy of mass-politics in Europe in favor of the creation of a European nation-state with significant economic power (Lanzavecchia et. al. 142). Geeroms, on the other hand, supports his proposal by reminding his audience that the Eurozone, structurally not an optimal currency area (OCA) as defined by prevailing theory, is doomed to repeat its devastating sovereign debt crisis without serious reform.

To understand why the Eurozone must be “saved” or why struggling countries must exit, (depending on one's perspective), one must understand why the Eurozone fails to meet the criteria of an OCA. Fritz Breuss wrote the article *Downsizing the Eurozone into an OCA or Entry into Fiscal Transfer Union* to explain the crossroads reached in the sovereign debt crisis.

Fundamentally, the Eurozone is plagued by differing business cycles among member states as well as its hesitancy to institute a fiscal transfer union. To have a consistently stable and functioning OCA, Geeroms might argue further integration is necessary in order to achieve business cycle harmony. Such harmonization would make the European Central Bank (ECB) more effective in setting an interest rate policy that works for all member states.

Several competing arguments regarding OCA theory and the Eurozone have been made, including currency union scholar Andrew K. Rose's view that the Eurozone has naturally been moving towards becoming an OCA. Rose's 2008 commentary *Is EMU Becoming an Optimum Currency Area?* argues that there is a direct link between business cycle synchronization and increased international trade ties. At the time that analysis was published, Rose's survey of economic research revealed that intra-Eurozone trade had increased anywhere from 8-23% since the euro's introduction in 1999³ (Rose 1). Strengthening trade ties among member states coupled with the integrative effects of EMU's introduction seemed to be setting the Eurozone on the path towards business cycle synchronization.

The date of Rose's study must be considered, however. In the ten years since it was penned, a crippling global financial collapse and a mismanaged sovereign debt has once again called the Eurozone's OCA status into question. A 2017 paper by Gomez et al. presented some interesting observations regarding business cycle synchronization in the wake of the crisis. The authors argue that the occurrence of the crisis indicated a synchronization of the Eurozone economies as they all slipped simultaneously into recession. On the whole, the member states can be grouped into two general groups of business cycle synchronization, with the second group

³ The euro became an accounting currency in global financial markets on January 1, 1999. Physical coins and banknotes first entered circulation on January 1, 2002.

generally following a more independent path. Interestingly, the authors reject the traditional designations of Eurozone core and periphery countries. For example, countries such as Italy and Spain, generally considered peripheral, are more in step with the “synchronized group” than so-called core countries like the UK and Germany, who are more economically independent (Gomez et al. 983-984). On the whole, the findings of Gomez et al. point to patterns of synchronization in the Eurozone, but refutes Rose’s belief that increased trade as a result of EMU has brought the entire Eurozone economy into lockstep.

With the benefit of hindsight, Paul de Grauwe wrote an analysis of the Eurozone’s critical design flaws in 2013 that indirectly contradicted Rose’s account. De Grauwe notes that the Eurozone’s incomplete integration of economic decision-making failed to integrate the “boom and bust dynamics” of member states (6). In fact, he asserts that absent such integration of fiscal decision-making, the presence of EMU actually *exacerbated* the sovereign debt crisis:

The reason is that the single interest rate that the ECB imposes on all the member countries is too low for the booming countries and too high for the countries in recession. Thus, when in Spain, Ireland, Greece the economy started to boom, inflation also picked up in these countries. As a result, the single nominal interest rate led to a low real interest rate in the booming countries, thereby aggravating the boom. The opposite occurred in the countries experiencing low growth or a recession. (De Grauwe 6-7)

The key point of this argument is to prove that since the single currency’s monetary policy is not uniformly effective, the business cycles of every member state could not possibly have been synchronized. De Grauwe makes other arguments as well, namely the inability individual member state central banks to act as lenders of last resort and that richer member states

misdiagnosed the nature of the crisis, to reinforce his primary point. He concludes the paper with his suggestions for reforming and completing EMU, but Eurosceptics have other ideas.

Politics aside, empirical analysis has attributed certain countries to be more likely candidates for currency union exits. Andrew K. Rose's work *Checking Out: Exits from Currency Unions* has been foundational for other research on the subject. By considering three variables (size, wealth, and level of democracy), Rose preliminarily concluded that larger, richer, and more democratic countries are more likely to leave currency unions. Notably, he also failed to definitively connect "dramatic macroeconomic events" to departures from currency unions (Rose 1). Antonio Estella built his 2015 analysis of a potential Spanish Eurozone exit on Rose's conclusions. After first using the Rose criteria to deem Spain a suitable departure candidate, Estella draws on the experiences of Argentina and South Korea at the end of the 20th century to project the impacts of a currency union exit. It is important to note that Argentina exited from a currency board, while South Korea broke its peg to the US dollar. While departure from a full-fledged currency union such as the Eurozone might have further implications, these cases provide a strong basis for the impacts of such an exit.

Estella's analysis using the case of Spain provides some important factors to be considered in this thesis. First, the invocation of the Rose study on currency union exits reminds researchers that the economy of a departing country likely will need to be sufficiently large enough to weather the resulting currency shock. Secondly, the viability of future growth prospects after the exit must be examined. In the case of Argentina, upon the breaking of the currency board, GDP growth spiked to nearly 9% in 2003 from negative 11% in 2002 (Estella 357-358). GDP growth was driven by export growth, as the devaluation against the US dollar made Argentine exports more attractive. Thus, could a prerequisite for Eurozone exit also be that

that the departing member state's economy be sufficiently export-oriented? Thirdly, Estella rightly inserts an extra consideration: wealth (in)equality. Estella notes that, at the time of his analysis, Spain was the second-most unequal country in the EU in terms of the GINI coefficient, behind only Latvia (371). Upon exit, however, Estella argues that both the most and least wealthy of a country will equally bear the distribution of costs required by the currency adjustment (375). Fourthly, the timing of a country's exit must be considered. If, as in Spain, a country's *real effective exchange rate* is overvalued relative to other members of the currency union, that country would see the strongest benefits by exiting the currency union quickly upon the onset of a crisis. Lastly, to create lasting stability, the exiting country would need to undertake significant structural reforms. Could a country such as Greece, which has repeatedly struggled with ballooning debt, commit to such ambitious reforms without the enforcement of a supranational entity such as the European Union?

Iordanoglou and Matsaganis wrote a paper for Harvard's Center of European Studies in March 2018 painting a far more pessimistic view of a Eurozone exit than Estella. They debatably take a more nuanced approach when analyzing the potential effects of a Greek exit ("Grexit") from the Eurozone. They present several implications that may be overlooked when taking a more macro-based approach. For example, they analyze the fundamentals of Greece's export economy. Iordanoglou and Matsaganis point out that many of Greece's exports rely on materials that must be imported. Given that importers would likely only be able to deal in euros, a return to the drachma would essentially halt imports to Greece. Thus, not only would shortages result in Greece, but exports would stagnate as well, negating any positive effect caused by currency devaluation. Other "tangible" factors are examined as well: shortages in imported food and fuel would negatively impact Greece's important tourism industry. Liquidity provided in euros by the

ECB would evaporate, and the public may be less inclined to service debt denominated in euros given the currency changeover. The authors believe that the stabilization in the medium-term would likely be unsustainable given Greece's weak public administration. While more detailed, Iordanoglou and Matsaganis's analysis is a catastrophe scenario, a fact that the authors acknowledge. Nonetheless, the outcome they present is a strong statement of the dangers to Greece's economy if even half of what they state occurs. Compared to Estella, the outlook described by Iordanoglou and Matsaganis is incredibly bleak, and underscores the extreme and unprecedented risk being taken by a country that may choose to exit the Eurozone.

A good basis for this thesis is presented by Dirk Meyer in his paper *Currency Disintegration: Two Scenarios for Withdrawal*. While the last two papers written by Estella and Iordanoglou and Matsaganis focus entirely on Greece, Meyer also adds Germany as a potential exiting country. If Germany was not as committed to the EU and euro as it currently is, it would actually be considered a strong candidate for Eurozone exit. It has a strong economy and was hesitant in anchoring bailouts to the countries in sovereign default during the crisis. Nonetheless, Euroscepticism has failed to make a significant dent in Germany's governing coalition. According to a flash Eurobarometer survey conducted on behalf of the European Commission in October 2018, 70% of Germans feel that the euro has been a good thing for Germany, compared to only 21% responding that it was a bad thing. Even more decisively, 76% of Germans feel that the euro has been a good thing for the EU against 15% claiming the opposite (European Commission).

In examining Germany, Meyer points to a "frustration hypothesis." Under such a scenario, Germany would be so angered by the Eurozone's inability to attain long-term stability and the sustained erosion of the euro's value that they would get "frustrated" and leave (Meyer

179-180). While much focus has been put on currency depreciation as a recovery tool for a country such as Greece, a reintroduced *deutsche mark* could potentially *appreciate* instead. With a stronger economy, leaving the Eurozone might be attractive to Germany since it would no longer be obligated to shoulder the financial difficulties of economically weak member states. International respect for Germany's fiscal discipline would cause the new deutsche mark to reassume its status as a reserve currency. Empowered with an independent monetary policy, Germany could eliminate the crowding-out effect by instituting a fiscal policy that works arm-in-arm with its monetary policy. Such a decision is not without its risks, however. German exports, particularly the hallmark automobile industry, stand to be hurt by an appreciation of the new currency. Beyond the borders of Germany, the Eurozone's remaining members might be tempted to run to the exits as well. The absence of Germany's stabilizing influence, combined with the aversion of some members to Macron's proposed reforms, might hasten the disintegration of the common currency, a major setback to the European project.

With the goal of building the methodology to be used in subsequent chapters of this thesis, several existing studies were examined. Italian scholars Alberto Bagnai and Christian Alexander Mongeau Ospina wrote a 2014 policy brief utilizing an econometric medium-run model of the Italian economy to determine the effects of exchange rate realignments on international trade. The study utilized Italy's trade balance as the dependent variable and observed its potential movement in response to a 20% downward adjustment in the value of either the euro or a reintroduced Italian lira, the independent variable. Their analysis of a hypothetical lira realignment found that the balance of trade with "core" partners (stronger, richer Eurozone economies such as Germany and France) improved significantly at the cost a worsening trade balance with the OPEC countries and much of the rest of the world (Bagnai and

Ospina 9-10). The opposite occurred when examining a euro-only realignment. Many consequences are left unexamined by Bagnai and Ospina, including the prospect of Eurozone disintegration or destabilization upon Italy's exit. Nonetheless, their research reveals the importance of considering real economic metrics such as balances of trade and current account balances in any empirical analysis of a hypothetical currency union exit.

Bagnai and Ospina's analysis raises other questions to be explored. How important is a currency union to international trade? Does exiting a currency union have a negative impact on the volume of trade? The above-referenced authors' paper offers a mixed response to these questions at best. The 2002 study by Reuven Glick and Andrew K. Rose seeks to provide more direct answers by examining countries that have joined and exited currency unions using what they call an "augmented gravity model." By creating coefficients to control for a wide variety of variables such as distance between countries, GDP, and current or former colonial status, the gravity model is able to explain two-thirds of the variation in bilateral trade flows (Glick and Rose, *Does a Currency Union Effect Trade?* 1130). This analysis is carried forward into fixed-effect estimates using a time-series variation. Glick and Rose ultimately concluded that pairs of countries entering a currency union could double bilateral trade, while those who leave would see bilateral trade halved (1138).

The implications of the initial Glick and Rose study must be taken relative to the time in which it was performed, which the authors themselves acknowledge. The paper was written in 2002 at the earliest stage of EMU. Thus, the many small countries and former colonies they utilize simply do not compare to the economic size of today's Eurozone members. Building on their original methodology, Glick and Rose revisited their 2002 conclusions in "A Post-EMU Reassessment," published in 2016. The new paper included data from European EMU in

addition to their original pre-1998 data set. The revised analysis indicated that the 2002 assumption of symmetry of entry and exit effects continues to hold. With regards to the relevance for EMU, the effect of entry into a currency union in Europe is less robust than the effect on small, dependent economy. Still, Glick and Rose find that bilateral trade has increased by 50% as a result of EMU (Glick and Rose, *A Post-EMU Reassessment* 90).

Lastly, the prospect of a country exiting the Eurozone has significant ramifications for the eighteen members that would remain. An existing study by Wildmer Daniel Grigori and Agnese Sacchi takes the creative approach of using news media mentions of the term “Grexit” to determine the effects of the discussion of Greece’s exit on the remaining members. In less than one year, from December 2014 to October 2015, Grexit was in the news over 64,000 times (Grigori and Sacchi 1). They concluded that sovereign bond yields in periphery countries such as Italy, Portugal, and Spain rose significantly due to Grexit news, while core countries such as Belgium, France, and Germany were relatively unaffected (Grigori and Sacchi 20-21). This suggests that periphery countries are more fearful of economic upheaval upon the occurrence of Grexit, while core Eurozone members are better equipped to weather the storm.

What conclusions about the Eurozone’s future can be drawn from Grigori and Sacchi? If Greece exits the Eurozone, it would certainly call attention to the economic weaknesses of the remaining countries once in sovereign default. Should they, too, leave the Eurozone as a recovery tool, as Eurosceptics have suggested? Perhaps instead those who remain would take the Emmanuel Macron route and integrate more deeply. The situation would undoubtedly play out differently if Germany chose to leave the Eurozone instead of Greece. Existing literature on these subjects has been widespread, but the political and economic ramifications of a currency union exit remain difficult to predict.

The works discussed in this literature review were presented to accomplish several goals. First, a discussion of the forces of Euroscepticism was necessary to provide needed context to the relevance of today's debate about a Eurozone exit. Reflective of the present division in European politics, the debate on Eurozone exit has been nothing short of polarizing. While some argue that a Eurozone departure would be economically useful, others fear the catastrophic consequences of such a choice and favor deeper economic integration among member states. The intended purpose of this thesis is to quantify the former argument. To do so, quantitative considerations must be drawn from existing literature. Lessons learned from this literature discussed in this section will be carried forward into the subsequent methodology, analysis, and conclusions reached in this thesis.

Chapter 5

Overview of Research Methodology

The purpose of the quantitative portion of this thesis is to test one of Eurosceptics' key arguments in favor of Greek Eurozone withdrawal: if Greece withdraws from the Eurozone and readopts a national currency, it can devalue its currency in order to improve its balance of trade, having a positive effect on gross domestic product (GDP).

The argument is founded in one of the foundational equations of macroeconomic theory:

$$Y_t = C_t + I_t + G_t + TB_t \quad (1)$$

The above equation defines GDP in period t as Y_t with C_t the variable for consumption, I_t the variable for investment, G_t the variable for government spending, and TB_t the variable for trade balance.

International monetary theory defines a simple relationship between a country's trade balance and its exchange rate:

$$TB_t(ER_t) = EX_t(ER_t) - IM_t(ER_t) \quad (2)$$

As a function of exchange rate (ER_t), a country's trade balance [$TB_t(ER_t)$] is the difference between its exports [$EX_t(ER_t)$] and imports [$IM_t(ER_t)$]. As the country's currency depreciates, or becomes cheaper, its exports will be cheaper relative to foreign consumers while imports will become more expensive domestically. Therefore, the country's citizens will consume fewer foreign goods, while more of the country's goods will be consumed abroad. The inverse is true for a currency appreciation. Ultimately, a currency depreciation will cause a country's trade balance to increase, and all else equal, GDP will increase.

To test the applicability of the hypothesis stated above to the case of Greece, a simple linear regression model is utilized. The goal of the regression is to discern a relationship between

Greece's GDP and its trade balance, exchange rate, and its membership in the Eurozone. The intended linear equation for the regression output was as follows:

$$GDP_t = \beta_0 + \beta_1 * TB_t + \beta_2 * \% \Delta ER_{t,t+1} + \beta_3 * InEuro + \beta_4 * (TB_t : InEuro) + \beta_5 * (\% \Delta ER_{t,t-1} : InEuro) \quad (3)$$

Each beta term represents a coefficient output of the regression. The model was created with GDP as the dependent variable and the Greek trade balance, percentage change in exchange rate, a dummy variable to indicate Eurozone membership, and two interaction terms as independent variables. The dummy "InEuro" variable assigned a zero-value to data observations made in years prior the adoption of the euro as Greece's currency (prior to 2002) and a value of one to observations made in years after adopting the euro (2002 and beyond). To discern the statistical significance of the relationship of trade balance and exchange rate to GDP, the variables "TB:InEuro" and "%ΔER:InEuro" were created as interaction terms. The interactions were created by simply multiplying InEuro by trade balance and (separately) by exchange rate.

All data for the linear regression analysis were gathered from the World Bank's DataBank service. Within this, the World Development Indicators (WDI) database was used. Speaking on WDI, the DataBank webpage describes the database as "the primary World Bank collection of development indicators, compiled from officially recognized international sources. It presents the most current and accurate global development data available, and includes national, regional and global estimates" ("DataBank"). To obtain the most complete sample of data, all years with available data for all variables were used, spanning 1960 to 2016 for Greece.

The availability of data from the World Bank was both a boon and a drawback to this thesis. One major issue in pursuing research about the Eurozone was that most data are denominated in United States Dollars (USD). Where data are available in local currency units

(LCU), they are not adjusted for inflation. Thus, all data used in this thesis are denominated in United States Dollars.

Table 4. Descriptive Statistics Used in Estimation ("DataBank")

Indicator Name	Obs.	Mean	Std. Dev.	Min	Max
Imports of goods and services (constant 2010 US\$, billions)	56	43.21	33.89	3.51	119.59
Exports of goods and services (constant 2010 US\$, billions)	56	31.47	25.05	1.90	77.44
GDP (constant 2010 US\$, billions)	56	196.16	73.97	56.49	332.06
Official exchange rate (LCU per US\$, period average)*	56	85.21	102.99	0.68	365.40

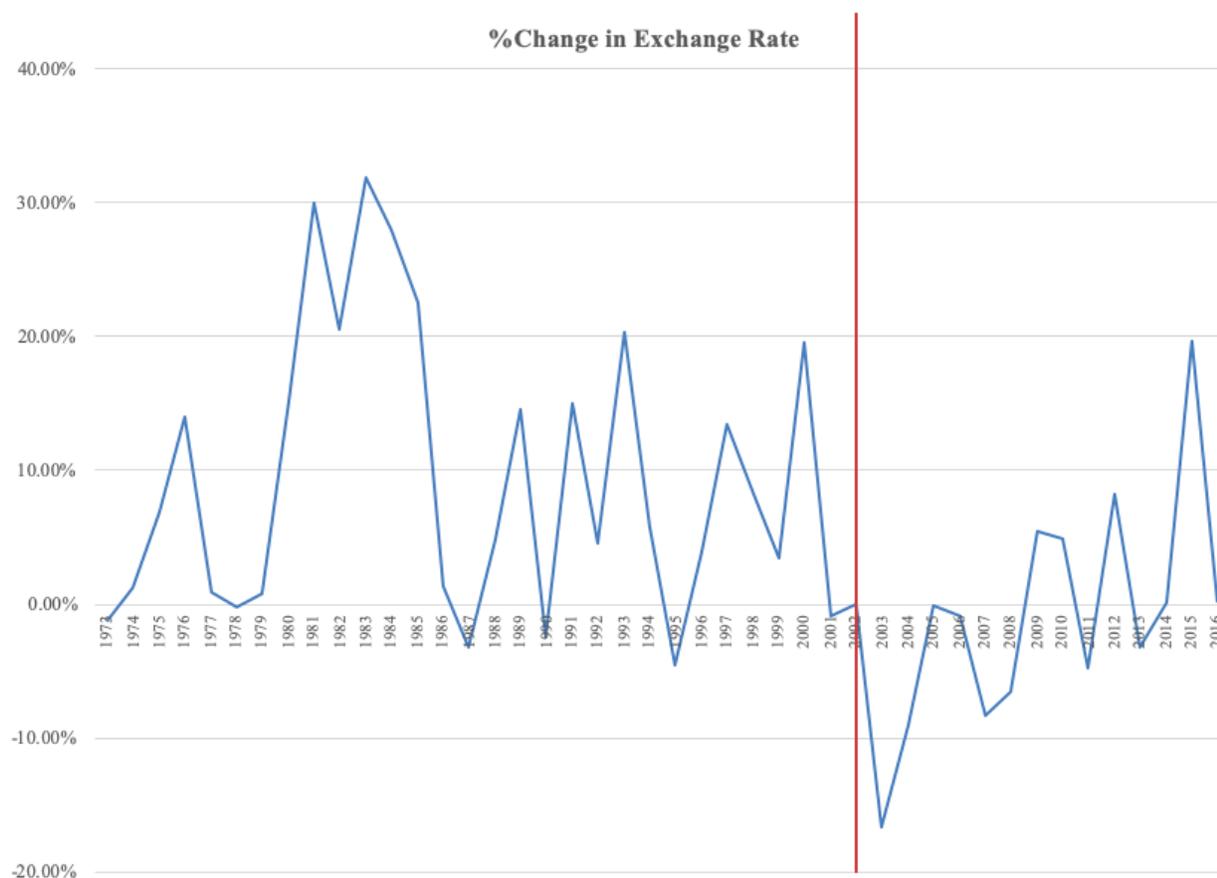
**Original data for official exchange rate utilizes Greek Drachma per US\$ from 1960-2001 and Euro per US\$ from 2002-2016.*

Imports and exports, used in the calculation of trade balance, as well as GDP are inflation-adjusted to 2010 USD. To strain out some of the “noise” from the linear regression model, these values were scaled to billions of USD by dividing each data point by 1,000,000,000.

The differing valuations of the exchange rate of the former Greek Drachma (GD) also posed problems for the accuracy of the linear regression model. At the time of its discontinuation, the drachma reached an exchange rate of GD 365.3986/USD. In 2002, the first year of the euro’s full circulation, the exchange rate was EUR 1.0626/USD. With each of these rates on drastically different scales, the statistical significance of the exchange rate variable to the regression would have been compromised. Instead, percentage change of the Greek exchange rate (including both drachmas and euros) is utilized. The gap between exchange rates in 2002 is addressed by using a rate of GD 362.0645/USD for that year. This was calculated by converting the final GD per euro exchange rate (GD 340.750/EUR) to GD per USD at the 2002 euro per USD exchange rate (EUR 1.0626/USD). This calculation is shown in Equation 4.

$$\frac{GD340.750}{EUR} * \frac{EUR1.0626}{USD} = 362.0645 \quad (4)$$

As Figure 2 below illustrates, Greece's exchange rate has tended towards depreciation in nearly every year beyond 1973. After the collapse of Bretton Woods, Greece broke its peg of GD 30/USD, and the new floating currency began depreciating relatively consistently, including a drop of nearly 33% in 1983 ("DataBank"). This pattern changed somewhat after the euro entered circulation in 2002. The euro appreciated against the dollar in every year from 2002 through 2008 at the onset of the financial crisis.



Notes: Greek drachma fixed to the USD from 1960-1973 at GD 30/USD. Rate of change over this period is zero and is omitted from this figure. The euro replaced the drachma in Greece in 2002, indicated by the vertical red line. Rate of change in 2002 is set at zero using the final conversion rate of GD 362.0645/USD.

Figure 2. Rate of Change of Greece's Exchange Rate (1973-2016)

The results of the linear regression model outlined in Equation 3 are presented in subsequent chapters.

Chapter 6

Greece Eurozone Withdrawal

Greece, a country many Eurosceptics believe would benefit from an exit from the Eurozone, is a logical case study for examining the impacts of a withdrawal accompanied by competitive devaluation. As discussed in Chapters 2 and 3, Greece was a significant beneficiary of EMU membership. The increased flow of capital to Greece made borrowing easier, ultimately leading to an unsustainable level of debt that was a major contributor to the European sovereign debt crisis. The renewed interest in long-term Eurozone stability while saving members from costly bailouts has led some to revisit the possibility of “Grexit.”

6.1 Potential Mechanics of Greece’s Withdrawal

Suppose that by national referendum and/or act of parliament, Greece unilaterally decides to withdraw from the European Monetary Union. At a specified date, presumably the first day of a calendar year, the euro would cease to be the national currency of Greece, and it would be replaced by the *New Greek Drachma* (NGD).

As this specified date approaches, Greek citizens would have the option to exchange their euros for NGD and a fixed exchange rate. Greece may choose to set the rate at NGD 1.2 or 1.4 per euro in order to incentivize Greek citizens to hold the new currency. To achieve the intended

result, Greece would need to devalue its currency significantly against the euro⁴. Such a devaluation would likely be sharp and significant. When Argentina broke its currency board with the United States Dollar in 2002, the currency depreciated from 1 peso per dollar to over 3 pesos per dollar in just one year, an annual depreciation of over 200% (“DataBank”).

6.2 Data Analysis

Thus, Greece would be able to test the hypothesis posed by Eurosceptics: with monetary sovereignty, a currency devaluation will be accompanied by an improvement in the trade balance, driving GDP upward. The data do indeed show that an exchange rate depreciation in Greece would have a positive impact on the trade balance. The effect of the exchange rate on Greece’s trade balance is illustrated by Equation 5:

$$\text{Trade Balance}_t (\$B USD) = \beta_0 + \beta_1 * \% \Delta ER_{t,t-1} \quad (5)$$

When evaluating a subset of the data described in Chapter 5, using trade balance as the dependent variable and percentage change in the exchange rate as the independent variable, a regression analysis shows that a 1% depreciation of the exchange rate would cause trade balance to move upward. The relationship is statistically significant with a p-value equal to 0.02, but the confidence level is fairly weak. The adjusted R square value for this regression is only 7.48%, suggesting that relatively little of the variation in trade balance is motivated by exchange rate movements. The results of the estimation of Equation 5 are illustrated in Table 5.

⁴ Given the data constraints of this analysis described in Chapter 5, further discussion of Greece’s hypothetical new exchange rate will use the United States Dollar as its base currency.

Table 5. Estimation of Equation 5 (Effect of Exchange Rate on Trade)

Intercept	-13.17***
	(0.00)
% Change in ER	0.34**
	(0.02)
Adjusted R Square	7.48%
Observations	56
<i>P-values indicated below coefficients in parentheses. *** = significant at the 1% level; ** = significant at the 5% level.</i>	

Even if the results in Table 5 are taken at face value, the results of the linear regression model outlined in Chapter 5 paint a bleak picture of Greece's potential Eurozone withdrawal. The effects of several variables on Greece's gross domestic product are tested in Equation 3, and the results of this equation's estimation using linear regression are depicted in Table 6.

Table 6. Estimation of Equation 3 (Effect of Selected Variables on GDP)

Intercept	103.53***
	(0.00)
% Change in ER	1.84***
	(0.00)
TB (\$B USD)	-6.10***
	(0.00)
InEuro	124.67***
	(0.00)
TB:InEuro	3.57***
	(0.00)
% Change in ER:InEuro	-1.25
	(0.30)
Adjusted R Square	84.25%
Observations	57
<i>P-values indicated below coefficients in parentheses. *** = significant at the 1% level.</i>	

With the incorporation of additional variables as defined in Equation 3, the model predicts the effect on GDP with much more certainty than the trade balance-exchange rate relationship considered above. As Table 6 shows, 84.25% of variation in Greece's GDP from 1960 to 2016 can be explained by changes in each of the studied variables according to the regression's adjusted R square.

Table 6 demonstrates that any positive impact of an exchange rate depreciation on trade balance, as shown in Table 5, fails to translate to GDP. In fact, the "TB-InEuro" interaction term shows that Greece's membership in the Eurozone actually *mitigates* damage to GDP caused by a trade balance increase. When InEuro = 0, Greece sees GDP decrease by \$6.1 billion per \$1 billion increase in trade balance, while when InEuro = 1, GDP drops by a lesser amount of \$2.53 billion. In short, the Eurosceptic argument that an improvement in trade balance would stimulate Greece's economy fails. While a trade balance increase would result in a GDP decrease in Greece no matter what, remaining in the euro would offset this effect by more than half.

An argument in the Eurosceptics' favor can be made regarding the "ER:InEuro" interaction term, but the conclusion is less definitive given that the coefficient is not statistically significant. On its own, the model predicts that a 1% depreciation results in a \$1.84 billion increase in GDP. This result is statistically significant at a p-value of less than 0.01. Again, the incorporation of the interaction term shows that Greece's Eurozone membership lessens the sensitivity of GDP to movements in the variables. In the case of the exchange rate, GDP increases \$0.59 billion per 1% depreciation when InEuro = 1. Therefore, Eurosceptics could argue that Greece's use of the euro lessens its economic gains from an exchange rate devaluation. Given a potential 200% devaluation over one year as in the case of Argentina, Greece's GDP gains would be magnified if it were to exit the Eurozone. Given the high p-value

of 0.30 for the “ER-InEuro” interaction term, however, there is ample reason to doubt this conclusion. The results of the model speak with far more certainty to a negative correlation between trade balance and GDP, a core tenet of the Eurosceptics’ argument.

The final consideration from Table 6 is the significance of the InEuro dummy variable. When $\text{InEuro} = 1$ and Greece is a member of the Eurozone, the estimation of Equation 3 predicts that \$124.67 billion is added to GDP. Thus, an exit from the Eurozone could potentially result in the loss of a sizable portion of Greece’s economy. Any depreciation of the new sovereign currency would have to be significant in order to offset the loss leaving the euro would create. Combining this with the detrimental effect of an increasing trade balance on GDP and other qualitative considerations to be discussed in Chapter 7, Greece would face significant challenges in stimulating economic growth if it chose to exit the Eurozone.

Chapter 7

Conclusions

Given the strength of coefficients produced for key variables by the linear regression model, the Eurosceptic hypothesis posed as a foundation for this thesis is likely invalid. While it is true that a weak relationship exists between exchange rate devaluation and an increase in the trade balance, this increase would fail to provide a boost to Greece's overall economy. Therefore, a departure from the Eurozone would not be beneficial to Greece, especially in the short-run. These findings, at a macro level, most clearly reinforce the arguments presented by Iordanoglou and Matsaganis at a micro level. It could certainly be argued, as Iordanoglou and Matsaganis have, that the fundamental makeup of Greece's economy would make a Eurozone exit nearly impossible to execute successfully. It also reinforces Rose's argument about likely candidate countries for a currency union exit. In the paper, Rose argues that larger economies are more likely candidates for a successful exit; Greece is in the bottom ten in the EU in terms of GDP per capita ("DataBank"). He also declines to link severe macroeconomic shocks to a predisposition for currency union exit. In other words, a country facing recession is not depicted by Rose as a country that could benefit from exiting a currency union.

This conclusion is reinforced by other factors that are much harder to quantify. It would likely be difficult for Greece to sustain the fiscal discipline necessary to wield monetary policy power. Greece's domestic political turmoil, coupled with the corruption and poor bookkeeping that led to its sovereign debt crisis demonstrate that it would likely benefit from a supranational entity like the European Union to hold its monetary reins. EU-mandated austerity measures,

debt-restructuring, and bailouts have helped get back on track since the crisis. Without Eurozone membership, the incentive for fiscal discipline would drop significantly. Still in a tenuous position despite the beginnings of economic recovery, Greece could certainly see “economic backsliding” in the case of a Eurozone exit. Combined with the results of the linear regression model, Greece would be hard-pressed to see economic improvement even with significant political and structural reforms.

Other considerations introduced in Chapter 4 can also be applied to the case of Greece. Estella noted that the short-term impact of a currency union exit can be felt equally by both the wealthiest and poorest of a country’s citizens, though countries with a higher Gini coefficient may place a disproportionate amount of the burden on the lower class. According to World Bank data from 2015, the most recent year with reported data, Greece had the second-highest Gini coefficient (36.0) among countries distressed by the sovereign debt crisis (Portugal, Italy, Ireland, Greece, and Spain), narrowly trailing Spain at 36.2 (“DataBank”). With a comparatively high level of inequality, a short-run economic shock to Greece’s economy due to a Eurozone exit would inflict significant pain on the Greek lower class.

Estella also argued that countries exiting with an overvalued real effective exchange rate (REER) would see the most significant gains upon departure. Again, comparing Greece to its severely distressed counterparts from the sovereign debt crisis, Greece had the lowest REER, indicating that the euro was effectively *undervalued* in Greek terms. In fact, Greece’s REER is lower than *all* twenty-seven of its EU colleagues (“DataBank”).

This is not to say that a country exiting the Eurozone could not succeed. Given Greece’s relative economic weakness, it is potentially in the worst position of the Eurozone’s nineteen members to undertake such a move. Germany, however, could be successful. One of the world’s

healthiest economies, Germany is largely considered the anchor of the European Union and the Eurozone for its careful fiscal discipline and considerable export power. If the same linear regression model is applied to Germany, the trade balance variable returns a coefficient of +4.99, indicating that a trade balance improvement would have a positive impact on GDP.⁵ Contrary to a Greek exit, the remaining Eurozone members would likely be hurt by a German exit. Without Germany's restraint and hesitation with regards to further fiscal integration, the Eurozone may choose to proceed with plans for a Eurozone-wide budget and finance minister. The new level of lost political sovereignty could sow further Euroscepticism, creating larger outrage at the outset of the next recession. Removing the strict fiscal demands of Germany may also allow other members to loosen austerity constraints, allowing public debt and deficits to balloon once again in Europe.

In summary, Eurozone departure with a positive effect (on the exiting state) is possible, but not in the targeted case of Greece.

7.1 Areas for Further Research

The conclusions reached by this thesis are undoubtedly limited by the scope of statistical methods available for an undergraduate finance thesis. Perhaps the largest unanswered question remaining is what historically has motivated trade balance increases to accompany GDP declines. The answer to this question lies within one or more elements of the GDP equation defined in Chapter 5. While this thesis targeted specifically the relationship between trade

⁵ Unlike Greece, complete World Bank data from Germany is only available from 1970 to 2016.

balance, exchange rate, and GDP, further research might consider movements in Greece's consumption, investment, and government spending levels over a similar span. Other researchers also may choose to apply more sophisticated methods of statistical analysis than a simple linear regression model. Those interested may want to consider models used by Bagnai and Ospina or Glick and Rose.

Further research also may choose to focus on the broader impact of a country's departure on the Eurozone as a whole. While Eurosceptics would argue that a country's departure would result in savings of hundreds of billions of euros in stabilization funding, that prospect is unclear for the future and likely would have only helped in the crisis of 2008. The EU is unlikely to backtrack on steps to create a stronger Eurozone, such as the creation of the European Stability Mechanism (ESM). Other researchers may also make an ambitious attempt to predict the long-run implications for an exiting country; it is quite possible that a country like Greece could undertake needed reforms and take the upper hand in its economic future outside of the Eurozone. However, the results of this thesis make clear that the short-run pain facing Greece would likely be hard to justify.

BIBLIOGRAPHY

- "About Us." *European Stability Mechanism*, European Union, www.esm.europa.eu/about-us/intro. Accessed 18 Mar. 2019.
- Archick, Kristin. "The 2014 European Parliament Elections: Outcomes and Implications." *Federation of American Scientists*, 24 July 2014. Accessed 18 Mar. 2019.
- Bagnai, Alberto, and Christian Alexander Mongeau-Ospina. *The Impact of an Exchange Rate Realignment on the Trade Balance – Euro Vs. National Currency - Some Preliminary Results with A/Simmetrie Model of the Italian Economy*. A/Simmetrie, 2014 Accessed 5 Nov. 2018.
- Breuss, Fritz. *Downsizing the Eurozone into an OCA or Entry into a Fiscal Transfer Union*. CESifo Forum, 2011. Accessed 11 Apr. 2018.
- Chrisafis, Angelique, and Jennifer Rankin. "Macron Lays out Vision for 'Profound' Changes in Post-Brexit EU." *The Guardian*, 26 Sept. 2017. Accessed 18 Mar. 2019.
- "DataBank - World Development Indicators." *The World Bank*. Accessed 25 Feb. 2019.
- De Grauwe, Paul. *Design Failures in the Eurozone: Can They Be Fixed?* London School of Economics and Political Science, Feb. 2013. Accessed 25 Mar. 2018.
- Estella, Antonio. *Potential Exit from the Eurozone: The Case of Spain*. Indiana Journal of Global Legal Studies, 2015. Accessed 11 Apr. 2018.
- European Commission. *Flash Eurobarometer 473: The Euro Area*. Nov. 2018 Accessed 6 Dec. 2018.

- "Europe: Greece." *The World Factbook*, Central Intelligence Agency, www.cia.gov/library/publications/the-world-factbook/geos/gr.html. Accessed 19 Mar. 2019.
- Geeroms, Hans. *Why the Eurozone Needs a Finance Minister and Economic Reform*. European View, 2017. Accessed 11 Apr. 2018.
- "General Government Debt." *OECD Data*, data.oecd.org/gga/general-government-debt.htm. Accessed 24 Feb. 2019.
- Glick, Reuven, and Andrew K. Rose. "Currency Unions and Trade: A Post-EMU Reassessment." *European Economic Review*, vol. 87, 2016, pp. 78-91 Accessed 31 Mar. 2019.
- . *Does a Currency Union Affect Trade? The Time-Series Evidence*. European Economic Review, 2002. Accessed 11 Apr. 2018.
- Gomez, David Matesanz, et al. "Synchronization and Diversity in Business Cycles: A Network Analysis of the European Union." *Applied Economics*, vol. 49, no. 10, 2017, pp. 972-86 Accessed 31 Mar. 2019.
- "Greece." *European Stability Mechanism*, European Union, www.esm.europa.eu/assistance/greece#bringing_greece_back_to_growth. Accessed 18 Mar. 2019.
- "Greece's Debt." *Council on Foreign Relations*, www.cfr.org/timeline/greeces-debt-crisis-timeline. Accessed 20 Mar. 2019.
- "Greek Civil War." *Encyclopedia Britannica*, www.britannica.com/event/Greek-Civil-War. Accessed 19 Mar. 2019.

- Gregori, Wildmer Daniel, and Agnese Sacchi. *Has the Grexit News Spilled Over into Euro Area Financial Markets? The Role of Domestic Political Leaders, Supranational Executives and Institutions*. Dec. 2016 Accessed 5 Nov. 2018.
- "A History of European Monetary Integration." *European Parliament*, Mar. 2015. Accessed 24 Feb. 2019.
- "The History of the Euro." *European Commission*, ec.europa.eu/info/about-european-commission/euro/history-euro/history-euro_en. Accessed 24 Feb. 2019.
- Jordanoglou, Chrysafis H., and Manos Matsaganis. *Why Grexit Cannot Save Greece (But Staying in the Euro Area Might)*. Center for European Studies Harvard, 29 Mar. 2018 Accessed 5 Nov. 2018. CES Open Forum Series.
- Kenton, Will. "Greek Drachma." *Investopedia*, 15 June 2018, www.investopedia.com/terms/g/greek-drachma.asp. Accessed 14 Mar. 2019.
- Lanzavecchia, Alberto, et al. *How Euro Shrinks Democracy: Insights from the Greek Crisis*. *Journal of Governance and Regulation*, 2015. Accessed 11 Apr. 2018.
- Meyer, Dirk. *Currency Disintegration: Two Scenarios of Withdrawal*. *Applied Economics Quarterly*, 2012. Accessed 11 Apr. 2018.
- Pirro, Andrea LP, et al. *The Populist Politics of Euroscepticism in Times of Crisis: Comparative Conclusions*. *Political Studies Association*, 27 May 2018 Accessed 5 Nov. 2018.
- Romei, Valentina. "Greece and the EU: A Brief (Economic) History in Charts." *Financial Times*, 10 Aug. 2015, www.ft.com/content/9436dfa7-cd88-3daa-a844-56da4b27ec54. Accessed 19 Mar. 2019.
- Rose, Andrew. *Checking Out: Exits from Currency Unions*. U of California, Berkeley, 15 Dec. 2006, faculty.haas.berkeley.edu/arose/exit.pdf. Accessed 25 Mar. 2018.

Rose, Andrew K. *Is EMU Becoming an Optimum Currency Area? The Evidence on Trade and Business Cycle Synchronization*. 21 Oct. 2008 Accessed 5 Nov. 2018.

"Startseite." *LKR*, lkr.de. Accessed 19 Mar. 2019.

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Armstrong Flooring, Inc.

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- Three-year rotational program to gain exposure to multiple areas of corporate finance
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Members 1st Federal Credit Union

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- Gained valuable insights into the operation of the mortgage industry by learning the role of the lender in issuing sound loans that are salable to entities operating on the secondary market
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Dauphin County Treasurer's Office- Janis Creason, Treasurer

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Aug 2014 – Aug 2016

- Learned office functions as an unpaid high school intern before being offered a paid, part-time position to perform the duties of a full-time staff member
- Created a policy guide for Pennsylvania County Treasurers that simplifies the regulations of Local Option Small Games of Chance Act, which governs the use of small games of chance at fundraising events for non-profit organizations

LEADERSHIP AND INVOLVEMENT

The Pennsylvania State University Marching Blue Band

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- Four-year member of the University's flagship band, performing signature field shows before sold-out crowds at Beaver Stadium and at five NFL stadiums across country
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- Founded the school's chapter with the assistance of several classmates and the school's Career Coordinator
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- Honors: Middletown Area High School Valedictorian, AP Scholar with Distinction, National Honor Society, President's Freshmen Award
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