THE IMPACT OF MACROECONOMIC FACTORS AND CORRUPTION ON THE ITALIAN ECONOMIC GROWTH

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THE IMPACT OF MACROECONOMIC FACTORS AND CORRUPTION ON THE ITALIAN ECONOMIC GROWTH

ABSTRACT

The aim of this study is to perform an econometric analysis on the Italian economic growth from 1983 until 2017 using quarterly data. This analysis consists eight macroeconomic factors. Our dependent variable is GDP growth rate while the independent variables are: unemployment rate, inflation rate, short term interest rate, productivity index, exports growth rate, imports growth rate and hourly wage industry. In this study we will be using the, Augmented Dickey-Fuller Unit Root test, ARDL model, Breusch-Godfrey Serial Correlation LM and Breusch-Pagan-Godfrey Heteroskedasticity Test. Based on our results from the ARDL model we find unemployment and productivity to be the macroeconomic factors which effect the GDP growth the most. We find no proof of heteroskedasicity or serial correlation in our model.

Key Words: *GDP growth, unemployment, import growth rate, exports growth rate, inflation, ARDL, Serial correlation, Heteroskedasticity test, Unit root test*

IMPAKTI I FAKTOREVE MAKROEKONOMIK DHE KORRUPSIONIT NE RRITJEN EKONOMIKE TE ITALISE

ABSTRAKT

Qellimi I ketij studimi eshte te zhvillojme nje analize ekonometrike ne rritjen ekonomike te Italise nga viti 1983 deri me 2017 duke perdorur te dhena kater-mujorshe. Variabla e varur eshte rritja ne perqind e GDP kurse variablat e pavarurajane: papunesia, inflacioni ,interesi afat-shkurter, indeksi I prodhimtarise, rritja ne perqind e eksporteve, rritja ne perqind e importeve dhe industria e pagave ne ore. Ne kete studim do perdorim Breusch-Pagan-Godfrey Unit root test, performojme modelin ARDL, testin Breusch-Godfrey Serial Correlation LM, dhe testin Augmented Dickey-Fuller per heteroskedasticiy. Duke u bazuar ne rezultatet e gjetura nga modeli ARDL ne gjejme papunesine edhe prodhimtarine te jene dy fakoret makroekonomike te cilet kane ndikimin me te madh ne rritjen e GDP. Ne nuk gjejme prove per korrelacion serik apo heteroskedasticity ne modelin tone.

Fjale kyce: *rritje e GDP, papunesi, inflacion, interes, prodhimtari, eksport, import, heteroskedasticity, unit root, korrelacionserik*

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I would like to dedicate this thesis firstly to my family, my mother, my father and my sister, who have supported and encouraged me with unconditional amount of love and appreciation throughout the whole writing process. Without their trust and compassion, I wouldn't be what I am today. I am also thankful to my closest friends who have always been by my side. Last but not the least; I want to thank God, who has helped me through with wisdom and peace.

DECLARATION

I hereby declare that this Master's Thesis titled "The impact of macroeconomic factors and corruption on the Italian economic growth" is based on my original work except quotations and citations which have been duly acknowledged. I also declare that this thesis has not been previously or concurrently submitted for the award of any degree, at Epoka University, any other University or Institution.

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Foni Qirko

June 22, 2017

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LIST OF ABBREVIATIONS

GDP	: Gross Domestic Product
OECD	: Organization for Economic Cooperation and Development
GPROD	: Growth rate of productivity index
GINT	: Growth rate of the short-term interest rate
GUNEM	: Growth rate of unemployment
GHWAGE	: Growth rate of hourly wage index
ADF	: Augmented Dickey-Fuller
IMF	: International Monetary Fund
ARDL	: Autoregressive Distributed Lag

CHAPTER 1
INTRODUCTION

1.1 Historical background

During the fascist regime the Italian economy was a disaster considering that during this period they were involved in two world wars and was affected by the great depression. After World War I, Italy was in a poor condition and very weakened. After the end of the Second World War their economy was destroyed where the GDP per capita in 1944 was at the lowest point since the beginning of the 20th century. During their regime they experienced difficulties regarding the inflation in 1926 and the great depression a few years later. Italy aimed to reduce inflation and fix the Lira (Italian currency at the time). According to them they wanted to prove to the other countries the power of Lira and Italy. This change caused a decrease in the net exports but by having cheaper imports the companies who relied on raw materials benefitted the most. The economic miracle of Italy happened during the 50's and 60's when their economy was booming. With the help of the Marshall Plan. The United States invested over 13 billion dollars in the countries that were affected the most by the World War 2. Italy was one of the countries who benefitted from this plan and they used these large amounts of money to help rebuild major cities in their country such as Rome, Milan and Turin. Due to political and economic problems caused after the economic miracle, Italy went on their first recession since the one on the 40's after the World War 2. High inflation and high energy prices were the major problems of Italy during that period. This recession continued up until the early 80's where after a recovery plan which involved reducing the public costs, tightening the budget and deficits and reducing inflation made Italy leave the recession in 1983. During this period the south of Italy due to large investment worth billions of dollars went to a phase where the economic growth in the south was higher than the north. Their economy relied mainly on

the three largest and industrialised cities which were Milan, Turin and Genoa. Along with the struggles of fighting the national debt and reducing government spending they were facing another problem related to the black market whose values at the time were estimated to be close to 15% of their GDP.

In the 21st century the Italian economy went through both economic growth and recession. The golden years in the 21st century for Italy were from 2002 until 2008 before the financial crisis. During that time Italy were experiencing a big economic expansion where their GDP reached the highest value ever recorded in their country in 2008 estimated at 2.3 trillion dollars. Italy was one of the countries affected the most by the recession which caused many problems within the country. GDP fell, exports fell, consumption fell, and unemployment rose and their national debt was higher than ever being 140% of their GDP. From the entire countries in the Eurozone only Greece is worse than Italy regarding their national debt. Italy during a short period after the recession suffered from deflation for the first time since 1959 Unemployment was and still is a major concern for Italy in these years where double-digit unemployment has caused problematic situations. Youth unemployment and female unemployment rate and low investments in the south are the main causes for this phenomenon. The justice system, organised crime, politics and the division between the north and the south are some of the main unsolved problems that occur to this day. Despite all the difficulties Italy still remains as one of the most powerful countries in the world regarding their economy where they are ranked the 3rd-largest national economy in the Eurozone, the 8th-largest by nominal GDP in the world, and the 12th-largest by GDP (PPP).They are one of the founding members of the G7, OECD and Eurozone and they have shown from the past that they can get through hard times and get back on the road to recovery.

1.2 Focus of the study

The focus of this study is to find a relationship between the macroeconomic factors and corruption with their economic growth. To get an accurate conclusion we will be performing the Unit Root test, ARDL model, Breusch-Godfrey Serial Correlation LM test and the Breusch-Pagan-Godfrey Heteroskedasticity test.

The first chapter of our thesis is the introduction where we will talk about the historical background and the transition of the Italian economy from the fascist regime to nowadays.

The second chapter will be an analysis regarding the impact of corruption in the Italian economy, the contributions of the northern regions against the southern regions, comparing the standard of living between these regions and analysis regarding the misery index from 1983 until 2017.

The third chapter will consist of the literature review where we will be analysing the theoretical relationships between the selected macroeconomic variables towards GDP and the results from previous analysis on Italian economic growth.

The fourth chapter will be the data and methodology chapter where we will talk about what kind of data will be used for our econometrical analysis, where we have collected the data, the application used for the analysis and the econometric methods used.

In the fifth chapter we will look at the results from the application based on the four test which are used in this thesis.

In the sixth chapter we will give our conclusion based on our econometric results and give recommendations regarding the improvement of this thesis.

1.3 Objective of the study

The objective of this study is determining which of the selected macroeconomic factors have a positive impact and which ones have a negative impact on the Italian economic growth and the impact of corruption.

1.4 Research questions

1. Which macroeconomic factors affect the Italian GDP growth the most?
2. How does the mafia affect the economy?
3. Why is the south so far behind the north region?
4. How can Italy get back to their pre-crisis economic growth?

CHAPTER 2
LITERATURE REVIEW

One of the most important and difficult goals of the central bank is regulating the interest rate. The Central Bank can increase the interest rates when inflation according to their predictions is expected to rise above their inflation target which for most countries is around 2%. The interest rate has a major impact on economic growth. One of the many effects of the interest rate is their impact on consumption. An increase in the interest rate will cause the citizens tendency to borrow to decrease due to having difficulties with the repayment of the loan. During this period the average citizen is going to prefer savings over consumption and therefore this increase in the interest rate will make consumption decrease. In the case of Italy, the interest rate has had a major decrease from 1983 to nowadays where the short-term interest rate has fallen below 0%.Italy was one of the countries affected most by the crisis in 2008. Many countries affected began to drastically lower the interest rate to increase foreign investment and to help them get back on track and recover. One of Italy's main concerns is high debt. Italy's debt ratio is the second worst in the euro zone, behind only Greece. The country's national debt weighs in at roughly 120% the size of its gross domestic product, or about $2.6 trillion. In the 1990's the Italian government learned to budget carefully and enjoyed slow but consistent GDP growth. Low deficits kept the size of the debt stable, and an expanding economy, aided by moderate inflation, made it possible to finance interest payments on what the government already owed. Thus, the country's economy stayed afloat. A high interest rate is going to cause a difficulty in paying back the debt due to increasing the interest costs on the National debt.By lowering the interest rate the currency will tend to depreciate making exports more competitive and imports more expensive while an increase in interest rate will make exports less competitive and imports cheaper.The interest rate also has an impact on a country's imports and exports. A decrease in the interest rate is going to make the currency of a country to depreciate and therefore making the exports more competitive

and making the imports more expensive. On the other hand, an increase in the interest rate will dothe exact opposite and make imports cheaper and exports less competitive.Italy's exports represent 31.8% of their GDP. (Daniel Workman,2018). Italian exported goods have a huge importance for the world due to their high-quality products they have to offer such as machinery and vehicles from which Italy made $150 billion dollars in 2017.During the financial crisis the Italian exports dropped by 24%. (Source: www.oecd.org). The cause for this was that during this recession other countries started to rely on their own products rather than imported goods which caused their exports to drop.A major concern regarding the Italian economy nowadays is their unemployment rate especially youth unemployment where the youth unemployment rate nowadays in Italy is higher than ever. Over 40% of people aged from 15-24 are unemployed (Source: https://fred.stlouisfed.org/). One of the causes for such a high number of unemployment is due to the types of work contracts where young workers get short term working contracts rather than the long term working contracts which are offered to older workers. During the time of recession, a company will get rid of the young workers first. The youth unemployment rate has increased by 15% from 2008 until now.The female unemployment rate in 2017 according to www.countryeconomy.com was around 37 % for females with less than 25 years of age while above 25 the unemployment rate was 11%. There is not yet a consolidated anti-age discrimination tradition in Italy, which like other industrialised countries reacted slowly to the need to adopt legal mechanisms to combat discrimination(Olga Rymkevitch, Claudia Villosio, 2007, Age Discrimination in Italy)

The unemployment rate has an immediate impact on a person's standard of living. Due to having no income people will tend to save and therefore decrease their consumption and spending. Even though in some cases the government can give unemployment benefits, the sum that they give can be roughly up to 50% of their former wage which would help the unemployed but still would have a noticeable decrease in consumption.There have been many studies that explain the relationship between unemployment and crime. Due to an absent high paying job, people will start to seek for illegal jobs and crime in order to make a living. Crime and corruption are major problems in Italy. There are three large crime organizations located in Southern Italy which have often caused many political problems during most of the Italian history. Based on a study made in 103 provinces in Italy they have found a positive correlation between unemployment and crime rate. (Nino Speziale, 2014).

When unemployment becomes a pervasive problem, there are often increased calls for protectionism and severe restrictions on immigration. Protectionism can not only lead to destructive tit-for-tat retaliation among countries, but reductions in trade harm the economic well-being of all trading partners. (Stephen. D. Simpson, 2017). Considering Italy's exports make 32% of the countries GDP this can be a severe problem for their economic growth. The unemployment rate has a significant impact on a country's GDP where an increase in unemployment is going to cause a decrease in GDP. Arthur Okun investigated a statistical relationship between the unemployment rate and the economic growth otherwise known as Okun's Law. Okun's Law is used as an indicator do determine by how much the GDP is going to fall when the unemployment rate is above its natural rate. Unemployment has a negative relationship with productivity. The higher the unemployment rate the lower the labour force. This is going to cause a decrease in productivity. Okun's law states that for one percent increase in unemployment the GDP is going to decrease by 2%.Unemployment also has a negative relationship with the inflation rate. According to the Phillips curve when one of these factors increases the other one decreases. We notice from the data collected in Italy's case that from the early 80's inflation rate decreased from 16% to 4% and the unemployment rate increased from 7% to 10%. But from 2002-2008 inflation remained almost constant with minor changes while unemployment dropped drastically from 12% to 6%. Many experts believe that the cause for this is due to the effective monetary policy strategies from which an economy can continue to expand without experiencing high inflation. Based on a study in 1999 they found evidence using an econometric model that the monetary policy strategies in Italy were mainly used to target inflation (Giuseppe De Arcangelis,Giorgio Di Giorgio,1999). Monetary policy has had a big impact to improve the Italian economy, said during an interview the governor of the Bank of Italy's Ignazio Visco. He said thatwithout taking the monetary policy measures deflation would have continued for many more years and it would be very difficult to stop and would bring bigger consequences to the economy. (Published by Alessandro Merli,2016).

One popular method of controlling inflation is through a contractionary monetary policy. The goal of a contractionary policy is to reduce the money supply within an economy by decreasing bond prices and increasing interest rates. This helps reduce spending because when there is less money to go around, those who have money want to keep it and save it, instead ofspending it. It also means that there is less available credit, which can

also reduce spending. Reducing spending is important during inflation, because it helps halt economic growth and, in turn, the rate of inflation. (Leslie Kramer, 2018)

The Italian Government has presented an economic stimulus plan of $80 Billion Euros in public and private spending on highways and other new infrastructure projects. The government will spend 12 Billion Euros on infrastructure, along with raising 4 Billion Euros from the Private Sector to help with the stimulus. This type of policy is a form of Expansionary Policy since the government is decreasing taxes and increasing government spending to help the unemployment rate decrease, help inflation to stable or decrease, and increase the GDP. This policy will also increase the countries deficit. (Andrew Davis).

Other ways the government can affect the inflation rate is by the supply side policies. Some of the techniques are: Privatization, deregulation, reducing income tax rates, deregulate labour markets, reducing the power of trades unions, reducing unemployment benefits, deregulate financial markets, increase free-trade.

Increases in the minimum wage may stimulate macroeconomic growth if productivity is shifted toward more highly-skilled sectors, possibly by inducing additional training for low-skilled workers. When increases in the minimum wage are indexed to inflation they do not appear to have larger adverse employment effects than non-indexed increases. (Joseph J. Sabia, 2015)

Productivity is one of the key factors that affect the GDP of a country and that contribute in economic growth and its one of the things that Italy have struggled with the most for many decades. Productivity has a lot of benefits because it can improve the competitiveness and trade performance, can increase profits, can pay higher wages to workers due to having a higher budget and also decrease the unit costs.

Why has Italy experienced problems with productivity?

According to a study conducted in 2017 they find no evidence that this slowdown is due to international trade developments. They do not find any evidence supporting the claim that excessive protection of employees is the cause but they find evidence that the slowdown is associated with Italy's inability to take full advantage of the ICT revolution. (Bruno Pellegrino, Luigi Zingales, 2017, diagnosing the Italian disease). Another brilliant study published by the Italian central bank (Banca D'Italia) made an analysis regarding

productivity in Italy and their conclusions on why productivity should be increased and how they can manage this.

Increasing productivity is a policy priority for Italy. Unfortunately, it is not an easy task. Productivity is a synthetic indicator affected by many different factors, some of them easily measurable, others definitely less so. Even when measurable, neither the estimate of their impact on efficiency nor the identification of the mechanisms through which the effect materializes are easily detectable. When they are, it is often difficult to derive reliable aggregate implications or take into account the interactions among the different drivers of productivity or the general equilibrium effects on other than-productivity variables, above all employment and inequality. Reaching a steadily higher rate of growth in productivity means adjusting the functioning of the economy along three different margins which seem to be equally important in Italy. First, it is crucial to remove all the factors that curb a firm's willingness or ability to grow in size by investing in labour and capital (both tangible and intangible), to adopt modern managerial practices and technologies, to open up its financial structure to equity capital, to innovate products, and to internationalize its activity. Secondly, given the huge heterogeneity characterizing the Italian productive system, the reallocation of production to its best uses, both across and within sectors, can give a further boost to aggregate productivity growth: this favours the growth of the most efficient firms to the detriment of those entrepreneurial initiatives that have no potential. A selection mechanism by which the latter ones will exit the market will also contribute to overall allocative efficiency. Thirdly, policy-making should carefully address the obstacles that are currently limiting the contribution to growth from the creation and development of new productive and innovative firms: leaving aside what happened during the crisis, this contribution is smaller in Italy than elsewhere and has continued to weaken over the last 15- 20 years. Policy interventions should aim at reducing the costs of investment (in both tangible and intangible assets) and innovation. If effective, such measures would bring a double dividend: triggering the desired structural change on one side and sustaining the growth of aggregate demand with further positive side effects on the willingness and convenience of firms to grow, to undertake risky, but potentiallymore profitable, projects, and update their technological endowment and organization. Since the sovereign debt crisis, Italian governments have been particularly active in this field. Strengthening the organizational flexibility of firms by providing a better alignment between wage and productivity dynamics would benefit product, process

and organizational innovations, the adoption of new technologies and managerial practices and therefore the competitiveness of the productive system as a whole. The third area of measures is the one where we see a bigger and more pressing need for intervention. Overall, what is needed are reforms that often are very complex and entail short-term political costs with longer-term economic benefits. Starting with taxation, the work by Bobbio(2016) highlights that tax evasion, often caused by a high tax burden, can be highly distortive because it generates unfair competition, limiting firms' growth and overall innovation. The governance system must grant universities and other institutions the flexibility to promptly adapt to the economic dynamics, updating curricula and encouraging the transmission of knowledge between the productive and the educational system. A larger supply of professional-oriented tertiary courses, though still very limited, could help narrow the educational attainment gap with other countries and reduce the distance between the demand and the supply of skills. Improvements in the quantity and quality of material and immaterial infrastructures are much needed. The fall in public investment since the crisis has weighed on infrastructure development. However, returns to investment primarily depend on its quality and efficiency. Despite some progress, in Italy time to completion is still long and costs remain high by international standards. Apart from illegality, this reflects the uncertainty of the funding framework, weakness in project selection and assessment, overlapping powers and responsibilities among different levels of government, and the shortcomings of the rules governing public procurement. The new Procurement Code contains relevant provisions to increase the efficiency of infrastructure spending. The inefficiency of the civil justice system, the degree of corruption, the presence of organized crime, and the general malfunctioning of the public administration58 are the main drags on productivity and GDP growth. The policy interventions on these matters have been very limited and often ineffective. Besides their complexity, these reforms require a long-term perspective with broad support that must go beyond a single legislature to avoid the risk of policy reversal. (M. Bugamelli, F. Lotti, M. Amici, E. Ciapanna, F. Colonna, F. D'Amuri, S. Giacomelli, A. Linarello, F. Manaresi, G. Palumbo, F. Scoccianti, E. Sette,2018, Productivity growth in Italy: a tale of a slow-motion change)

There are three major mafia organisations located in Italy mostly in the southern region where they have caused many political problems throughout the years. The foreign direct invest for Italy in 2002 we around 21 billion dollars. Source: (www.oecd.org). In a study

made by the Italian stock exchange 98% of the foreign direct investment were distributed in the northern and central regions of Italy, leaving the southern ones with only 2%. The presence of organised crime makes the south far less appealing when it comes to attracting new investors. The corruption of the youth is also a major concern in the south. Crime organisations take advantage of the youth unemployment rate and start recruiting. To join these organisations there are no requirement of education, pay significantly more than an average job and are almost all the time available. Like any other organisation, they require funding to run their operations. One of the most effective ways of doing that is by moving to the legal economy. How do they do it? There are many ways that this could happen. One of them is corrupting politicians and business managers. An example is the Italian Tangentopoli' scandal in 1992. According to the Italian judge Giovanni Falcone, who led against the Sicilian Mafia in 1987 and was assassinated by the organisation, "more than one-fifth of Mafia profits come from public investment". According to a survey performed 2010-2011 by the Global Corruption Barometer Report, less than 30 percent of Italy's population believes the government is effective in fighting corruption. Italians rated their Parliament and political parties as "very corrupt. Italy is ranked 15th out of the 28 largest global economies in perceptions of bribe paying. In 2010 that Italy had poor mechanisms to fight corruption in public administration and lacked effective laws on conflict of interest. Prices are around two to five percent higher in the southern part of Italy due to the impact of these organisations where they collect a percentage of tax in every transaction of goods and services. Organised crime has influenced politics a lot. There have been cases where the mafia has guaranteed the election to a politician in exchange for a 'favour'. Corruption is one of the many causes of poverty in the south. Judges, police officers and politicians have been exposed for collaborating with the Mafia many times. Bribing and threatening are their main ways to get them to their side. This would allow them to perform illegal activities without experiencing any consequences.

According to Nicola Gratteri the best way to defeat the mafia is by spending money on education and culture rather than spending on anti- mafia conventions because according to him it's the best way to protect the youth against these organisations.
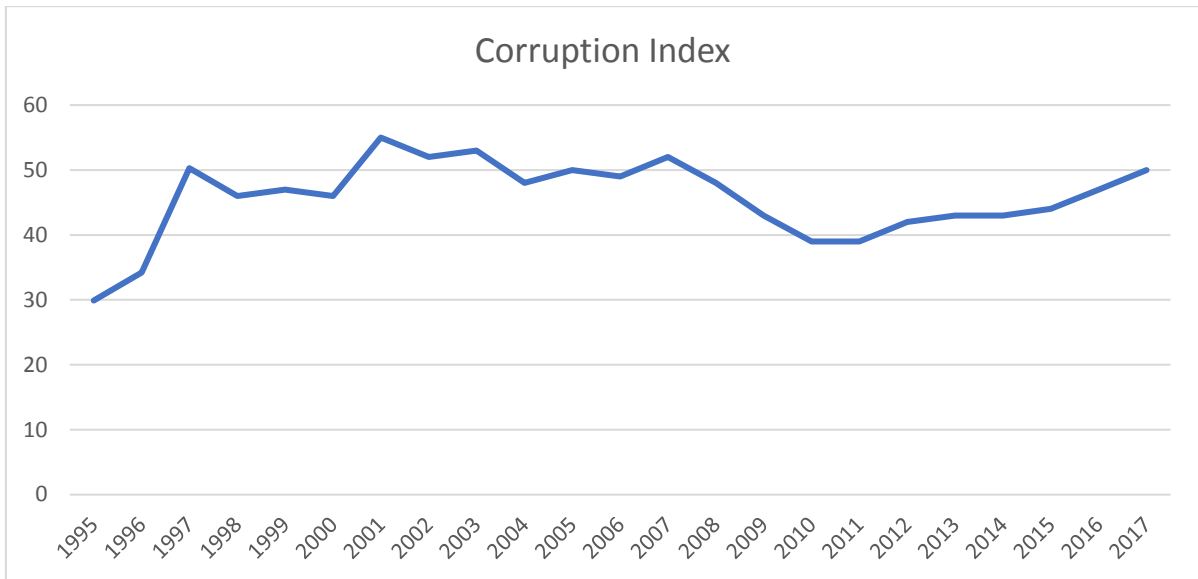
Figure 2.1 Corruption Index. *(Source*: www.tradingeconomics.com)

In order to compare the contribution of the north and the south of Italy towards the GDP we have selected two regions, one located in the north which is Lombardy and the other one located in the south which is Sicilia where the northern region selected is the one with the highest GDP contribution out of all the regions in the north and the southern region is the one with the highest GDP contribution from the south of Italy.
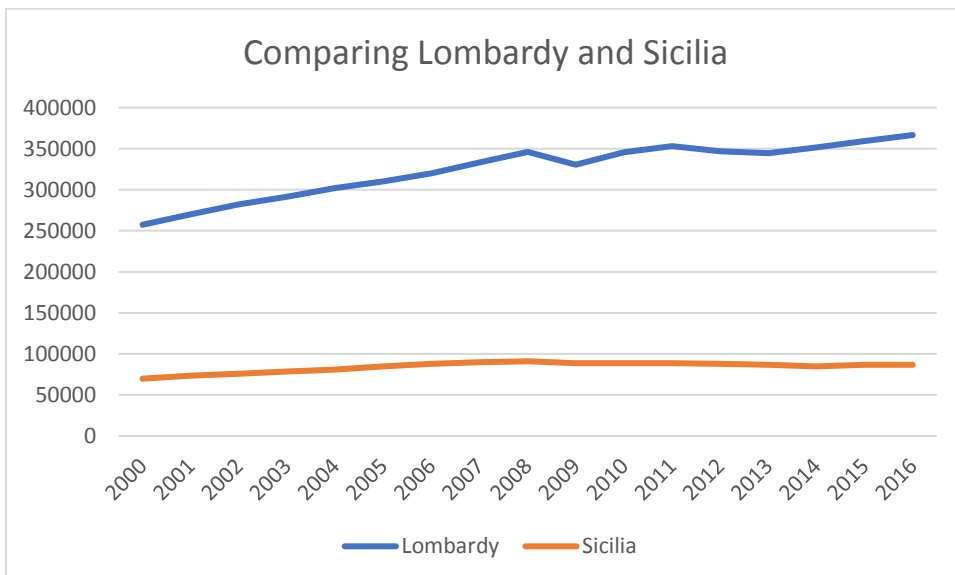
Figure 2.2: Comparing Lombardy and Sicilia (*Source*: http://ec.europa.eu/eurostat/)

It is very clear from the graph that the northern region is superior to the southern one when it comes to GDP contribution where Lombardy is responsible for approximately 20% of

the country's total GDP. The two regions of Italy have experienced a decrease in their GDP contribution during the financial crisis of 2008 but the region of Lombardy had a 16 billion euro decrease while Sicily had a 1.5 billion euro decrease. During the financial the Italian exports dropped drastically especially in the third and fourth quarter of 2008 and due to 90% of the exported goods come from the north and the major firms are located there, would explain why they had more than ten times the loss than the south had in that year. Since then they have been on the road to recovery but still the south is not growing at the same rate as the north.
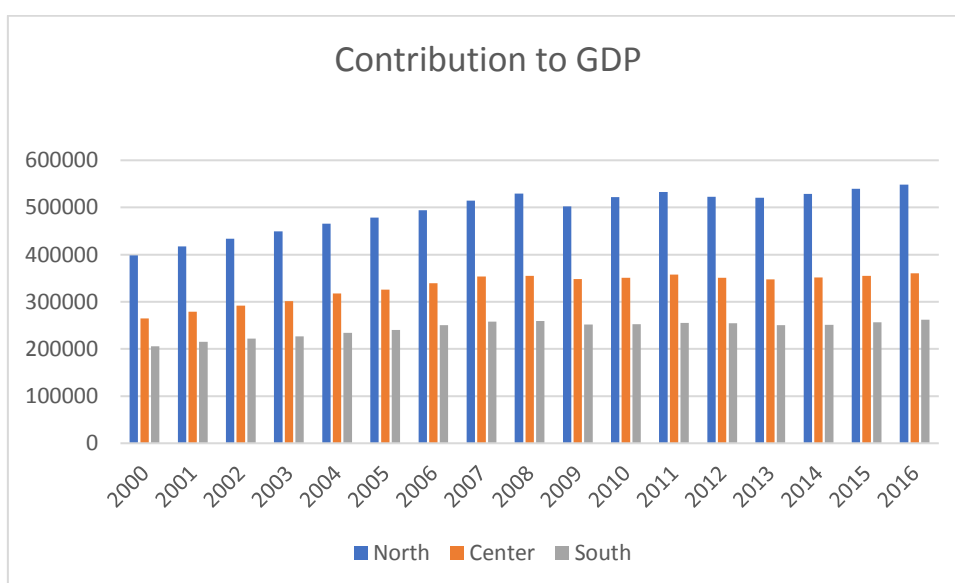
Figure 2.3: Contribution to GDP (*Source:* http://ec.europa.eu/eurostat/)

According to the Fortune Global 500, there are 9 major companies in Italy who record the highest revenue in the country which are: Fiat, Generali Group, Eni, Enel, Intesa Sanpaolo, Unicredit, Postaleitaliane, Telecom Italia and Unipol. All of these companies have their headquarters in the north and centre of Italy, none of them in the south. This shows the impact of the north in the economy of Italy where in 2016 these companies surpassed 600 billion dollars in revenue. The south on the other hand, has difficulties in attracting businesses and creating new jobs. The south of Italy relies mostly on tourism due to the rich background and historical values. The employment rate in the south is ranked the lowest when compared to the countries who are members of the European Union.

GDP per capita is a standard of living indicator which is mostly used to do a comparison between two or more countries where a higher GDP per capita means a higher standard of

living. It is one of the primary indicators of a country's economic performance. In our case the GDP per capita will be used to compare all the regions in Italy with each other. These data are for the year 2017.
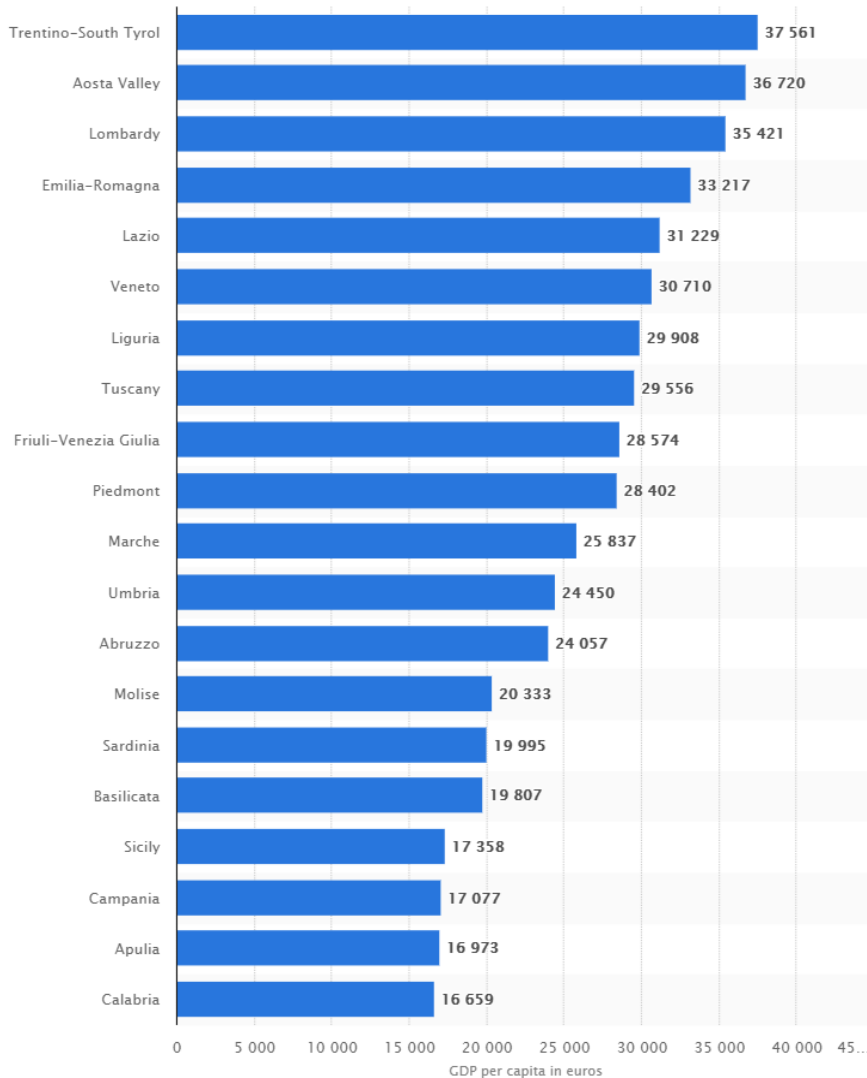
Figure 2.4: GDP per capita of all regions (*Source:* www.statista.com)

The north of Italy consists of 8 regions which are: Aosta Valley, Liguria, Lombardy, Piedmont, Emilia-Romagna, Friuli-Venezia Giulia, Trentino-South Tyrol and Veneto. The centre of Italy has four regions which are: Lazio, Marche, Tuscany and Umbria. The south of Italy has 8 regions which are: Abruzzo, Apulia, Basilicata, Calabria, Campania, Molise, Sardinia and Sicily.

As we can see from the table all 8 regions in the south have lower GDP per capita than the rest of the regions which is a clear indicator that the standard of living in the south is much lower than in the rest of Italy. Crime, corruption, high unemployment, low investment and

low job opportunities are all characteristics of the southern region which would explain why the standard of living is almost twice as low when compared to the north.

A few years after the financial crisis Italy began their road to recovery but will Italy maintain their growth rate in the future? According to the IMF, yes. Their estimations predict positive economic growth for the next five years but that doesn't change the fact that there's still a lot of work left to do regarding their internal problems that the government should quickly interfere.

International Monetary Fund (IMF) Forecast
Real GDP Growth (% Change)

	2015	2016	2017	2018	2019	2020	2021	2022	2023
%	0.95	0.86	1.47	1.54	1.14	0.90	0.80	0.80	0.77
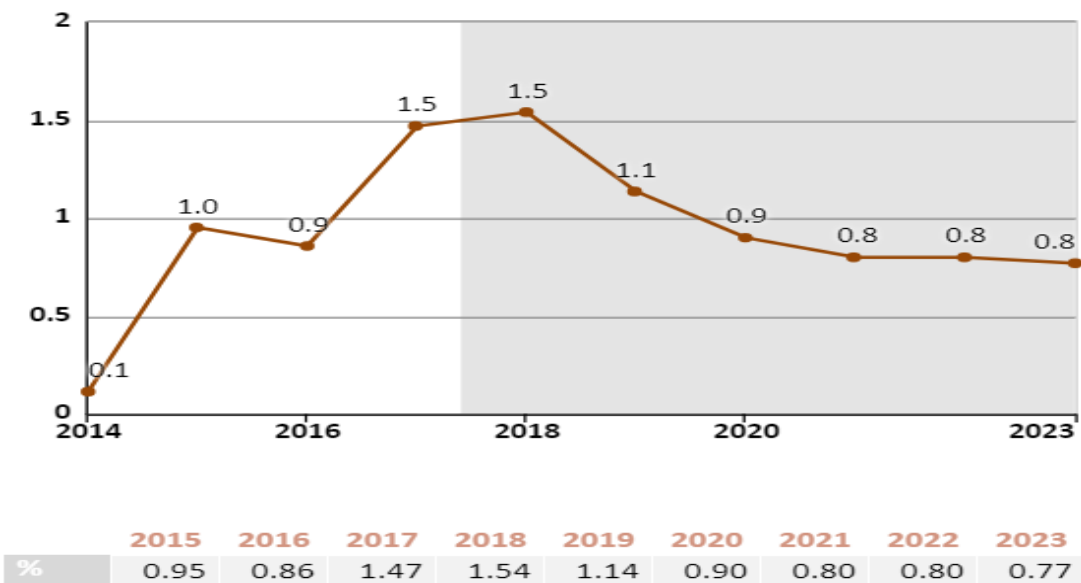
Figure 2.5: GDP growth predictions according to the IMF (*Source*: www.imf.org)

Figure 2.6: Misery Index (*Source*: https://fred.stlouisfed.org)

The misery index which was invented by Arthur Okun, is an economic indicator which is calculated by adding the unemployment rate with the inflation rate. This calculation is useful in order to determine how the average citizen of Italy is doing due to the fact that the unemployment rate and the inflation rate pay a big contribution in the standard of living. In Italy's case we notice that the highest misery index was calculated in the early 80's with their misery index being approximately 23. During this period Italy was characterized by high inflation and single-digit unemployment rate. Italy was just going through a recovery plan in order to help them get back on track from the recession occurred in the 70's and early 80's. Italy decided to cut back on the public costs and spending, tighter budget deficits and lowering the inflation rate, increasing investment in the south 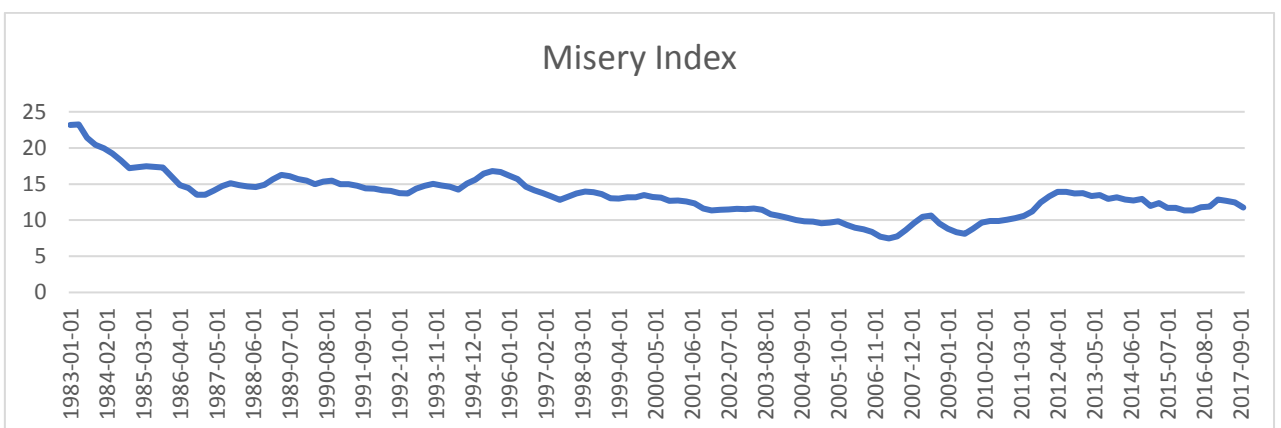which help them get back on track to recovery. In three years the inflation rate decreased by 12% but on the other hand unemployment rate increased by 2%. Italy managed to improve their misery index but shortly after, an increase in inflation would cause it to go back up slightly. Even though inflation didn't go as high as it was in 1983 it was still far away from what they desired it to be. But that changed in 1996 where through strict monetary policy Italy managed to get the inflation rate to 2% and kept it almost the same for over a decade. During this time unemployment in Italy decreased due to an increase in investment and before the crisis in 2008 Italy was going through an economic expansion and experienced their lowest misery index recorded in the country during the second quarter of 2007. Italy was one of the countries affected most by the financial crisis in 2008 which caused an economic slowdown and affected the population in a very negative way due to a rapid increase in the unemployment rate. Almost one million Italians lost their jobs from 2008-2014. 70% of them were southerners. After 2014 the economy experienced deflation for the first time in the last 40 years but luckily for them due to the impact of monetary policy they were able to get the inflation rate back to positive values between 0.5% and 1.5%. The unemployment rate on the other hand still remains an unsolved problem for Italy where to this day they are still struggling with double-digit unemployment rate and there's still a lot of work left to do in order to fix this problem. One of the factors that caused this is the youth unemployment rate where nowadays in Italy is over 40% due to companies not giving long-term contracts to young workers. In order for Italy to improve their misery index they need to focus on reducing unemployment while maintaining inflation at their current level. A decrease in inflation even though can make the misery index go lower, it is not helpful for the economic growth of a country due to low money circulation. As prices fall, production slows down, defaults

on debt increase which will make the depositors to withdraw all their money which would cause a lack of liquidity. Investing to create new jobs seems to be the ideal approach for Italy where they can create new companies, institutions etc. mainly in the southern part where they can lower the unemployment rate and help the economy of the south to grow.

CHAPTER 3
DATA AND METHODOLOGY

3.1 Data

In order to perform the analysis for our case we have collected secondary data for each macroeconomic factor. The data for each macroeconomic factor consists of 140 observations from January 1st 1983 to October 1st 2017. We are using quarterly data instead of yearly data in order to make a more accurate analysis so we can determine which of our independent variables has an impact on our dependent variable GDP growth rate. The website used for data collection is: **https://fred.stlouisfed.org/**The application used in our case for this analysis is EViews. With the help of EViews we will be able to perform theUnit Root test, ARDL model, Breusch-Godfrey Serial Correlation LM test and the Breusch-Pagan-Godfrey heteroskedasticity test

There are two major concerns to consider when you are performing an analysis by secondary data which are reliability and validity .In order for an analysis to be in any value of use both criteria are required. By reliability we mean that if our findings will get the same results if performed for a second time then the data are reliable .By validity we mean that are the findings genuine.

Based on previous research we are expecting to see productivity as the key factor to Italy's economic growth considering that many experts believe that it's the key to improving their economy. Double-digit unemployment rate is also going to give a negative contribution to the GDP growth rate due to its close relationship with productivity and GDP.

3.2 Methodology

Breusch-Pagan-Godfrey Heteroskedasticity test:

This allows you to test for a range of specifications of heteroskedasticity in the residuals of your equation. Ordinary least squares estimates are consistent in the presence of

heteroskedasticity, but the conventional computed standard errors are no longer valid. If you find evidence of heteroskedasticity, you should either choose the robust standard errors option to correct the standard errors or you should model the heteroskedasticity to obtain more efficient estimates using weighted least squares.

Breusch-Godfrey Serial Correlation LM test:

In statistics, the Breusch–Godfrey test, named after Trevor S. Breusch and Leslie G. Godfrey, is used to assess the validity of some of the modelling assumptions inherent in applying regression-like models to observed data series. In particular, it tests for the presence of serial correlation that has not been included in a proposed model structure and which, if present, would mean that incorrect conclusions would be drawn from other tests, or that sub-optimal estimates of model parameters are obtained if it is not taken into account. The regression models to which the test can be applied include cases where lagged values of the dependent variables are used as independent variables in the model's representation for later observations. This type of structure is common in econometric models.

Because the test is based on the idea of Lagrange multiplier testing, it is sometimes referred to as LM test for serial correlation.

A similar assessment can be also carried out with the Durbin–Watson test and the Ljung–Box test. This test is an alternative to the *Q*-statistics for testing serial correlation. The test belongs to the class of asymptotic (large sample) tests known as Lagrange multiplier (LM) tests.

Unlike the Durbin-Watson statistic for AR (1) errors, the LM test may be used to test for higher order ARMA errors and is applicable whether there are lagged dependent variables or not.

Unit Root Test:

This test is used in order to determine stationary variables from non-stationary variables. This test is crucial for our analysis because we can't have non-stationary variables in our model. In case the data are non-stationary then we will calculate the growth rate of the data from the previous period. If the data are still non-stationary then they will be excluded

from our model. The testing procedure for the ADF test is the same as for the Dickey–Fuller test but it is applied to the model $\Delta y_t = \alpha + \beta t + \Upsilon y_{t-1} + \delta_1 \Delta y_{t-1} \dots + \delta_{p-1} \Delta y_{t-p+1} + E_t$ where α is a constant, β the coefficient on a time trend and p the lag order of the autoregressive process. Imposing the constraints $\alpha=0$ and b=0 corresponds to modelling a random walk and using the constraint $\beta=0$ corresponds to modelling a random walk with a drift. Consequently, there are three main versions of the test, analogous to the ones discussed on Dickey–Fuller test (see that page for a discussion on dealing with uncertainty about including the intercept and deterministic time trend terms in the test equation.) By including lags of the order *p* the ADF formulation allows for higher-order autoregressive processes. This means that the lag length *p* has to be determined when applying the test. One possible approach is to test down from high orders and examine the *t*-values on coefficients. An alternative approach is to examine information criteria such as the Akaike information criterion, Bayesian information criterion or the Hannan–Quinn information criterion. The unit root test is then carried out under the null hypothesis $\Upsilon=0$ against the alternative hypothesis of $\Upsilon<0$ Once a value for the test statistic is computed it can be compared to the relevant critical value for the Dickey–Fuller Test. If the test statistic is less (this test is non-symmetrical so we do not consider an absolute value) than the larger negative critical value, then the null hypothesis of $\Upsilon=0$ is rejected and no unit root is present. $DF_t = \Upsilon / SE(\Upsilon)$

ARDL Model

A distributed lag model or ARDL model (Pesaran& Shin, 1999)is built for testing the time series data and a regression equation is used to predict the actual values of dependent variable on current values of an independent variable and the lagged (previous periods) of this independent, explanatory variable.

In econometric models where time-series data is applied, the regressions driven out of models carry both lagged independent and dependent variables as role of regressors. The dependent or otherwise called endogenous variables may be correlated with their lags, meaning that the dependent variable lags must be added to the regression model. Based on this model, the Y (dependent variable), lean on the lags of itself and the independent variables as well depend on the lags of independent variables as below:

$$Y_t = \alpha + \theta t + \beta_1 Y_{t-1} + \cdots + \beta_p Y_{t-p} + \varphi_1 X_{t-1} + \cdots \varphi_q X_{t-q} + e_t$$

Where Y_t presents the time period value t of the dependent variable Y

α Indicates the intercept term to be measured

t refers to time trend,

and Y_{t-1} and X_{t-1} refers to lags of Y and X

The econometric model portrayed above is called ARDL, or the autoregressive distributed lag model. Also, this model may include the deterministic trend (t). We can present this model as ARDL(p;q) because the Y is represented by p lags and the X is defined by its q lags. To achieve the performance of this model, it is required that series must have stationary features, being both stationary of having both a unit root.

Furthermore, the long run multiplier calculates the impact of permanent change in x. Independent variable, or x, change permanently to a new level one unit bigger than the original value. The one that measures this type of change is the long run multiplier.

CHAPTER 4
EMPIRICAL ANALYSIS

4.1 Unit Root Test

In order to do the analysis for our case firstly we need to perform the unit root test for all of our macroeconomic factors to see if they are stationary or non-stationary. If a macroeconomic factor is stationary in level then it can be included in the analysis. On the other hand, if a macroeconomic factor is non-stationary in level then it cannot be included. For non-stationary in level variables we need to calculate the growth rate from previous period and perform the unit root test again to see if they have become stationary. The test type for our case will be the Augmented Dickey-Fuller test and the test for unit root will be in level. Our significance level will be 10%.

Table 4.1

Augmented Dickey-Fuller Unit Root Test Results

Variables	T-Statistics	Probability	Critical Values	
Exports_Growth_rate*	-10.3941	0	1%Level	-3.4781
GDP_Growth_rate*	-7.15461	0	5%Level	-2.8824
Hourly_wage_industry	-1.97502	0.2976	10%Level	-2.5779
Imports_Growth_rate**	-3.19331	0.0226		
Unemployment	-1.93448	0.3157		
Productivity_Index	-1.94204	0.3123		
Inflation**	-3.41819	0.012		
Short_term_int_rates	-1.80321	0.3777		
GPROD*	-9.51812	0		
GUNEM*	-7.75193	0		
GINT*	-7.53677	0		
GHWAGE***	-2.70686	0.0755		

Note: * indicates significance at 1%, ** at 5% and *** at 10%.

4.2 ARDL Model

Table 4.2

ARDL Model Results

Dependent Variable: GDP_GROWTH_RATE
Method: Least Squares
Date: 06/15/18   Time: 18:16
Sample (adjusted): 1983Q2 2017Q3
Included observations: 138 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXPORTS_GROWTH_RATE	0.001834	0.012462	0.147191	0.8832
IMPORTS_GROWTH_RATE	-0.017076	0.009643	-1.770766	0.0791
INFLATION	0.231100	0.150863	1.531852	0.1282
INT_GROWTH	-0.271159	0.152571	-1.777268	0.0780
PROD_GROWTH	4.920095	2.555571	1.925243	0.0565
UNEM_GROWTH	-4.720491	1.976542	-2.388257	0.0185
WAGE_GROWTH	7.892161	10.89954	0.724082	0.4704
C	0.660294	0.306803	2.152172	0.0334
GDP_GROWTH_RATE (-1)	0.346127	0.081625	4.240468	0.0000
EXPORTS_GROWTH_RATE (-1)	0.029443	0.012074	2.438599	0.0162
IMPORTS_GROWTH_RATE (-1)	0.004069	0.007840	0.519024	0.6047
INFLATION (-1)	-0.243704	0.132198	-1.843474	0.0677
INT_GROWTH (-1)	0.176691	0.153229	1.153116	0.2511
PROD_GROWTH (-1)	4.563179	2.654535	1.719013	0.0882
UNEM_GROWTH (-1)	0.614363	2.083620	0.294854	0.7686
WAGE_GROWTH (-1)	-7.022224	11.25728	-0.623794	0.5339
@TREND	-0.005611	0.002558	-2.193192	0.0302

R-squared	0.388703	Mean dependent var	0.293173
Adjusted R-squared	0.307871	S.D. dependent var	0.728653
S.E. of regression	0.606198	Akaike info criterion	1.951692
Sum squared resid	44.46453	Schwarz criterion	2.312296
Log likelihood	-117.6667	Hannan-Quinn criter.	2.098232
F-statistic	4.808745	Durbin-Watson stat	2.099766
Prob(F-statistic)	0.000000		

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.968039	Prob. F(2,119)	0.1443
Obs*R-squared	4.418384	Prob. Chi-Square(2)	0.1098

Our dependent variable for this model will be the GDP growth rate and the independent variables will be the exports growth rate, imports growth rate, inflation, unemployment growth rate, productivity index growth rate, short term interest growth rate, hourly wage industry growth rate. From this model we are also going to see if one of these macroeconomic factors from the previous period have an impact on the current GDP growth rate. Our significance level is 10%.

From our model we notice that the interest rate, unemployment and imports have an immediate negative impact on current GDP growth rate while productivity index has an immediate positive impact on GDP growth. The exports growth rate, hourly wage industry and inflation are not significant.

Exports growth rate from previous period are significant and will have a positive impact on current GDP growth after one period (in our case 3 months) while inflation from previous period will have a negative impact on current GDP growth. Hourly wage industry is still insignificant. The growth rate of the productivity index from the previous period also has a significant positive impact on current GDP growth rate at 10% significance level.

Trend is significant at 10% significance level so we will include it in our model.

R^2=0.388703 which means that this model explains 38.87% of our variables.

Based on our estimations the productivity index growth rate has the highest positive impact on GDP. Both productivity from current and from the previous period have a larger impact than the other macroeconomic factors based on a 10% significance level. The unemployment growth rate has the most negative impact compared to the other macroeconomic variables on the GDP growth rate where 1% increase in the unemployment growth rate is going to cause a 4.72% decrease in GDP growth.

4.3. Breusch-Godfrey Serial Correlation LM Test

Table 4.3
Breusch-Godfrey Serial Correlation LM Results

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 06/15/18   Time: 18:18

Sample: 1983Q2 2017Q3

Included observations: 138

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXPORTS GROWTH RATE	0.000935	0.012420	0.075261	0.9401
IMPORTS GROWTH RATE	-0.001169	0.009631	-0.121358	0.9036
INFLATION	0.005919	0.149730	0.039530	0.9685
INT GROWTH	0.048047	0.153556	0.312894	0.7549
PROD GROWTH	0.080059	2.541243	0.031504	0.9749
UNEM GROWTH	0.314805	1.989273	0.158251	0.8745
WAGE GROWTH	2.369129	11.00059	0.215364	0.8299
C	-0.456114	0.382642	-1.192013	0.2356
GDP GROWTH RATE (-1)	0.414563	0.224643	1.845427	0.0675
EXPORTS GROWTH RATE (-1)	0.004128	0.012160	0.339454	0.7349
IMPORTS GROWTH RATE (-1)	0.002639	0.007918	0.333358	0.7395
INFLATION (-1)	0.013658	0.131354	0.103978	0.9174
INT GROWTH (-1)	0.068690	0.155910	0.440571	0.6603
PROD GROWTH (-1)	-2.298768	2.883944	-0.797092	0.4270
UNEM GROWTH (-1)	1.638746	2.226230	0.736108	0.4631
WAGE GROWTH (-1)	-2.959872	11.29191	-0.262123	0.7937
@TREND	0.003608	0.003133	1.151843	0.2517
RESID (-1)	-0.484759	0.248130	-1.953651	0.0531
RESID (-2)	-0.190507	0.126494	-1.506051	0.1347

R - squared	0.032017	Mean dependent var	-2.47E-17
Adjusted R - squared	-0.114400	S. D. dependent var	0.569700
S. E. of regression	0.601405	Akaike info criterion	1.948136
Sum squared resid	43.04089	Schwarz criterion	2.351164
Log likelihood	-115.4214	Hannan-Quinn criter.	2.111917
F- statistic	0.218671	Durbin-Watson stat	2.010250
Prob (F-statistic)	0.999702		

We perform the Breusch-Godfrey Serial Correlation LM test to see if there is any serial correlation(autocorrelation). The null hypothesis of our model is that there is no serial correlation while the alternative hypothesis is that there is serial correlation. The dependent variable is this case is RESID. All macroeconomic variables are non-significant at 10% significance level. From our results we notice that there is no serial correlation so we accept the null hypothesis. Having no serial correlation is very important. By having serial-correlation it would mean that incorrect conclusions would be drawn from other tests, or that sub-optimal estimates of model parameters are obtained if it is not taken into account.

4.4 Breusch-Pagan-Godfrey Heteroskedasticity Test

Table 4.4

Breusch-Pagan-Godfrey Heteroskedasticity Test Results

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.521397	Prob. F(16,121)	0.9316
Obs*R-squared	8.900753	Prob. Chi-Square(16)	0.9174
Scaled explained SS	9.060966	Prob. Chi-Square(16)	0.9109

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 06/15/18   Time: 18:18
Sample: 1983Q2 2017Q3
Included observations: 138

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.313651	0.274115	1.144233	0.2548
EXPORTS_GROWTH_RATE	0.005833	0.011134	0.523895	0.6013
IMPORTS_GROWTH_RATE	-5.93E-05	0.008616	-0.006883	0.9945
INFLATION	0.174321	0.134789	1.293289	0.1984
INT_GROWTH	0.003112	0.136315	0.022828	0.9818
PROD_GROWTH	0.786882	2.283285	0.344627	0.7310
UNEM_GROWTH	0.105485	1.765950	0.059733	0.9525
WAGE_GROWTH	-4.981103	9.738235	-0.511500	0.6099
GDP_GROWTH_RATE(-1)	-0.090311	0.072928	-1.238354	0.2180
EXPORTS_GROWTH_RATE(-1)	0.001004	0.010787	0.093077	0.9260
IMPORTS_GROWTH_RATE(-1)	-0.001155	0.007004	-0.164887	0.8693
INFLATION(-1)	-0.172586	0.118113	-1.461198	0.1466
INT_GROWTH(-1)	-0.046074	0.136903	-0.336548	0.7370
PROD_GROWTH(-1)	1.020832	2.371705	0.430421	0.6677
UNEM_GROWTH(-1)	-0.209589	1.861618	-0.112585	0.9105
WAGE_GROWTH(-1)	14.53299	10.05786	1.444938	0.1511
@TREND	-0.000822	0.002286	-0.359705	0.7197

R-squared	0.064498	Mean dependent var	0.322207
Adjusted R-squared	-0.059205	S.D. dependent var	0.526255
S.E. of regression	0.541610	Akaike info criterion	1.726371
Sum squared resid	35.49425	Schwarz criterion	2.086975
Log likelihood	-102.1196	Hannan-Quinn criter.	1.872911
F-statistic	0.521397	Durbin-Watson stat	1.524717

Prob(F-statistic)	0.931645

We will perform the Breusch-Pagan-Godfrey heteroskedasticity test to test the null hypothesis which is that there is no heteroskedasticity against our alternative hypothesis which is that there is heteroskedasticity. Our dependent variable is RESID^2. All macroeconomic factors are non-significant at 10% significance level. From our results we accept our null hypothesis. There is no heteroskedasticity in our model.

CHAPTER 5
CONCLUSIONS

5.1 Overall Conclusions

Italy is facing many difficulties throughout the year due to high corruption, high unemployment rate especially youth unemployment rate, low productivity and the fact that the south of Italy is nowhere near as developed as the north, giving little contribution to the economy. The three mafia organisations and corruption are a major contributor to why the south hasn't been contributing much as researchers explain that the organised crime was responsible for a 20% decrease in economic output from the regions in the south of Italy from mid-1970s to mid-2000s. Lack of investment in the south is causing the citizens very little job opportunities and therefore a high unemployment rate. Back in the 50's the Vanoni plan was a strategy used to help the south to catch up to the north. Its plan was using full employment, get help of direct government action on the agriculture sector and leveraging the capacity of private enterprise to create stable jobs and change the overall context to attract a maximum of foreign capital. Even though this strategy was effective in the short term, nowadays it seems like the gap between the north and south keeps getting bigger. The southern region can't rely only on tourism forever but instead the government should interfere by attracting more investment and creating more jobs. Based on our results from our econometric model the unemployment rate had the most negative impact on GDP growth therefore Italy cannot let this situation go on any longer and should take action in reducing the unemployment rate. Focusing on the youth sector would be a very benefit able approach as well considering that over 40% of them are unemployed. Productivity based on previous research was described as the key to economic growth where due to wrong techniques used in the last few decades Italy hasn't taken full advantage of the situation and it should be considered as their number one priority for the government in order to get back on their previous expanding economy situation before the financial crisis. Based on our results from our ARDL model we discovered that the

productivity growth rate was the one who could have the most positive impact due to the fact that productivity from previous periods had a significant impact on the current GDP growth rate. The Central Bank strategy in lowering the interest rate has been very benefit able for Italy due to their impact on exports. The total value of the goods exported outside of Italy has been increasing year by year and it has been one of the major contributors to the national GDP. Based on our model it would take one period (in our case three months since the data are quarterly) for the exports to have an impact on the GDP while an increase in the interest rate would bring an immediate negative impact. The hourly wage index was the only macroeconomic factor which was non-significant to explain changes in the GDP growth rate. The monetary policy's job to control inflation is a big contributor to economic growth. After recovering from a short period of deflation their main concern now is maintaining inflation positive but in a controlled rate. Based on our model an increase in inflation is going to cause a decrease in economic growth after one period. From the analysis we found no evidence of serial correlation or heteroskedasticity which is a good indicator for the results of this study.

5.2 Implications:

This study can be very useful to the Italian government and policy makers. Based on the results from our study the government can identify what affects the GDP growth the most and can make policy changes in order to benefit them. This study takes to consideration data for 36 years and they show the huge impact that unemployment and productivity have on the economic growth where the Italian government should intervene and improve the current condition

5.3 Recommendations:

For future studies we recommend an increase in the macroeconomic factors and time period. Usage of monthly data instead of quarterly data is going to make the analysis more precise. The problem with this is due to the availability of data where the sources used for data collection do not obtain these certain data in their database. In the future if there is an availability of data regarding the corruption index of Italy it is recommended to be added in the econometric model due to the negative impact that corruption has had during this period on the Italian economy.

5.4 Limitations:

The aim of this study at first was to include the data for the corruption index and from the regions of the south in our econometric model but due to having access to data only for a short period of time they could not be included in our model.

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APENDIX

Observation date	Short term interest rate	Inflation	Unemployment	GDP Growth rate	Exports growth rate	Imports Growth Rate	Productivity Index	Hourly wage industry
1983-01-01	19.111	16.136	7.067	0.195	9.941	-14.085	68.500	29.222
1983-04-01	18.295	15.986	7.267	0.046	-2.471	-10.602	71.800	30.063
1983-07-01	17.869	13.968	7.433	0.812	-5.018	-3.804	72.300	31.185
1983-10-01	17.960	12.737	7.700	-0.040	8.414	2.554	73.000	32.143
1984-01-01	17.759	12.083	7.867	-0.284	2.613	-1.272	74.700	33.152
1984-04-01	17.103	11.400	7.833	-0.053	-10.622	3.019	74.100	33.720
1984-07-01	16.903	10.472	7.800	-0.291	8.688	6.127	73.600	34.566
1984-10-01	17.308	9.351	7.833	0.280	-2.229	10.139	74.500	35.353
1985-01-01	16.162	9.336	8.000	-0.120	-1.389	0.940	76.700	36.758
1985-04-01	15.471	9.444	8.033	1.862	1.039	9.110	78.200	37.650
1985-07-01	14.699	9.150	8.233	2.217	8.999	-0.427	80.000	38.580
1985-10-01	14.656	8.909	8.400	-0.196	15.362	21.982	83.900	39.116
1986-01-01	16.447	7.479	8.567	0.322	5.152	22.733	82.300	39.155
1986-04-01	13.806	6.066	8.767	1.177	-1.006	8.389	83.300	39.630
1986-07-01	11.955	5.432	9.000	0.016	3.759	12.976	83.000	40.018
1986-10-01	11.366	4.408	9.133	0.572	2.508	-2.339	84.700	40.696
1987-01-01	11.986	4.277	9.267	1.321	10.805	10.905	86.400	41.311
1987-04-01	10.796	4.423	9.667	0.801	-3.635	26.737	84.300	42.215
1987-07-01	11.530	4.901	9.800	0.667	9.277	29.349	86.900	42.674
1987-10-01	11.023	5.371	9.733	0.623	6.320	32.742	87.300	43.597
1988-01-01	10.672	5.142	9.700	0.647	-3.291	13.801	84.900	44.040
1988-04-01	10.562	5.023	9.633	0.998	11.364	14.935	86.400	44.820
1988-07-01	10.749	4.972	9.600	0.411	-10.457	7.620	87.800	45.355

1988-10-01	11.288	5.097	9.800	0.410	11.108	7.621	86.700	45.946
1989-01-01	12.448	5.852	9.800	1.514	0.209	15.065	88.700	46.529
1989-04-01	12.660	6.453	9.800	0.289	3.160	7.717	89.200	47.422
1989-07-01	12.655	6.391	9.700	1.076	0.560	14.087	91.300	48.147
1989-10-01	12.718	6.336	9.367	1.472	6.828	8.519	90.600	49.005
1990-01-01	12.913	6.463	9.000	0.635	6.228	14.927	84.600	49.919
1990-04-01	12.030	6.089	8.900	1.314	4.908	14.392	86.000	50.798
1990-07-01	11.350	6.543	8.800	1.194	3.421	19.457	88.000	51.665
1990-10-01	12.627	6.723	8.733	0.621	7.223	24.894	89.600	52.548
1991-01-01	13.183	6.339	8.633	0.432	-4.420	11.195	93.100	53.858
1991-04-01	11.723	6.523	8.467	1.042	-8.605	0.493	95.000	55.757
1991-07-01	11.843	6.329	8.433	1.029	0.178	-3.230	95.300	57.120
1991-10-01	12.083	5.823	8.600	0.399	10.335	-6.760	95.300	58.079
1992-01-01	12.220	5.698	8.667	0.305	-1.815	-2.309	93.900	58.777
1992-04-01	12.760	5.491	8.667	0.160	0.364	10.538	95.700	59.112
1992-07-01	16.430	5.053	9.000	-0.650	11.959	13.378	99.000	59.290
1992-10-01	14.643	4.860	8.900	1.974	-14.217	-8.553	97.700	59.991
1993-01-01	11.840	4.573	9.133	-0.547	-5.291	-22.648	96.400	60.619
1993-04-01	10.837	4.547	9.800	0.036	6.050	-21.477	99.200	61.324
1993-07-01	9.327	4.810	9.967	1.174	-3.990	-28.496	101.300	62.374
1993-10-01	8.793	4.576	10.433	0.269	3.998	-17.871	100.300	62.678
1994-01-01	8.430	4.373	10.433	-0.057	1.866	1.037	97.700	63.077
1994-04-01	8.010	4.063	10.567	-0.222	6.449	6.861	95.200	63.598
1994-07-01	8.707	3.824	10.400	-0.689	7.384	21.412	95.000	63.810
1994-10-01	8.883	3.955	11.133	-0.139	3.957	32.066	93.000	64.180
1995-01-01	9.743	4.356	11.233	-0.241	1.417	21.086	80.670	65.221
1995-04-01	10.787	5.334	11.100	-0.158	-1.162	12.681	80.130	65.452
1995-07-01	10.610	5.648	11.167	0.733	6.261	13.161	81.030	66.302
1995-10-01	10.687	5.586	11.100	0.762	4.335	7.596	81.920	66.968

1996-01-01	9.950	5.176	11.000	0.724	4.961	14.184	83.840	67.253
1996-04-01	9.103	4.392	11.300	0.623	4.160	11.229	85.260	67.747
1996-07-01	8.667	3.551	11.100	0.939	0.768	4.367	87.740	68.258
1996-10-01	7.560	2.957	11.200	1.256	2.500	6.562	87.220	68.823
1997-01-01	7.340	2.494	11.267	0.070	-6.370	-0.049	87.200	70.069
1997-04-01	6.947	1.890	11.400	0.445	0.457	4.313	84.480	70.411
1997-07-01	6.810	1.822	11.000	0.828	-1.859	1.968	85.110	70.708
1997-10-01	6.407	1.972	11.300	0.433	3.803	3.728	84.970	71.225
1998-01-01	5.947	2.023	11.682	-0.521	-2.562	6.006	82.490	71.511
1998-04-01	5.153	2.044	11.943	0.226	1.851	1.813	84.750	72.417
1998-07-01	4.913	2.040	11.821	-0.060	-1.133	1.854	85.990	72.752
1998-10-01	3.953	1.716	11.913	0.269	1.835	0.495	86.970	73.361
1999-01-01	3.091	1.394	11.652	1.359	-4.446	-0.282	84.780	73.528
1999-04-01	2.634	1.448	11.547	0.603	-2.551	-1.641	86.060	73.694
1999-07-01	2.699	1.723	11.426	1.644	1.080	1.632	84.930	74.379
1999-10-01	3.430	2.085	11.081	-0.650	3.786	4.868	83.010	74.748
2000-01-01	3.542	2.353	11.115	0.386	1.738	9.674	82.130	74.865
2000-04-01	4.263	2.491	10.741	0.133	-3.173	11.156	81.290	75.593
2000-07-01	4.738	2.631	10.492	-0.465	3.000	12.582	81.510	75.811
2000-10-01	5.024	2.673	9.992	0.591	-1.388	4.061	80.750	76.096
2001-01-01	4.745	2.896	9.811	0.428	5.789	5.260	82.060	76.418
2001-04-01	4.591	3.053	9.534	0.835	-4.820	0.480	83.700	76.653
2001-07-01	4.268	2.799	9.512	1.417	-0.603	-3.657	84.550	77.430
2001-10-01	3.444	2.399	9.234	1.163	1.431	-5.549	86.010	77.811
2002-01-01	3.362	2.408	8.961	0.713	-4.067	-9.471	85.880	78.226
2002-04-01	3.446	2.272	9.181	0.540	5.639	1.160	85.970	79.163
2002-07-01	3.357	2.408	9.068	1.541	7.238	9.153	85.920	79.303
2002-10-01	3.109	2.771	8.816	0.365	3.607	18.685	87.000	79.986
2003-01-01	2.683	2.720	8.796	-0.272	4.312	27.433	87.710	80.237
2003-04-01	2.362	2.700	8.900	-0.424	0.845	22.465	89.260	80.546

2003-07-01	2.139	2.743	8.695	0.049	1.905	11.567	90.050	81.888
2003-10-01	2.150	2.530	8.293	-0.082	12.265	19.966	88.580	82.209
2004-01-01	2.063	2.289	8.319	0.492	2.536	18.236	90.040	82.654
2004-04-01	2.082	2.327	7.985	0.215	1.671	18.052	89.890	83.503
2004-07-01	2.116	2.234	7.803	0.388	1.699	23.151	90.370	83.733
2004-10-01	2.164	1.979	7.887	-0.299	6.037	17.103	91.130	84.450
2005-01-01	2.140	1.914	7.877	-0.315	1.582	13.348	90.240	85.256
2005-04-01	2.125	1.846	7.716	0.115	-0.618	11.308	90.210	85.388
2005-07-01	2.130	2.025	7.636	0.801	-1.017	9.818	88.750	86.087
2005-10-01	2.343	2.154	7.692	0.462	-1.683	1.177	89.230	86.534
2006-01-01	2.612	2.143	7.212	0.325	3.970	6.075	89.130	87.384
2006-04-01	2.890	2.233	6.738	0.095	8.383	14.344	88.270	88.564
2006-07-01	3.221	2.168	6.581	0.164	3.416	18.754	88.300	88.962
2006-10-01	3.594	1.822	6.573	-0.249	7.639	23.106	88.440	90.022
2007-01-01	3.820	1.735	5.991	0.971	2.230	18.571	89.070	90.374
2007-04-01	4.065	1.593	5.879	0.667	5.089	13.836	89.550	90.898
2007-07-01	4.501	1.636	6.144	0.281	3.137	13.770	89.000	91.346
2007-10-01	4.725	2.352	6.284	0.357	6.356	17.006	90.300	92.083
2008-01-01	4.480	3.055	6.568	0.589	6.717	22.231	91.140	92.954
2008-04-01	4.860	3.567	6.893	0.355	2.159	20.927	91.120	93.990
2008-07-01	4.982	3.974	6.672	1.302	-4.993	12.602	95.180	94.952
2008-10-01	4.215	2.797	6.759	0.161	-20.191	-16.066	100.730	95.274
2009-01-01	2.012	1.482	7.354	-0.100	-15.560	-33.945	107.880	96.259
2009-04-01	1.311	0.855	7.477	-0.037	2.239	-35.370	107.970	96.666
2009-07-01	0.869	0.121	7.980	-0.148	8.192	-28.246	106.940	97.401
2009-10-01	0.722	0.656	8.184	1.110	5.751	-2.434	105.710	98.801
2010-01-01	0.662	1.290	8.393	-0.984	-1.910	18.709	103.030	99.191
2010-04-01	0.686	1.405	8.495	-1.398	-2.383	17.923	99.590	99.846
2010-07-01	0.875	1.619	8.275	-2.268	5.027	14.331	99.140	100.351

2010-10-01	1.020	1.786	8.287	-2.752	8.925	18.443	98.250	100.678
2011-01-01	1.093	2.339	7.930	-0.794	3.724	19.591	99.000	101.680
2011-04-01	1.412	2.671	7.913	0.570	8.387	27.908	100.120	102.261
2011-07-01	1.562	2.806	8.422	0.394	-1.469	18.072	100.900	102.739
2011-10-01	1.496	3.300	9.164	0.421	-4.648	-2.194	102.670	103.109
2012-01-01	1.043	3.250	10.048	0.549	-0.959	-8.042	104.690	103.968
2012-04-01	0.696	3.285	10.626	0.528	-1.050	-16.971	104.290	104.510
2012-07-01	0.359	3.168	10.732	0.642	-1.130	-15.485	102.900	105.169
2012-10-01	0.195	2.471	11.207	0.309	3.365	-7.737	106.350	105.733
2013-01-01	0.211	1.908	11.831	0.064	0.454	-4.933	106.370	106.270
2013-04-01	0.207	1.165	12.178	-0.585	-0.991	-4.952	105.990	106.762
2013-07-01	0.224	1.128	12.328	-0.901	2.227	0.791	106.250	107.392
2013-10-01	0.241	0.689	12.258	-0.878	3.440	1.453	105.860	107.872
2014-01-01	0.295	0.499	12.682	-0.917	1.078	0.769	104.930	108.941
2014-04-01	0.299	0.436	12.404	-0.450	-0.712	5.006	104.180	109.532
2014-07-01	0.165	-0.062	12.803	-0.558	-1.364	-1.424	105.930	109.961
2014-10-01	0.081	0.093	12.841	-1.026	-5.132	-9.519	106.030	110.471
2015-01-01	0.046	-0.248	12.221	0.009	-8.943	-15.792	105.450	111.827
2015-04-01	-0.007	0.062	12.311	0.336	0.028	-13.867	104.900	112.223
2015-07-01	-0.028	0.186	11.511	-0.120	-0.970	-14.588	105.370	112.687
2015-10-01	-0.089	0.155	11.541	0.037	-0.981	-10.137	106.360	113.103
2016-01-01	-0.186	-0.095	11.458	-0.076	0.621	-2.702	105.730	112.655
2016-04-01	-0.258	-0.390	11.733	0.228	3.108	-2.304	106.350	112.891
2016-07-01	-0.298	-0.019	11.798	0.033	-0.026	0.802	105.190	113.113
2016-10-01	-0.313	0.129	11.762	0.251	-2.180	2.404	105.440	113.363
2017-01-01	-0.328	1.340	11.498	0.379	2.165	5.217	106.760	113.171
2017-04-01	-0.330	1.504	11.162	0.224	4.727	6.812	106.700	113.542
2017-07-01	-0.330	1.131	11.344	0.235	8.153	14.778	106.700	113.843
2017-10-01	-0.329	0.933	10.837	0.271	2.946	18.615	104.900	114.122