The Impact of Trade on Unemployment

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Submitted to the
Institute of Graduate Studies and Research
in partial fulfillment of the requirements for the degree of

Master of Science
in
Economics

Eastern Mediterranean University
February 2016
Gazimağusa, North Cyprus

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ABSTRACT

International trade has been one of the most fiercely debated economic issues. While standard trade theories state the benefits of free trade, several economist have raised questions about the validity of these theories and of the claimed benefits of trade. These debated have been intensified as we progressed in the era of globalization. In this thesis we focus on one of these debate topics that is we attempt to investigate the impact of trade on unemployment.

In other words this study is an empirical investigation of how trade volume impacts the unemployment rate. The hypothesis of the paper is that, like the standard trade theory has suggested, the more is the trade, the bigger are the welfare and growth gains, and hence the lower is the unemployment. To this end, the study gathers data for 20 countries, 9 of which are from low income countries and 11 of which are from high income countries.

Panel data regressions are carried for three different samples: low-income countries only, high-income countries only and high and low income countries together. In all regressions we find a supportive evidence that the trade impacts unemployment rate negatively. Controlling for GDP growth rates and accounting for granger-causality issues do not change the results.

Keywords: Trade**,** unemployment.

ÖZ

Uluslararası ticaret ekonomi biliminde en yoğun tartışılan konulardan biri olmuştur. Her ne kadar da standart ticaret teorileri ticaretin faydalarından bahsetse de, birçok ekonomici bu teorilerin ve konu bahis ticaret faydalarının gecerliliği konusunda birçok sorgulayıcı sorular sormaktadır. Küreselleşme çağında ilerlediğimiz şu sıralarda, bu tartışma konuları daha da yoğunlaşmıştır. Bu tezle, biz de bu konuların bir tanesine odaklanmak istiyoruz. Bir başka deyişle bu tezle ticaretin işsizliğe olan etkisine bakmak istiyoruz.

Başka bir deyişle, bu tez ampirik bir çalışmayla ticaretin işsizlik oranına atkilerini incelemeyi hedeflemektedir. Bu çalışmada kullanılan hipotez, standart ticaret teorilerinin de belirtiği gibidir, yani artan ticaretle beraber, refah ve ekonomik büyümenin de artacağı ve buna bağlı olarak da işsizlğin düşeceği yönündedir. Bu amaçla 9 tanesi düşük gelirli, 11 tanesi de yüksek gelirli olmak üzere 20 ülkeden veri toplanmıştır.

Düşük gelirli ülkeler kendi arasında, yüksek gelirli ülkeler kendi arasında ve tüm 20 ülke beraber olmak üzere 3 değişik örnek üzerinde panel regresyonlar çalışması yapılmıştır. Tüm regresyonlarda ticaretin işsizliği azalttığı yönünde bulgular bulunmuştur. Ekonomik büyüme ve granger-causality kontol edildiğinde bile bu bulgular değişmemiştir.

Anahtar kelimeler: Ticaret, İşsizlik

To God Almighty and my parents
Mr. and Mrs. Adekunle

ACKNOWLEDGEMENT

I will not fail to appreciate my awesome and understanding supervisor Asst. Prof. Dr Çağay Coşkuner with his advice, lectures and motivation that made this thesis possible. I also use this opportunity to appreciate my adorable and kindhearted parents who stand by me in all areas to make this thesis a successful one. I will also like to appreciate my friends and colleagues who by one way or the other contributed to the success of this thesis especially my special friends Olaniyi Bello, Olokode Mayowa, Segun Ogunbayo.

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Chapter 1

INTRODUCTION

1.1 Background of the Study

While unemployment has been a major economic problem over the years, economists that have studied trade have usually abstracted away from considering it. More correctly, most of the models on trade consider full employment with flexible wages. This indicates that trade economists do not consider trade to be an important factor which can affect unemployment substantially. Of course, there are series of exception to this assertion and surely there is considerable available literature and developing ones in regards to the relationship that exist between trade and unemployment. Outside the profession of economics, some individuals believe that one of the significant impacts of trade is job destruction which results in significant unemployment. Such report comes majorly from various popular forms of the news media which entirely ignore the prospects of international trade creating new jobs (Dewatripont and Sekkat 1999). Therefore it is widely essential not just for theoretical development but also for empirical studies to be performed to investigate the impact of international trade on the level of unemployment in countries or in the world as a whole.

There are many trade theories such as Comparative Advantage model, Heckscher Ohlin model, Specific Factors model or Moore Modelling trade theories such as Product Cycle which all states that trade improves the living standard of the people and therefore helps for economic growth. However, while these theories suggest that

increasing trade increases welfare, they do not necessarily say that it improves the living standards of everybody in the country. Therefore, trade may impact different groups of people in a different way within a country. As such, it may also impact the unemployment level in a negative way because trade may increase certain sectors without many employment gain and reduce some other sectors with many job losses. It is important to analyse these trade theories to see how trade impacts different groups and different sectors within a country and how this may or may not lead to unemployment. This is particularly an important topic because we live in a time period where countries are opening up for larger and larger trade relationships. The statistics also indicates that almost all countries are becoming more trade open over the past two or three decade. Therefore while international trade is taking a larger role in the economics of each country, it is also important to find out how will trade impact individuals and specifically employment.

In the short run, the liberalization of trade might result in job turnover as worker gets reallocated from contracting to expanding economic sectors. Some empirical evidences has been able to identify that such adjustments result in temporary increase in the level of aggregate frictional unemployment as identified in the work of Trefler (2004). Conversely, the long run impact of liberalization of trade on the level of unemployment is not very clear (Helpman and Itskhoki, 2010).

A growing amount of literature includes the labor market imperfections into the workhorse models of trade between countries. Majority of such papers draws that openness of trade matters for the equilibrium level of unemployment, nevertheless the form and direction of relationship differs amongst different works.

The work of Blanchard (2006) expresses views about the abundance of existing theories of unemployment and wage setting within the framework of different international trade theories such as product differentiations and comparative advantage, the amount of possible theoretical model is very large. The study performed by Brecher (1974) and Davis (1998) adopted minimum wages into the Heckscher-Ohlin models and discovered that the liberalization can bring about worsening unemployment. In the study performed by Davidson and Matusz (1999) frictional unemployment is introduced in the models of comparative advantage and found that the relationship is dependent on the comparison of capital endowments across different countries. Egger and Kreickemeier (2009) introduced fair wages into a model that is characterized by increasing returns to scale and found that liberalization of trade has the potential to increase the level of unemployment.

The work of Felbermayr, Prat, and Schmerer (2009) introduce frictions in search into similar model of trade and finds that unemployment may possibly be increasing with the level of openness. The work of Helpman and Itshoki (2008) adopts the searching matching perspective, but also combines motives of comparative advantage and increasing return to scale. The findings of their study were that globalization has the potential to increase the level of unemployment. The state of theoretical review of literature therefore suggest turning in regards to empirical evaluation.

Priya Ranjan (2011) found that liberalization of trade gives rise to the creation of job and also the destruction of job in an import competing sector while it gives a decrease in job in the export sector. In the mode, the liberalization of trade influence job creation incentives with no breathing space for the destruction of jobs. The paper generated a

general equilibrium two sector model with hunt created unemployment and endogeneous job ruin. It was concluded that the liberalization of trade, has an asymmetric effect on the import competing sector and the export competing sector.

As earlier mentioned, few studies are known to have investigated the impact trade has on unemployment. Additionally, previous studies that are related to the trade literature in this regards usually does not account for the significance of labor market institution in the understanding of the trade on the outcomes of the labor market.

The work of Dutt et al. (2009) investigates the impact which trade policies has on the level of aggregate unemployment in countries with diverse characteristics and found significant evidence that open trade policies brings about unemployment.

This study follows the same perspective as that of Dutt et al. (2009) in regards to heterogenuosity of the combination of countries but contrasts by focusing on the impact of aggregate trade variables on unemployment. This supports the suitability for this study accounting for the extent and variability of labor market institutions and improves the analysis by focusing on more recent data and information. Additionally, Dutt et al. (2009) directs more focus on the magnitude in which labor market institutions (such as the unemployment law index) which basically serve as a control variable, while this present-day study focus more on the role played by labor market institutions and the manner at which it interacts with trade in the explanation of aggregate level of unemployment in different countries.

Dutt et al. (2009) also presented a model of trade and search-induced unemployment, where the result of trade differs in Heckscher-Ohlin (H-O) and Ricardian comparative advantage. The paper adopted the use of data from cross-country on trade, unemployment, and various controls, and controlling for endogeneity and measurement-error problems. For the Ricardian prediction, the study found fairly strong and robust evidence that unemployment and trade openness are negatively related. This effect dominates the positive H-O effect of trade openness on unemployment for capital abundant countries, which turns negative for labor-abundant countries. Making use of panel data, it was found that in the short run, there will be rise in the level of unemployment on impact of trade liberalization, followed by an unemployment-reducing effect leading to the new steady state.

This current study however also examines if the impact of trade on unemployment is different within low income countries and high income countries.

This study stays further organized as follows:

Next chapter provides the theoretical underpinnings of the study. Chapter 2 shows the theoretical framework, Chapter 3 explores the empirical literature, Chapter 4 discusses the empirical specification and data, Chapter 5 estimation technique, Chapter 6 estimation of results and Chapter 7 draws the conclusion.

Chapter 2

THEORETICAL FRAMEWORK

There are several trade theories in international economics, few of which are discussed and linked towards growth rate and unemployment.

Some of the theories are as follows: mercantilism, absolute advantage theory, comparative advantage theory, the Heckscher-Ohlin theory, Specific Factors Model and so on. Of this list, the first 3 are the early models of Trade Theory. Below I present these early models very briefly before I present the more advanced Hecksher-Ohlin model in section 2.1.

The Mercantilism theory is based on the assumption that countries should promote exports and discourage imports. It also emphasizes that a country should acquire wealth mostly in the form of gold. The major limitation of this theory is the failure to recognize the fact that it is actually good in some cases to import goods.

The absolute advantage theory is focused on the basis that a country is better off to produce a product and export the product which it can produce a greater amount of output than the other countries with the same amount of resources used as input. Some of the basic assumptions of the theory are trade between two countries, two commodities only are involved, there is existence of free trade between the two countries, and lastly the major and only element or input of production is labor. In such

a framework international trade will take place if each country has one product as an absolute advantage product.

Comparative advantage adopted law is that of a country`s ability to produce a given good or service at a lesser forgone alternative than the other country and import the goods which it has a higher opportunity cost in the production. The major limitationof the comparative advantage is that of the basic assumption that a nation is geared towards consumption and production maximization ignoring concern of workers. Thus in these early models of trade, there is no formal link between trade volume and unemployment rate.

2.1 Heckscher-Ohlin Model

Heckscher Ohlin model states that nations differ in accordance to available factors of production. The model states that a country should focus on the production of a good in which it is resourcefully endowed. Countries can be land, capital or labor endowed. The assumptions of the model are two countries and commodities, similar technology, and production of products is done in both states under constant returns to scale.

Unlike the early models presented above in Heckser-Ohlin model, there is a direct relationship between trade and unemployment due to the differences in factor endowments. Developed countries are mostly capital abundant while less-developed countries are labor abundant. Developed countries export manufactured goods which is capital intensive and thus which use or require less labor in production. Thus, this will show a positive relationship between trade and unemployment that is higher trade may result in increase in unemployment. While in developing country, where labor

intensive goods is more dominant there will be a negative relationship between trade openness and unemployment (Ghazali, 2009).

2.2 Theoretical Perspectives on Trade and Unemployment

There are series of theoretical perspectives that provides different analysis of the impact of trade on unemployment. There is no unanimity on whether a rise in the level of trade will bring about a greater or lesser level of unemployment. The universal belief is that there is negative relationship between trade and unemployment (Baker, 1998).

The work of Dutt et al. (2009) postulated that the openness of trade which brings about the productivity of labor will reduce the level of unemployment as it bring about more creation of jobs and search of job. Correspondingly, built on their pursuit to unemployment ideal with series of heterogeneous firms, Felbermayr et al. (2011) argues that the liberalization of trade decreases the level of unemployment as long as it brings about improvement in the level of productivity. This comes to realization through the flocking out of various firms that are least productive and reallocation of labor into more fruitful firms.

Yotov, Y. (2006) pointed out that it is a common perception that a government, especially in the face of elections, is particularly sensitive to the presence of trade-induced unemployment. In this paper, the author asked a question: how much weight does the incumbent politician actually attach to unemployment resulting from trade? To answer, the study build a model that captures government's sympathy to trade affected workers and allows the author to decompose the channels through which trade-induced unemployment affects the level of sectorial protection chosen by a politically-driven incumbent official.

The case of trade and unemployment rate in G7 countries is another case. Gozgor, G. (2014) considered recent literature that strongly implies the existence of a significant and robust impact of trade openness (liberalization) and globalization on unemployment, particularly in developed economies, this study empirically examines the impacts of four different measures of trade openness and globalization on the rate of unemployment in an unbalanced panel data analysis. The analysis focuses on the G7 countries which are: Canada, France, Germany, Italy, Japan, the United Kingdom (UK), and the United States (US). Robust empirical findings from panel data estimates and demonstrate that, all the measures of trade openness and globalization sideways with macroeconomic indicators and market size, are significantly and negatively connected with the unemployment rate. Therefore, the study concluded that the continuation of the globalization process instead of protectionism is of great importance in reducing the unemployment rate in developed economies.

The perspective of Matusz (1996) further agrees with the idea that trade improves the productivity of economy and thereby reduces the rate of unemployment. The reason behind this is that trade brings about greater level of division of labor as a result of increase in the variety of available intermediaries. On the other hand, Helpman and Itskhoki (2010) agitated that reduced barrier to trade can lead to the rise in the level of unemployment. This occurs as a result of reduced barrier in trade improving the likelihood of growing exporting firms and therefore bringing about expansion in the trading sector. Unemployment has the tendency of increasing when workers are reallocated towards the exporting sector of the economy, if the sector is significantly characterized by the frictions within the labor market.

One of the vital perspectives in international economics is trade brings about well-fair gains. Gains generated from trade can be derived from different channels. Through trading, it is possible for economies to benefit through their different forms of diversity. Efficiency gains can be derived from international specialization and as stated in the "home market" effect, the consequential concentration of production level in one area can result to economies of scale (Trefler, 2004). Integration of economies can result to increase in the growth rate of the world by the increase in the flows of ideas through the research and development sector (Rivera-Batiz and Romer, 1991). In recent academic works on the extent of heterogeneity in the international economics has yet been able to identify another mechanism that brings about improvement in welfare when the economy increasingly gets more expose to trade activity on the international scale.

It is evident that the presence of a fixed cost of entry into the international markets results to the participation of firms that are mostly productive (they are actually the largest) (Johnston et al. 2000). As a result of the sunk cost, being open to trade therefore has an impact on intra-industry allocations. As there is current liberalization of trade at most parts of the world, the large firms that are in the export business demands more amount of labor to produce as the expansion of the market and the presence of new ones makes brings about wider investment opportunities (Pavcnik, 2002). The rise in the demand for labor from these large firms makes workers to reallocate their provision of services from least productive to most productive firms and these results to aggregate increase in productivity and improvement in welfare gains. Additionally, as large organizations gets the ability to set their prices lower,

small firms gets to be forced out of production in the industry, which further increases productivity at the average level (Laplagne, Marshall and Stone, 2001).

A model that focuses on providing explanation for the reallocation of labor from small firms to big ones is that of Melitz's (2003). In this model, firms are assumed to be heterogeneous as a result of the uncertainty that is essential to investment in entry of market. Therefore, as a result of the existence of the sunk cost of entry to the export market, only the firms that have high level of productivity export and the liberalization of trade brings about higher level of aggregate productivity, smaller number of producers and larger firms. The smallest firms exists production and the market because the largest producers pushes up the real wage rate. Nevertheless, the conclusions of the model are drawn from the perspective of full employment (Trefler, 2004). Therefore, in the kind of world that is characterized be different forms of frictions in the labor market there is still questions that needs to be answered in regards to the consequences of such reallocation on the level of unemployment. Indeed, this may result to the regular equal of work for each entity to increase, but as a result of the reduction of the number of the domestic firms, it should be expected that the second impact of such will be dominant on the first and results in a rise in the level of unemployment.

There are also series of theoretical studies that have founded that effect of trade on the level of aggregate unemployment is unclear. The works of Sener (2001) and Moore and Ranjan (2005) agitated that liberalization of trade brings about increase in the level of unemployment for majority of workers that are not skilled, but do have a theoretical unclear impact on aggregate level of unemployment. Previous studies have argued that

the liberalization of trade increases the probability of innovative endeavors by increasing the profit margin of firms in the exporting sector. As a result, more firms get involved in the research and development and increase in the demand of firms for skilled labor. Nevertheless, higher innovation frequency give rise to the rate of turnover for non-skilled workers by accelerating the rate of innovative deduction process and increase the rate of frictional unemployment of non-skilled labor. Therefore, there is no clearity on impact of trade liberalization on the level of unemployment.

According to Janiak, A. (2013) the openness of trade gears towards a rise in intra-industry firm revenue. Janiak also emphasized that the superiority and productivity of firm lies towards the exporting firm rather than the non-exporting firm. The liberalization of trade, leads to the increase in labor for large firms for production while small firms exit, prominent to restructuring of labor from large firms to the small one. This instrument leads to welfare advances as aggregate productivity is improved. The paper discovers that advanced trade exposure is related with a lesser rate of employment, with the idea that trade brings about more destruction of job than it creates job. This is as a result of the outcome of relations between goods and labor market limitations.

In similar vein, Moore and Ranjan (2005) stated that aggregate unemployment have the likelihood of decreasing in countries that have abundant skilled labor and increasing in countries that have abundant unskilled labor.

Ian King developed a model with respect to open economy general equilibrium, with sale based engaged search unemployment to study the connections of trade and unemployment. The paper evolved around factor endowment theory. This paper concluded that trade differs according to factor endowment. It was found that trade may increase unemployment in a capital abundant country if technology is the main engine and for labor intensive country, trade is said to decrease unemployment.

2.3 Theoretical Perspectives of Interaction between Trade and Growth Rate and the Level of Unemployment

Aside from the direct impact of trade on unemployment level, this study explores the manner at which gross domestic growth rate can be shaped by trade.

The work of Muhammad (2014) examined the impact of trade openness on economic growth in the Asian region. The paper found that trade openness contributed significantly to the growth process of the developing nations situated in Asian region. The paper suggested that developing nations in the Asian region needs to speed up the process of trade liberalization and also pay favorable attention to other determinants of economic growth in other to accelerate long run economic growth.

The unemployment problem in Jordan was observed by Frankel and Romer (1999) and discussed whether the inflow of foreign direct investment enhances the solution of the unemployment problem in the country. The results of the study indicated that there was no evidence that foreign direct investment flows contribute to the reduction in the level of unemployment in Jordan, partly as a result of the sector being capital intensive and heavy reliance on labor.

Chapter 3

EMPIRICAL LITERATURE

The role played by trade liberalization in the macroeconomic dynamics, especially after the period of 1970s, has brought about vast amount of empirical researches, trying to link the unemployment and trade liberalization, and having mixtures of findings, in time series, cross sectional and panel data studies. Looking at the work of Blanchard and Wolfers (2000), majority of the literature concerns were with the explanatory power of macro-economic shocks and different labor market institutions. The work of Nickell et al. (2005) provided more recent example relating to this approach whereas, Bassanini and Duval (2006) provided a very comprehensive survey.

While majority of some worldwide studies have focused on liberalization of trade and trade openness and the impact of globalization on stability in the labor market, it was however found that local studies focuses only in the direction of unemployment. For instance, the work of Melitz (2003) assumed full employment and homogeneous workers and predicted that workers gain the most as a result of trade liberalization.

Evidences are also provided suggesting that openness of trade has result to reduction in the level of unemployment. This was performed by Dutt et al. (2010) for cross-section of countries and the same was done by Kpodar (2007) for Algeria, Egger and Kreickemeier (2009) for Zambia and Nickell et al (2005) for Madagascar.

According to the investigation of Dutt et al. (2009) on the impact of trade on the level of unemployment using cross sectional data for the period between 1990 and the year 2000, the study found a strong evidence for the prediction of the Ricardians that trade openness and unemployment have inverse relationship.

Conversely, series of important researches have directly projected the impact of trade on the rates of unemployment. The work of Dutt, Mitra, and Ranjan (2009) performed an empirical test of the model they built, earlier described, using a combination of econometric models and data collected for 90 countries within the 1990s. The cross sectional regressions they explored include the aggregate unemployment rates as dependent variable and series of trade policy measures and economic features as the explanatory variables. Their study found that aggregate unemployment rates are negatively related to the level of trade openness of different countries and positively related to the level of trade barriers. The study also perform estimate on a dynamic econometric model of the rate of unemployment during the period of 1985 to 2004 and found that country trade liberalization immediately results to increases in the level of unemployment which dissipate in the long run.

Davidson et al (1999), relied on the level of required labor allocation across different sectors, such process of allocation is well identified to be restricted within the short run. In the study, it was argued that the trade economists needs to rely on considering the issue of unemployment in international context. They therefore develop a kind of model like the Heckscher-Ohlin type that has frictions in both capital and labor markets and shows that a large economy such as the United States would have the experience of a rise in the level of unemployment when being opened to international

trade since it has a capital abundant economy and therefore will make use of its labor to a lesser extent.

Unfortunately, the model of Melitz (2003) which has wide critics because at the firm level, productivity is random and exogenous. This has brought about motivation for other approaches to be developed such as the Yeaple (2005) model, which accounts for ex-ante identical firms that chose to use different kinds of technologies in process of production. This kind of approach does not however seem to be controversial for the labor economists. There is indeed large amount of empirical studies focusing on the evolution of the plant level employment that provides reports of evidences on idiosyncratic shocks. The well-known Mortensen and Pissarides (1994) approach in the macro labor economics was been motivated by this evidence, which was identified as a very appropriate model in regards of the study of the dynamics of labor market at the frequencies of business cycle.

A regression framework was used in the work of Gaston (1998) for the estimation of the way reduction in in the level of assistance to manufacturing have impact on the sector of employment. With the use of data for 12 different manufacturing industries for a period between 1973-1974 to the period between 1991 and 1992, Gaston provided an estimate of 10% reduction in the effective protection rate being associated with a 1% level of reduction in the employment in manufacturing sector. The Australian Productivity Commission (2003) adopted the parameters used by Gaston in the advent of estimating the impact of trade on employment in the manufacturing sector over a longer period of time. The aggregation of the effect on employment was estimated as the sum of the impact of import and export growth and the level of reductions in the

effective assistance rate. The changes were computed in order to reduce the employment in the manufacturing sector by 20% within 1960-1970 to 2001-2002. The major aspect of this can be attributed to growth in the level of imports majorly as a result of the decreased price of imports, rather than the level of reduction in assistance.

The work of Felbermayr, Prat, and Schmerer (2011) provided report on the econometric analysis of a panel data collected from 20 OECD countries and borders in a cross-section of 62 countries within the period of 1990 to 2007. The empirical evaluation does not provide for the test of a specific theoretical model. However, they aimed on documented robust facts and information in regards to the relationship that exist between the unemployment rates and trade, this was also done by including measures of trade openness within the framework of the regression model that was previously established in the macro-economic literature on the existing differences in the national rates of unemployment. The study averaged the early rates of unemployment for the period of five years in order to remove the effect of the fluctuations in business cycle. The model they offered provided control for international differences within the labor market institutions. The study found that a 10% increase in the level of trade openness results to reduction in the rate of aggregate unemployment by approximately three quarters of a one percent point. The primary reason for the reduction is due to the reduction rate of unemployment of workers that are highly skilled. The result does not provide sensitivity to the choice of sampling, the methodology of estimation or the specific measures of unemployment or openness.

Furthermore, Felbermayr and Prat (2009) tested the prediction made in their model with panel data on the rates of unemployment for 20 OECD countries for the period between 1982 and 2003. In their evaluation, they estimated the extent of the spillover effect using an econometric model that provides control for labor market institutions and for fluctuations in business cycle in partner countries. The findings show that the impact of foreign institutions on domestic level of unemployment is approximately 10% of the impact of the domestic sectors and institutions and that the flexibility of wages brings about reduction in the size of unemployment spillovers. The findings of their study also indicated that expanding the scope of international trade reduces the rate of unemployment. Their estimation shows that, all other things being equal, a one standard deviation level of increase in openness of trade reduce unemployment level by 1.4% points.

The result derived is in consistent with it being possible that trade openness brings about reduction through the improvement in productivity. If the greater level of exposure to trade induces firms with low level of productivity competing in the import market to shut down and high productive firms to further expand, productivity in the whole of the economy will increase, which increase the incentives for firms to increase the rate at which they hire and this is consistent with the model of Melitz (2003). The re-allocation brings about growth in the industry wide level of productivity.

The work of Gaston and Rajaguru (2011) relates the level of changes in the unemployment rate to the changes in the terms of trade, having other factors controlled with the use of annual data from Australia from 1960 to 2008. The study found that a 10% level of improvement in the terms of trade is in association with a level of fall in

the rate of unemployment of about a one percent point. Although, this may be interpreted as a direct connection between aggregate employment and trade, labor market settings have the likelihood to have contributed significantly to the obtained result.

Whereas, Papageorgiouet al. (1990) examined the amount of benefit employment derives from trade liberalization in 19 countries and found that trade liberalization does not bring about rise in the level of unemployment in the manufacturing sector of the economies of the countries.

When contradictory answers are provided in different literatures, the conventional step necessary is to investigate the patterns that are within the data. Nonetheless, the rapidly developing amount of empirical literature has not signified an unambiguous response of unemployment to liberalization of trade. Series of important papers have been able to show that import growth or trade liberalization has brought about an increase in the level of unemployment. The work of Scarpetta (1996) indicates that there is existing and clear evidence in such regards for a country like Mexico, where Rose (2005) supports this assertion for Brazil and Baker et al. (2004), ALesina, Spolaore and Wacziarg (2000), and Pierce and Schott (2013) gives their evidences in this regards for the United States. The work of Dinopoulos and Thompson (2000) identified that there is a significant transitional correlation between skilled premium, trade liberalization and wage inequality. The work of Moore and Ranjan (2005) with the use of a cross sectional data found that the impact trade has on the overall level of unemployment is largely ambiguous. The work of Wacziarg and Wallack (2004) was performed investigating the relationship existing between trade and unemployment

and inequality in wages in Norway using a very large macro econometric model with labor that is heterogeneous. The study argued that the pressure coming from prices of import has increased the level of skill mismatched and surprisingly decreasing the level of the wage differentials.

Moreover, Benhabib and Spiegel (2005) investigated the relationship between liberalization of trade and unemployment in Argentina and the findings was that it brought about increase in the agro manufactured product bringing about lower rate of unemployment and increase in the rate of labor market participation. Resulting from this, wage increases as a result of increase in the prices of export. The work of Lum and Nanto (2007) investigated the relationship that exists between liberalization of trade and the level of unemployment in India and found that there was no evidence of an increase in unemployment resulting from the reform on trade. In the analysis, it was revealed that the unemployment in the urban area declined in states that have flexible labor markets and larger share of employment in the net exporting industries.

The work of Davidson and Matusz (2004) emphasized on the theoretical model developed by Davidson, Martin, and Matusz (1999) but also support the analysis with theoretical evidences and discussed the implications caused by labor market policies. In the empirical analysis they made, it was found that there are higher rate of job destruction in import competing industries, the explanation of trade was supported by the rate of turnover to help the explanation of the pattern of traded and political perspective in influencing trade is consistent with some part of the prediction that followed their theoretical models. Nevertheless, none of the findings in the empirical

investigations directly addresses their theoretical predictions in regards to the impact of trade on the rates of unemployment.

Finally the study of Noguer and Siscart (2005) estimated the impact of the vast increase in the level of U.S. imports of goods manufactured in China between the year 1990 and 1970 on the outcomes of labor market within different parts of the United States. The econometric specification they derived was from the theoretical model of trade that excludes unemployment. Nevertheless, they included the rate of unemployment in their regression model to provide for a sensitivity analysis. The model was rerun placing unemployment rate in each of the labor market as dependent variable. The estimate shows that for every $1000 imports coming from China per worker brings about increase in the number of unemployed individuals in the affected market by 4.9%. Their estimate shows that there was a more significant impact on the unemployed individuals that do not possess college education, and this brings about rise in the enrolment of individuals in the Social Security Disability Insurance programs.

In this section, I have tried to provide a review of the literature looking at the link between unemployment and trade. Given the mixed result, we are inclined to look further into the detail of the relationship between trade and unemployment in the rest of the thesis.

Chapter 4

EMPIRICAL SPECIFICATION AND DATA

4.1 Empirical Specification

This study aims at identifying the impact of trade on the aggregate level of unemployment with the recognition of the impact of GDP growth rate. This study test if the magnitude of trade is directly correlated with the rate of unemployment.

The basic econometric model is that the unemployment rate is the dependent variable, while the explanatory variables are trade and GDP growth rate. Thus our empirical model will be specified as:

Equation (1) provides the econometric model for the rate of unemployment that identifies the direct impact of trade:

$$Unemploy_{it} = \beta_0 + \beta_1(trade_{it}) + \beta_2(Growth_{it}) + \mu_i \qquad Eqn\ 1$$

Within the model, i refers to the country and t denotes time. While unemployment stands for the dependent variable which is the aggregate rate of unemployment.

Unemployment is the percentage rate or fraction of labor forces between ages 15-64 who are unemployed.

Trade stands for trade volume as percentage of gross domestic product over the years.

Growth stands for the GDP growth rate which is the percentage of gross domestic product.

In this study we will utilize two models;

In the first model, we regress unemploy on trade only as shown in equation 2

$$Unemploy_{it} = \beta_0 + \beta_1(trade_{it}) + \mu_i \qquad Eqn\ 2$$

And in the second model, we also include growth that is GDP growth rate as the explanatory variable to improve the model, as shown in equation 3.

$$Unemploy_{it} = \beta_0 + \beta_1(trade_{it}) + \beta_2(Growth_{it}) + \mu_i \qquad Eqn\ 3$$

Moreover, we are interested to find out if the relationship found out for the overall sample of data would be valid for sub-samples when countries are classified into two groups as High-Income Countries (HIC) and Low-Income Countries (LIC).

Thus, we run a regression in equation 2 and equation 3 three time;

The first for overall sample of all 20 countries, the second for Low-Income Countries only and third for High-Income Countries only.

This study is set to determine whether the total impact of trade on unemployment differ from zero significantly by recognizing the signs carried by the coefficients and the interactions of the trade effect.

The hypothesis formulated for this model can be found below;

Our null hypothesis HO: Trade increases unemployment.

Our alternative hypothesis H1: Trade decreases the level of unemployment.

4.2 Data

The regression adopted is used for analyzing the degree at which international trade affects the aggregate unemployment with the use of panel data from 20 countries within the period of 1993 to 2013. The countries are as follows: Australia, Canada, Cyprus, Czech Republic, Denmark, Greece, Korea Rep, Spain, United Kingdom, United States, Cambodia, Cameroon, El Salvador, Malaysia, Morocco, Nicaragua, Pakistan, Singapore, Uganda and Vietnam.

Countries with a Gross Natonal Income per capita of less than $15,000 are classified as low-income countries and countires with GNI per capita of $15,000 or more are classified as high income countries.

From the countries stated above, the following 11 are classified as high income countries: Australia, Canada, Cyprus, Czech Republic, Denmark, Greece, Korea Rep, Singapore, Spain, United Kingdom, and United States.

The low income countries are as follows: Cambodia, Cameron, El Savador, Malaysia, Morocco, Nicaragua, Pakistan, Uganda and Vietnam.

The unemployment data was collected from the World Bank database. Unemployment is the percentage of Labor force.

The data on trade was also collected from the World Bank database. It is the export plus imports as percentage of GDP.

Growth data was collected from the United Nation database. It is the percentage of growth rate of GDP.

4.2.1 Descriptive Statistics

In section 4.2.1 we provide the descriptive statistics about our variables; unemploy, trade and growth for selected countries in other to make the readers aware of the data used and notice the differences between High-Income Countries and Low-Income Countries.

Here are the descriptive statistics.

Table 1: Descriptive Statistics of Australia

Variables	Mean	Max	Min	Standard deviation
Trade (as % of GDP)	40.1	44.9	35.5	2.5
Unemployment rate (Age 15-64)	6.5	10.9	4.2	1.8
GDP growth rate	3.4	5.01	1.8	0.9

The table above is a descriptive statistics of Australia. From the table above, it can be seen that the mean trade is 40.0% of the GDP, trade maximum is at 44.9%of GDP, trade minimum is at 35.4% of GDP and the standard deviation is at 2.4% of GDP. The unemployment mean is at 6.5% of the total labor force in Australia. GDP growth rate mean is at 3.44%, GDP growth rate maximum at 5.01%, GDP growth rate minimum at 1.82%, GDP growth rate standard deviation at 0.88%.

Table 2: Descriptive Statistics of Cameroon

Variables	Mean	Max	Min	Standard deviation
Trade (as % of GDP)	42.0	52.3	31.7	4.6
Unemployment rate (Age 15-64)	5.2	8.1	3.4	1.5
GDP growth rate	3.3	5.6	-7.93	2.8

Table 2 is a brief statistics of Cameroon over the years. From the table above, it can be seen that the mean trade is 42.0% of the GDP, trade maximum is at 52.3%of GDP, trade minimum is at 31.7% of GDP and the standard deviation is at 4.6% of GDP. The unemployment mean is at 5.2% of the total labor force in Cameroon. GDP growth rate mean is at 3.29%, GDP growth rate maximum at 5.56% and the minimum gross domestic rate declined at about 7.93%. GDP growth rate standard deviation at 2.76%.

Table 3: Descriptive Statistics of Canada

Variables	Mean	Max	Min	Standard deviation
Trade (as % of GDP)	69.1	83.2	58.4	7.3
Unemployment rate (Age 15-64)	7.9	11.4	6.0	1.4
GDP growth rate	2.7	5.1	-2.7	1.7

In table 3, the descriptive statistics of Canada is as follows: The mean trade is 69.1% of the GDP, trade maximum is at 58.3% of GDP, trade minimum is at 58.3% of GDP and the standard deviation is at 7.3% of GDP. The unemployment mean is at 7.8% of the total labor force in Canada. GDP growth rate mean is at 2.67%, GDP growth rate

maximum at 5.12% and the minimum gross domestic rate declined at about 2.71%. GDP growth rate standard deviation at 1.67%.

Table 4: Descriptive Statistics of Morocco

Variables	Mean	Max	Min	Standard deviation
Trade (as % of GDP)	65.8	88.3	48.7	12.9
Unemployment rate (Age 15-64)	10.9	13.9	8.9	1.5
GDP growth rate	4.2	13.5	-6.3	4.4

In Table 4, Morocco experienced a mean trade of 65.8% of the GDP, trade maximum is at 88.3%of GDP, trade minimum is at 48.6% of GDP and standard deviation is at 12.9% of GDP. The unemployment mean is at 10.8% of the total labor force in Morocco. GDP growth rate mean is at 4.2%, GDP growth rate maximum at 13.46%, GDP growth rate minimum at negative 6.3%, GDP growth rate standard deviation at 4.4%.

Table 5: Descriptive Statistics of Nicaragua

Variables	Mean	Max	Min	Standard deviation
Trade (as % of GDP)	71.5	110.7	39.0	20.6
Unemployment rate (Age 15-64)	5.8	8.0	2.7	1.5
GDP growth rate	3.7	7.0	-2.8	2.3

From table 5, Unemployment mean is at 5.8% of the total labor force in Nicaragua. The mean trade is 71.4% of the GDP, trade maximum is at 110.7%of GDP, trade

minimum is at 39.0% of GDP and the standard deviation is at 20.5% of GDP. GDP growth rate mean is at 3.74%, GDP growth rate maximum at 7.04%, GDP growth rate minimum at negative 2.76%, GDP growth rate standard deviation at 2.3%.

Table 6: Descriptive Statistics of Vietnam

Variables	Mean	Max	Min	Standard deviation
Trade (as % of GDP)	119.4	165.1	66.2	30.9
Unemployment rate (Age 15-64)	2.3	3.0	1.8	0.3
GDP growth rate	6.9	9.5	4.8	1.4

In table 6, it can be seen that the mean trade is at 119.4% of the GDP, trade maximum is at 165.0%of GDP, trade minimum is at 66.2% of GDP and the standard deviation is at 30.8% of GDP. The unemployment mean is 2.3% of the total labor force in Vietnam. The GDP growth rate mean is 6.9%, the maximum growth rate is at 9.5%, the minimum growth rate is at 4.8%, GDP growth rate standard deviation at 1.4%.

4.2.2 Low-Income Countries versus High-Income Countries

In this section, we also present some diagrams/figures in order to compare the High-Income Countries and the Low-Income Countries.

For each sub-group, the average series are calculated according to the following formulas;

$$Average\ unemployment_j = \frac{\sum_i^n unemployment\ rate_i}{n}$$

Where 'j' represents high income and low income country respectively and 'n' denotes the number of countries being averaged in each of the equations respectively.

The average trade for low and high income countries was calculated for each year thus;

$$Average\ trade_j = \frac{\sum_i^n trade\ \%\ of\ GDP}{n}$$

Now let us look at the figures below to see the differences among the sampled countries in more detail.

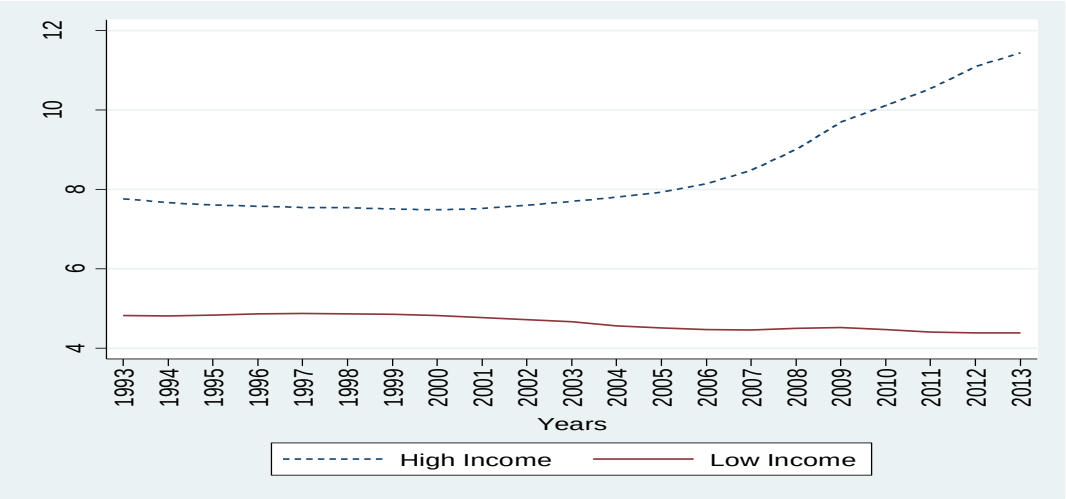

Figure 1: Unemployment Rate in Low and High Income Countries.

From figure 1, the trend of the average rate of unemployment between low income countries (Cambodia, Cameroon, El Salvador, Malaysia, Morocco, Nicaragua, Pakistan, Uganda, Vietnam.) and high income countries (Australia, Canada, Cyprus, Czech Republic, Denmark, Greece, Korea Rep, Singapore,Spain, United Kingdom, United States.) over the years between 1993 and 2013. From the line graph, average unemployment rate in high income countries can be found to be significantly higher than that of low income countries throughout the years. The unemployment has higher level of increase for high income countries from 2006 till 2013. The unemployment rate of the high income countries trends between the averages of approximate 7 to 11% through the years, whereas in low income countries it ranges between approximate of 4 to 5%. The graph is generated from the OECD website.

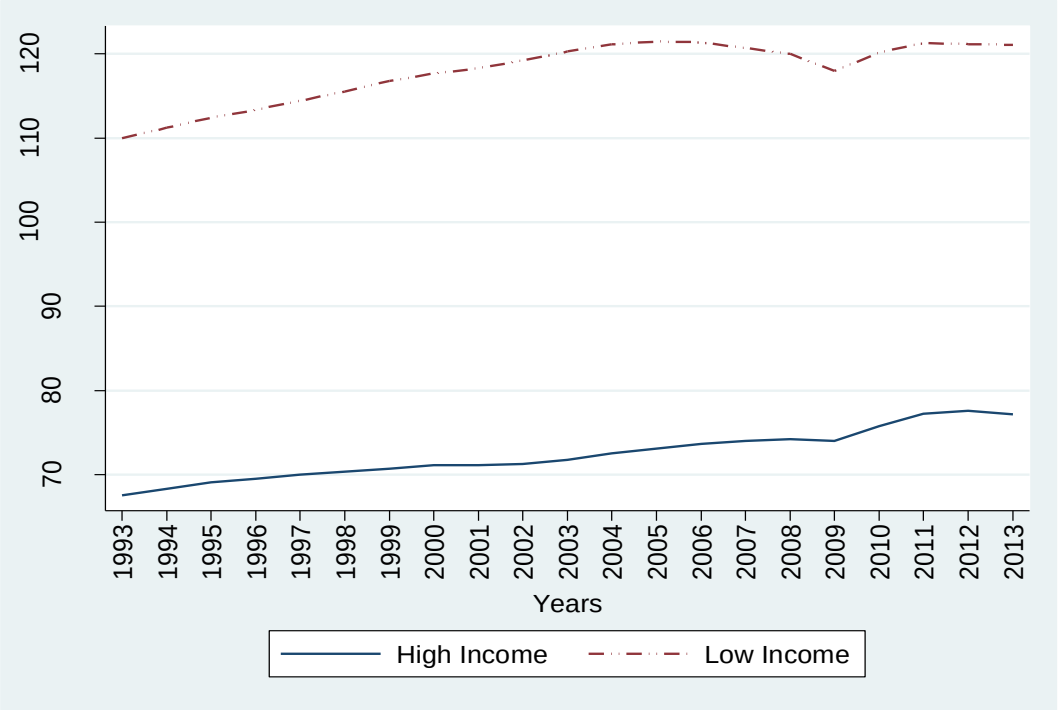

Figure 2: Average Trade as Percentage of GDP in Low and High Income Countries

From Figure 2, low income country had significantly higher average trade level than high income countries do. In high income countries average trade was between approximately 60% and 70% of GDP. Within the two groups of countries, average trade grew consistently throughout the years.

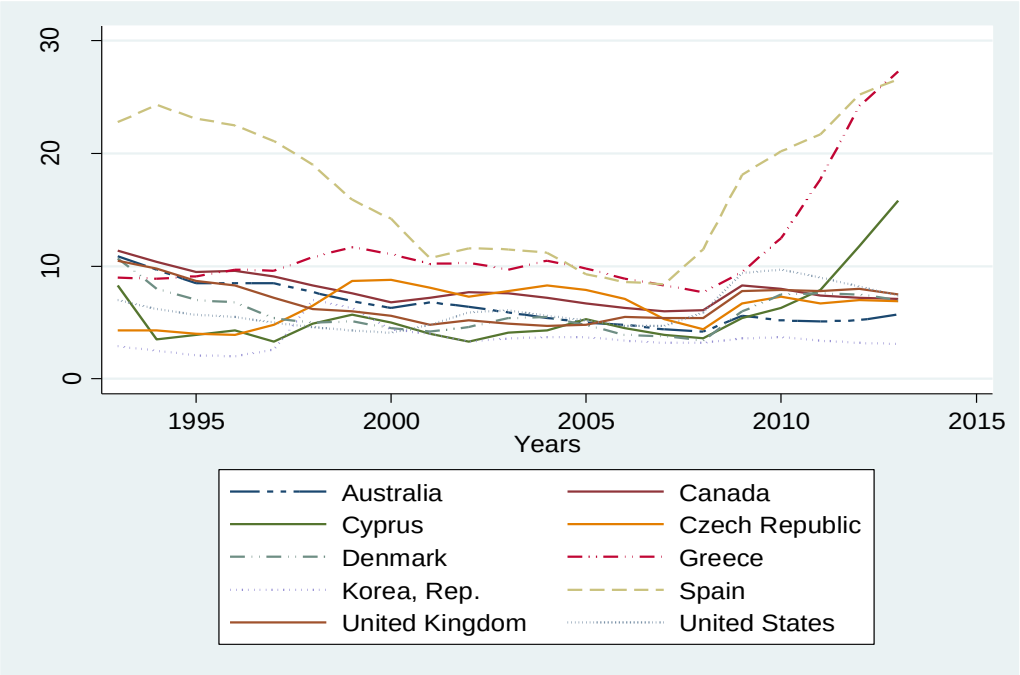

Figure 3: Total Unemployment as Percentage of Labor Force for High Income Countries

The graph shown on Figure 4 shows that Spain has the highest rate of unemployment out of the high income countries. This is followed by Greece and other countries such as Canada, Cyprus, Denmark, United Kingdom, United States, and Australia tend to be clustered around 1 to 11% across the period of time from 1993 to 2013. The United States has the lowest level of unemployment rates within the group of high income countries selected for this study.

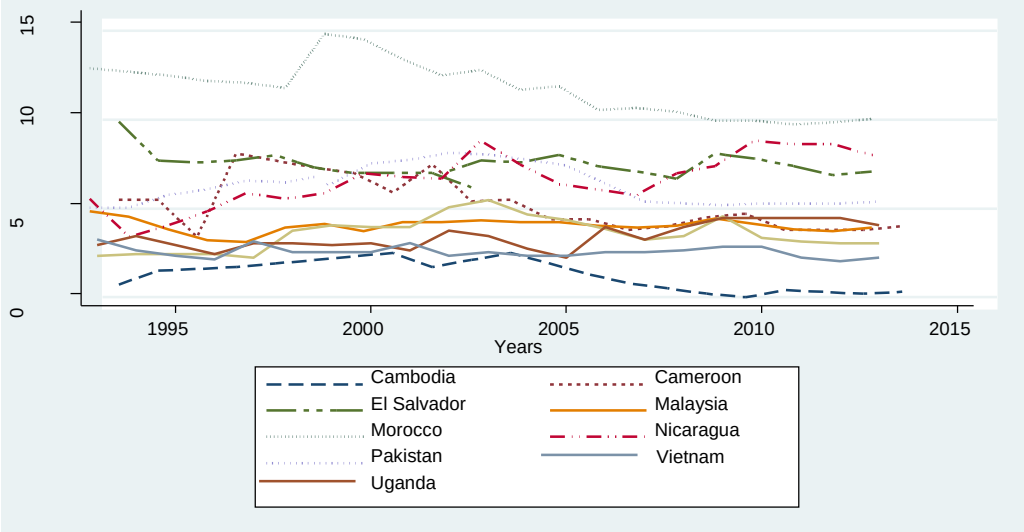

Figure 4: Unemployment as Percentage of Labor Force for Low Income Countries

On the other hand, looking at Figure 5 it will be found that Morocco has the highest level of unemployment through the years. The country unemployment level lies entirely above all other countries throughout the period between 1993 and 2013. Furthermore, the Cambodia has the lowest unemployment rate as percentage of GDP. Other countries such as El Salvador, Pakistan, Uganda Cameroon, Malaysia, Nicaragua and Vietnam trended between 6 to 10% of the Unemployment as a ratio of GDP.

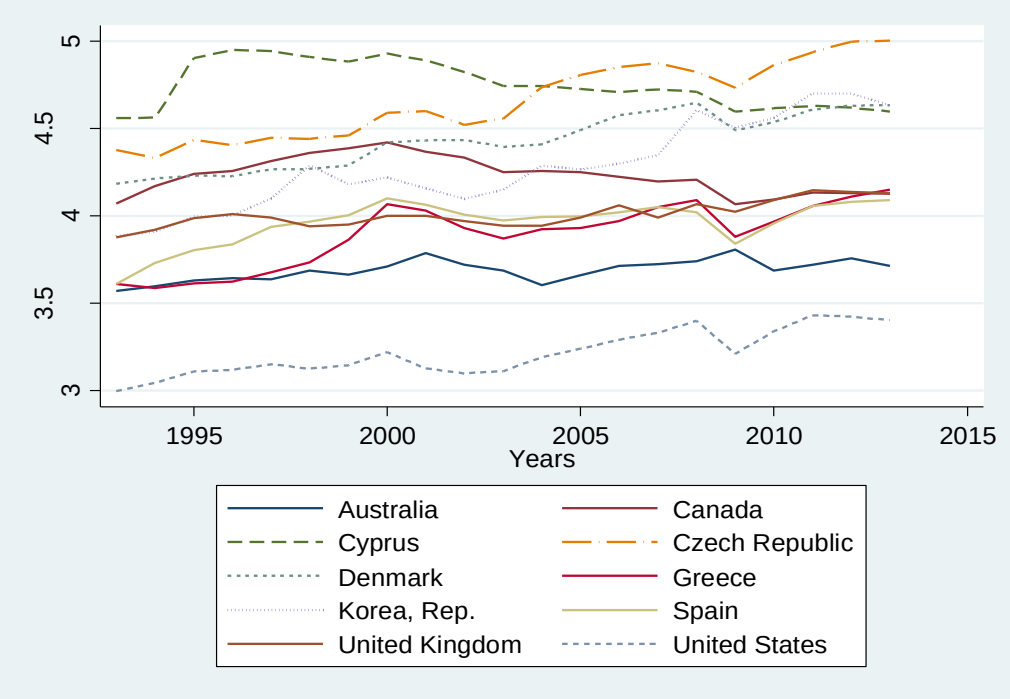

Figure 5: Total Trade as Percentage of GDP for High Income Countries

Looking at the line graph in Figure 5, it will be found that out of the high income countries, Cyprus has the highest trade level as percentage of GDP from 1993 to 2005 where the trend started falling and then Czech Republic took over in 2004. The lowest trade level was from the United States trending about its peak of about 3.4% of GDP. Overall, the Figure shows that trade has been increasing all through the years for all high income countries within the specified period of time.

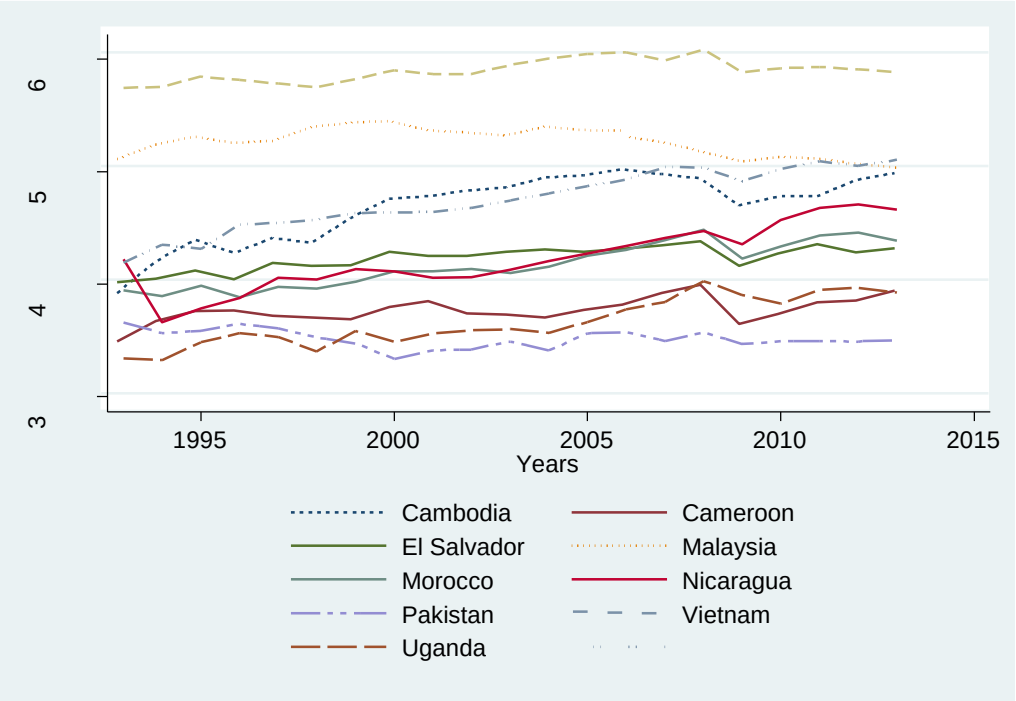

Figure 6: Total Trade as Percentage of GDP for Low Income Countries

The line graph presented on Figure 7 shows that Maylaysia has the highest level of trade as percentage of GDP in the group of low income countries which peaked at fairly 5.4%. Pakistan has the lowest trade as percent of GDP and other countries trend to be within 3.5% and 5.1% throughout the years. Trade as percentage of GDP has also been on the increasing trend for all low income countries except for some few exceptions.

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Chapter 5

ESTIMATION TECHNIQUE

This study collected panel data also known as cross-sectional time series data from 20 countries which are Australia, Canada, Cyprus, Czech Republic, Denmark, Greece, Korea Rep, Spain, United Kingdom, United States, Cambodia, Cameroon, El Salvador, Malaysia, Morocco, Nicaragua, Pakistan, Singapore, Uganda, Vietnam. The data set provides the variation of the countries over 1993 to 2013. The panel data makes it possible to control for variables that cannot be observed in the model such as cultural factors, national policies or factors that changes overtime but not in all entities. This means it accounts for heterogeneity in individual countries and it is suitable for multilevel modeling.

Before using the panel data estimation technique, there is need to test the data for stationarity. To do so, we carry out the unit root test.

5.1 Unit Root Test

The unit root test can be described as a test that is carried out for the intention that in autoregressive statistical ideal of a time series data, the autoregressive constraint is one. Whether trending data should be first differenced or regressed on deterministic functions of time to render the data stationery is decided by the unit root test. The need to test for non stationarity is due to the justification that the stationarity or non stationarity of a series can powerfully be swayed by its properties and behaviors. If after the test, and the variables are found to be non-stationery, this implies non valid

assumptions for the asymptotic analysis. The need for this is to enable casual estimation relationship when the exogenous variables are not feasible. We adopted three different unit root tests in this thesis which are namely; Augmented Dickey Fuller test, Phillips Perron test and the Levin Lin Chu test. Te null and alternative hypothesis for the unit root test is stated as follows;

H0; Series have unit root (variables are not stationery)

H1; Series are stationery

5.2 Panel Data Estimation Technique

Panel data is also known as cross sectional data or longitudinal data. Panel data is a data set which the actions of entities are experimental across time. Panel data is advantageous when considering inference accuracy of model parameters. The essential benefit of a panel data above cross section data is that it enables scholar abundant elasticity in displaying dissimilarities in behavior through individuals. By combining time series of cross section observations, panel data gives more informative data, more variability, less collinearity among variables, more degrees of freedom and more efficiency.

The panel data can enrich empirical analysis in ways that is not possible with the use of only cross section or time series data. Panel data enables us to study more complicated behavioral models such as economies of scale and technological change.

5.2.1 Random Effects Model

The idea behind the model is the assumption of the model is the uncorrelated and randomized variation across entities with the exogenous variables included in the model. The random effect is useful if there is reason to believe that differences across units will affect the endogeneous variable.

5.2.2 Fixed Effects Model

The fixed effect model is used to examine the effect of variables that vary over time. The fixed effects was adopted in this paper.

5.3 Endogeneity and Granger Causality Test

The basic idea behind endogeneity is that even if a variable is an independent variable, it can turn out to be the exogeneous variable for a parameter. In this case, where we want to measure how much trade influence unemployment. If we have the case of endogeneity, it will be the other way around where unemployment influence the volume of trade.

The granger causality predicts that if a signal time “t” granger causes another signal time “t-1” then the past values of “t” should encompass information that can aid in the prediction far beyond the details contained in “t-1”.

Chapter 6

ESTIMATION RESULTS

6.1 Unit Root Test Results

In this thesis, we are applying several unit root tests namely;

The Levin Lin Chu, Augmented Dickey Fuller and Phillip Perron unit root test is carried out to test for stationerity. The results are provided in the table 7 below. The null and alternative hypothesis for the unit root test was stated in chapter 5 but for clarity it is re-stated as follows; H0; Series have unit root

H1; Series are stationery

Table 7: Unit Root Test

Variable	LLC	ADF	PP
Unemployment	-3.836 (0.0001)	81.48 (0.0001)	75.08 (0.0007)
Trade	-3.674 (0.0001)	81.03 (0.0001)	73.63 (0.0009)
GDP growth rate	-13.978 (0.000)	351.01 (0.000)	410.88 (0.009)

ADF - Augmented Dickey Fuller test
PP - Phillips Perron Test
LLC - Levin Lin Chu test
Numbers in parenthesis indicates the p-value

The Levin Lin Chu test statistics on unemployment, trade and GDP growth rate are significantly less than zero from the table and with significance at one percent level. The Augmented Dickey Fuller and Phillip Perron test on unemployment, trade and GDP growth rate are also significant at one percent level. Therefore, we reject the null hypothesis of a unit root, and we accept the alternative hypothesis of stationerity.

The p-values in all 3 tests indicate that the null hypothesis of unit root and thus non-stationarity is rejected at one percent level of significance for all 3 variables namely unemployment, trade and Growth. Thus the test results conclude that these variables are stationery at the level data.

The computer outcome of the unit root test can be found in the appendices.

6.2 Panel Data Estimation Result

In this section, am going to present my result in which I used panel data and fixed effect estimation technique.

Regression was carried out using the level data. The granger causality effect was tested by using the lagged values of trade. Moreover the unemployment lag was introduced and the regression was carried out again in order to correct for serial correlation in the model.

The regression results is reported in this section and the computer outcome can be found in the appendix.

Table 8 shows the result for the overall sample of all countries while tables 9 and 10 show the result of the high income and the low income countries respectively.

The results are presented in the table below

Table 8: Estimation Results on all countries

Dependent Variable Unemployment	1	2	3	4	5
Trade	-0.02 * (-6.17)	-0.01 * (-4.09)	0.007 (1.0486)		
Trade(-1)				-0.01* (-4.21)	-0.02 * (-3.08)
Unemploy (-1)			0.965 * (69.016)		0.96 * (69.75)
Growth		-0.56 * (-9.11)	-0.158 * (-8.66)	-0.58 * (-8.66)	-0.16 * (-8.90)
Durbin Watson	0.31	0.47	1.36	0.30	1.36
R-Squared	0.12	0.27	0.95	0.28	0.95

Numbers in parenthesis indicates the t-statistics
* indicates significance at 1% level.

Table 8 shows the regression result using level data after the unit root test shows stationerity for all variables.

From the table, column one indicates the result of the initial regression. In column 1, Trade proves to be negatively related to unemployment and statistically significant at one percent level. More specifically a coefficient estimate of -0.02 indicates that one unit increase in trade (as a percentage of GDP) indicates that unemployment will decrease by 0.02 units (as percentage of Laor Force). The Durbin Watson statistic is low and the r-squared explains only about 12% of the variation.

Column 2 describes the regression results of the impact of trade on unemployment and thus adding the gdp growth rate as an additional exogeneous variable. From the table, trade shows a negative relationship towards unemployment and it is statistically significant at 1% level. This imply that one more unit increase in trade will bring about

.01 decrease in unemployment. The GDP growth rate reduces unemployment by 0.56 unit and is also statistically significant one percent. The Durbin Watson statistics in the regression is about 0.47 and the r-squared explains about 27% of the variation.

Column 3 is the regression result on trade, GDP growth rate and the unemployment lag. The regression was carried out to test for a better result. In this column, trade shows a positive impact on unemployment though it is not significant at any level. the GDP growth rate shows a negative sign which implies a negative impact on unemployment and it is statistically significant at one percent level. The Durbin Watson is 1.3 and the r-squared is about 95%.

Column 4 shows the regression result on trade lag and GDP growth rate. The trade lag shows a negative impact on unemployment with significance at one percent. The GDP growth rate also shows significance at one percent and also a negative impact on unemployment. The Durbin Watson is 0.3 and the r-squared is .28

Finally in column 5, the result on Granger Causality Effect and unemployment lag was reported. The granger causality effect still shows trade and unemployment to be negatively related and statistically significant at one percent level. The GDP growth rate still shows a negative impact on unemployment and is also statistically significant at one percent level. The Durbin Watson Statistics is about 1.36 and the r squared shows that the variables explains about 95% of the variation.

After the regression is carried out on all countries, I move on to carry out the regression on high and low income countries separately to see if it will yield a different outcome.

The table below is the regression results on high income countries.

Table 9: Level Data Estimation Results on High Income countries

Dependent Variable Unemployment	1	2	3	4	5
Trade	-0.04 * (-3.47)	-0.03 * (-3.48)	-0.0009 (-0.3725)		
Trade(-1)				-0.035 * (-3.505)	-0.03 * (-2.07)
Unemploy (-1)			0.977 * (54.514)		0.97 * (54.77)
Growth		-0.82 * (-5.99)	-0.351 * (-10.264)	-0.799 * (-5.746)	-0.35 * (-10.35)
Durbin Watson	0.39	0.43	1.05	0.21	0.97
R-Squared	0.17	0.30	0.96	0.30	0.96

Numbers in parenthesis indicates the t-statistics
* indicates significance at 1% level.

Table 9 presents the result on high income countries.

Column 1 is the initial regression result on high income countries. Trade shows a negative impact and it is statistically significant at one percent level. The result shows Durbin Watson statistics to be 0.39 and r-squared is about 17%.

In column 2, we introduce the GDP growth rate and it was found to impact unemployment negatively with about .03 unit decline in unemployment. The variable is significant at one percent level. Trade is also significant at one percent level and also shows a negative sign. Durbin Watson is 0.43 and r-squared is at 30 percent.

The regression result in column 3 is the regression carried out using the trade, unemployment lag and GDP growth rate. From the table, trade is negatively impacting unemployment but it is statisticaly insignificant for high income countries. The GDP

growth rate is significant at one percent level and it shows that one more percent increase in growth rate will imply a drop of about .35 unit in unemployment. The Durbin Watson is 1.05 and the r-squared is around 96%.

Column 4 is the result using the trade lag and GDP growth rate which shows that trade and the GDP growth rate is negatively impacting unemployment and they are both significant at one percent level. Our Durbin Watson is 0.21 and r-squared is 0.30.

Finally, column 5 shows the result on the Granger Causality effect and unemployment lag. The granger causality effect still shows trade and unemployment to be negatively related with about .03% decline and statistically significant at one percent level. The gross domestic growth rate reduce unemployment by .035 unit and is statistically significant at one percent level. The Durbin Watson is about 0.97 and r-squared is about 96%.

After the results on high income countries, I move on to the estimation on low income countries. The result is presented in the table below;

Table 10: Level Data Estimation Results on Low Income countries

Dependent Variable Unemployment	1	2	3	4	5
Trade	-0.009 * (-4.72)	-0.007 * (-3.913)	-0.0002 (-0.3903)		
Trade(-1)				-0.008 * (-3.996)	-0.007 (-1.38)
Unemploy (-1)			0.933 * (48.594)		0.93 * (48.7)
Growth		-0.281 * (-4.617)	-0.60 * (-3.36)	-0.31 * (-4.77)	-0.06 * (-3.49)
Durbin Watson	0.16	0.32	2.44	0.26	2.4
R-Squared	0.13	0.22	0.95	0.23	0.95

Numbers in parenthesis indicates the t-statistics
* indicates significance at 1% level.

The table above presents the results on low income countries. Column 1 shows the estimation result on low income countries where trade shows a negative impact on unemployment and statistically significant at one percent level. The Durbin Watson statistics is 0.16 and the r-squared explains about 13% of the variation.

The second column is the result after the GDP growth rate was added. From column 2, trade is significant at one percent level and also shows a negative impact on unemployment. The GDP also shows a negative impact on unemployment and it is significant at one percent. Durbin Watson is 0.32 and R-squared is 0.22.

From the table, column three is the estimation result on trade, unemployment lag and GDP growth rate. Trade shows a negative impact on unemployment in low income countries though it is statistically insignificant. The GDP growth rate also hows a negative impact on unemployment and it is statistically significant. Durbin Watson statistics is 2.44 and r-squared is 0.95.

Column 4 is the result on trade lag and GDP growth rate. Trade and GDP growth rate are negatively related to unemployment and both significant at one percent level. Durbin Watson is 0.26 and r-squared is 0.23.

Finally, column five is the presentation of the result on the Granger causality effect and the lagged unemployment. The Granger causality effect still shows a negative effect between trade and unemployment but it is statistically insignificant at one, five or ten percent. The GDP growth rate is statistically significant at one percent level and it reduces unemployment by .06 unit. The Durbin Watson statistics is 2.4 and the R-squared is about 95%.

In conclusion, trade seems to have a negative sign in all cases of the regression and it is also statistically significant in most cases, though not really by a huge effect but it still imply that one more unit increase in trade will lead to a decrease in the level of unemployment. The GDP growth rate proves to be statistically significant and have a negative relationship on unemployment rate. In the regression for trade, unemployment and GDP growth rate for low and high income countries respectively, trade is statistically insignificant and thus does not necessarily influence unemployment.

Chapter 7

CONCLUSION

This study is built upon the belief that the expansion of the world market through globalization and increase in the level of international trade may bring about negative consequence on Unemployment in both developed and developing countries. Meanwhile, this perspective have been studied severally in the literatures adopting different categories of industry sector, very few have directed efforts towards analyzing the impact of trade on unemployment accounting for the trend of growth rate. Collecting data from 10 low income and 10 high income countries, and years between 1993 and 2013, the study tests the impact of trade on unemployment and also the impact of trade on the growth rate.

From the panel data estimation result in table 8, we reject our null hypothesis and accept the alternative hypothesis which states that the increase in trade will bring about a decrease in the level of unemployment.

This study found that trade has the potential of bringing about decrease in unemployment but it is not enough to influence unemployment level in a country. Specifically, increase in the level of trade brings about decrease in unemployment. The result remain the same in both high income countries and low income countries.

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APPENDICES

Appendix A: Descriptive Statistics Tables

AUSTRALIA			
	TRADE	UNEMPLOYMENT	GDPGROWTH_RATE
Mean	40.05046	6.509524	3.435139
Median	39.96909	5.900000	3.757658
Maximum	44.96071	10.90000	5.007096
Minimum	35.46711	4.200000	1.819678
Std. Dev.	2.454256	1.823980	0.878241
Skewness	0.044094	0.863049	-0.491060
Kurtosis	2.503463	2.840777	2.311396
Jarque-Bera	0.222535	2.629168	1.258895
Probability	0.894699	0.268586	0.532886
Sum	841.0597	136.7000	72.13791
Sum Sq. Dev.	120.4674	66.53809	15.42616
Observations	21	21	21

CANADA			
	TRADE	UNEMPLOYMENT	GDPGROWTH_RATE
Mean	69.14328	7.880952	2.674459
Median	69.32816	7.600000	2.738494
Maximum	83.17568	11.40000	5.123122
Minimum	58.35271	6.000000	-2.711471
Std. Dev.	7.333074	1.420429	1.671081
Skewness	0.261420	0.895625	-1.333757
Kurtosis	2.081941	3.156045	6.316217
Jarque-Bera	0.976670	2.828810	15.84882
Probability	0.613647	0.243070	0.000362
Sum	1452.009	165.5000	56.16364
Sum Sq. Dev.	1075.479	40.35238	55.85023
Observations	21	21	21

MOROCCO			
	TRADE	UNEMPLOYMENT	GDPGROWTH_RATE
Mean	65.83510	10.88095	4.195556
Median	62.41194	11.00000	4.243714
Maximum	88.34727	13.90000	13.45978
Minimum	48.65566	8.900000	-6.328695
Std. Dev.	12.92862	1.490510	4.411246
Skewness	0.334535	0.316616	-0.168504
Kurtosis	1.790332	2.239812	3.528180
Jarque-Bera	1.672082	0.856509	0.343480
Probability	0.433423	0.651646	0.842198
Sum	1382.537	228.5000	88.10667
Sum Sq. Dev.	3342.984	44.43238	389.1818
Observations	21	21	21

CAMERRON			
	TRADE	UNEMPLOYMENT	GDPGROWTH_RATE
Mean	42.02853	5.238095	3.286918
Median	41.36901	4.700000	4.030993
Maximum	52.34214	8.100000	5.561688
Minimum	31.74518	3.400000	-7.932067
Std. Dev.	4.619192	1.489119	2.758000
Skewness	0.268471	0.634294	-3.374123
Kurtosis	3.343355	2.055326	14.43968
Jarque-Bera	0.355425	2.189009	154.3544
Probability	0.837183	0.334705	0.000000
Sum	882.5992	110.0000	69.02527
Sum Sq. Dev.	426.7387	44.34953	152.1313
Observations	21	21	21

VIETNAM			
	TRADE	UNEMPLOYMENT	GDPGROWTH_RATE
Mean	119.4489	2.314286	6.869810
Median	115.1175	2.300000	6.787316
Maximum	165.0942	3.000000	9.540480
Minimum	66.21227	1.800000	4.773587
Std. Dev.	30.85328	0.319821	1.351283
Skewness	-0.022208	0.590866	0.469231
Kurtosis	1.779601	2.685807	2.327260
Jarque-Bera	1.304927	1.308307	1.166628
Probability	0.520761	0.519882	0.558046
Sum	2508.428	48.60000	144.2660
Sum Sq. Dev.	19038.50	2.045715	36.51933
Observations	21	21	21

NICARAGUA			
	TRADE	UNEMPLOYMENT	GDPGROWTH_RATE
Mean	71.48402	5.819048	3.735533
Median	67.19532	5.900000	4.101590
Maximum	110.7220	8.000000	7.035970
Minimum	39.08122	2.700000	-2.759210
Std. Dev.	20.57872	1.485133	2.325767
Skewness	0.522370	-0.230908	-1.153359
Kurtosis	2.345766	2.455815	4.295721
Jarque-Bera	1.329565	0.445735	6.124863
Probability	0.514385	0.800221	0.046774
Sum	1501.164	122.2000	78.44619
Sum Sq. Dev.	8469.675	44.11238	108.1838
Observations	21	21	21

Appendix B: Unit Root Test

Panel unit root test: Summary

Series: UNEMPLOYMENT

Date: 02/18/16 Time: 15:03

Sample: 1993 2013

Exogenous variables: Individual effects

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 2

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-3.83586	0.0001	20	391
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-3.47036	0.0003	20	391
ADF - Fisher Chi-square	81.4804	0.0001	20	391
PP - Fisher Chi-square	75.0799	0.0007	20	400

** Probabilities for Fisher tests are computed using an asymptotic Chi

-square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary

Series: GDPGROWTH_RATE

Date: 02/18/16 Time: 15:06

Sample: 1993 2013

Exogenous variables: Individual effects

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-13.9786	0.0000	20	396
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-11.7965	0.0000	20	396
ADF - Fisher Chi-square	351.014	0.0000	20	396
PP - Fisher Chi-square	410.884	0.0000	20	400

** Probabilities for Fisher tests are computed using an asymptotic Chi

-square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary

Series: TRADE

Date: 02/18/16 Time: 15:15

Sample: 1993 2013

Exogenous variables: Individual effects, individual linear trends

User-specified maximum lags

Automatic lag length selection based on SIC: 0 to 1

User-specified bandwidth: 2 and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-3.67413	0.0001	20	396
Breitung t-stat	-1.99826	0.0228	20	376
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-4.37714	0.0000	20	396
ADF - Fisher Chi-square	81.0313	0.0001	20	396
PP - Fisher Chi-square	73.6345	0.0009	20	400

** Probabilities for Fisher tests are computed using an asymptotic Chi

-square distribution. All other tests assume asymptotic normality.

Appendix C: Panel Data Estimation

Regressiom on both high and low income Countries.

Dependent Variable: UNEMPLOYMENT

Method: Panel Least Squares

Date: 02/17/16 Time: 19:17

Sample: 1993 2013

Periods included: 21

Cross-sections included: 20

Total panel (balanced) observations: 420

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.719681	0.302680	25.50440	0.0000
TRADE	-0.016074	0.002604	-6.172926	0.0000

Effects Specification
Period fixed (dummy variables)

R-squared	0.119206	Mean dependent var	6.292619
Adjusted R-squared	0.072732	S.D. dependent var	4.158032
S.E. of regression	4.003967	Akaike info criterion	5.663408
Sum squared resid	6380.638	Schwarz criterion	5.875040
Log likelihood	-1167.316	Hannan-Quinn criter.	5.747054
F-statistic	2.564995	Durbin-Watson stat	0.312332
Prob(F-statistic)	0.000210		

Panel Data Regression with Growth Rate.

Dependent Variable: UNEMPLOYMENT

Method: Panel Least Squares

Date: 02/17/16 Time: 19:44

Sample: 1993 2013

Periods included: 21

Cross-sections included: 20

Total panel (balanced) observations: 420

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.317084	0.326608	28.52679	0.0000
TRADE	-0.010063	0.002461	-4.089101	0.0001
GDPGROWTH_RATE	-0.557230	0.061140	-9.114054	0.0000

Effects Specification

Period fixed (dummy variables)

R-squared	0.271610	Mean dependent var	6.292619
Adjusted R-squared	0.231246	S.D. dependent var	4.158032
S.E. of regression	3.645706	Akaike info criterion	5.478182
Sum squared resid	5276.594	Schwarz criterion	5.699434
Log likelihood	-1127.418	Hannan-Quinn criter.	5.565631
F-statistic	6.728982	Durbin-Watson stat	0.470003
Prob(F-statistic)	0.000000		

Regression on Trade, Gdp growth rate and Unemployment lag.

Dependent Variable: UNEMPLOYMENT

Method: Panel Least Squares

Date: 02/20/16 Time: 12:35

Sample (adjusted): 1994 2013

Periods included: 20

Cross-sections included: 20

Total panel (balanced) observations: 400

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.791965	0.154459	5.127366	0.0000
TRADE	0.000716	0.000683	1.048624	0.2950
GDPGROWTH_RATE	-0.158133	0.018252	-8.663812	0.0000
UNEMPLOYMENT(-1)	0.965269	0.013986	69.01558	0.0000

Effects Specification

Period fixed (dummy variables)

R-squared	0.947101	Mean dependent var	6.240000
Adjusted R-squared	0.944014	S.D. dependent var	4.106655
S.E. of regression	0.971691	Akaike info criterion	2.836223
Sum squared resid	355.9571	Schwarz criterion	3.065732
Log likelihood	-544.2445	Hannan-Quinn criter.	2.927111
F-statistic	306.8079	Durbin-Watson stat	1.357949
Prob(F-statistic)	0.000000		

Regression with Trade lag and Gdp growth

rate

Dependent Variable: UNEMPLOYMENT

Method: Panel Least Squares

Date: 02/20/16 Time: 12:36

Sample (adjusted): 1994 2013

Periods included: 20

Cross-sections included: 20

Total panel (balanced) observations: 400

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.400225	0.335586	28.01140	0.0000
TRADE(-1)	-0.010347	0.002458	-4.209184	0.0000
GDPGROWTH_RATE	-0.580574	0.063254	-9.178414	0.0000

Effects Specification

Period fixed (dummy variables)

R-squared	0.280104	Mean dependent var	6.240000
Adjusted R-squared	0.240109	S.D. dependent var	4.106655
S.E. of regression	3.579841	Akaike info criterion	5.441943
Sum squared resid	4844.168	Schwarz criterion	5.661474
Log likelihood	-1066.389	Hannan-Quinn criter.	5.528880
F-statistic	7.003598	Durbin-Watson stat	0.304766
Prob(F-statistic)	0.000000		

Regression with the unemployment lag and Granger

Causality

Dependent Variable: UNEMPLOYMENT

Method: Panel Least Squares

Date: 02/18/16 Time: 16:27

Sample (adjusted): 1994 2013

Periods included: 20

Cross-sections included: 20

Total panel (balanced) observations: 400

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.792282	0.152755	5.186625	0.0000
TRADE	0.020231	0.006382	3.170181	0.0016
TRADE(-1)	-0.019696	0.006405	-3.075224	0.0023
GDPGROWTH_RATE	-0.160865	0.018073	-8.901059	0.0000
UNEMPLOYMENT(-1)	0.964786	0.013833	69.74602	0.0000

Effects Specification			
Period fixed (dummy variables)			
R-squared	0.948399	Mean dependent var	6.240000
Adjusted R-squared	0.945242	S.D. dependent var	4.106655
S.E. of regression	0.960972	Akaike info criterion	2.816382
Sum squared resid	347.2239	Schwarz criterion	3.055870
Log likelihood	-539.2764	Hannan-Quinn criter.	2.911223
F-statistic	300.4628	Durbin-Watson stat	1.357576
Prob(F-statistic)	0.000000		

Panel Data Regression on High Income Countries

Dependent Variable: UNEMPLOYMENT

Method: Panel Least Squares

Date: 02/17/16 Time: 19:33

Sample: 1993 2013

Periods included: 21

Cross-sections included: 10

Total panel (balanced) observations: 210

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.24695	0.780639	13.12636	0.0000
TRADE	-0.036713	0.010592	-3.465993	0.0007

Effects Specification			
Period fixed (dummy variables)			
R-squared	0.171470	Mean dependent var	7.766667
Adjusted R-squared	0.078921	S.D. dependent var	4.710137
S.E. of regression	4.520453	Akaike info criterion	5.953960
Sum squared resid	3841.684	Schwarz criterion	6.304609
Log likelihood	-603.1657	Hannan-Quinn criter.	6.095714
F-statistic	1.852756	Durbin-Watson stat	0.388075
Prob(F-statistic)	0.016374		

Panel data regression with growth rate

Dependent Variable: UNEMPLOYMENT

Method: Panel Least Squares

Date: 02/18/16 Time: 18:47

Sample: 1993 2013

Periods included: 21

Cross-sections included: 10

Total panel (balanced) observations: 210

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.12418	0.782338	15.49738	0.0000
TRADE	-0.033869	0.009739	-3.477677	0.0006
GDPGROWTH_RATE	-0.815085	0.136002	-5.993191	0.0000

Effects Specification

Period fixed (dummy variables)

R-squared	0.304969	Mean dependent var	7.766667
Adjusted R-squared	0.223201	S.D. dependent var	4.710137
S.E. of regression	4.151336	Akaike info criterion	5.787786
Sum squared resid	3222.682	Schwarz criterion	6.154374
Log likelihood	-584.7176	Hannan-Quinn criter.	5.935984
F-statistic	3.729672	Durbin-Watson stat	0.427089
Prob(F-statistic)	0.000000		

Regression with Trade, Growth rate and Unemployment

lag.

Dependent Variable: UNEMPLOYMENT

Method: Panel Least Squares

Date: 02/20/16 Time: 12:38

Sample (adjusted): 1994 2013

Periods included: 20

Cross-sections included: 10

Total panel (balanced) observations: 200

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.223291	0.273488	4.472920	0.0000
TRADE	-0.000896	0.002405	-0.372510	0.7100
GDPGROWTH_RATE	-0.350732	0.034168	-10.26482	0.0000
UNEMPLOYMENT (-1)	0.977195	0.017926	54.51410	0.0000

Effects Specification
Period fixed (dummy variables)

R-squared	0.960663	Mean dependent var	7.666000
Adjusted R-squared	0.955774	S.D. dependent var	4.665456
S.E. of regression	0.981149	Akaike info criterion	2.907647
Sum squared resid	170.3896	Schwarz criterion	3.286954
Log likelihood	-267.7647	Hannan-Quinn criter.	3.061147
F-statistic	196.4806	Durbin-Watson stat	1.051673
Prob(F-statistic)	0.000000		

Regression with Trade lag and Growth rate.

Dependent Variable: UNEMPLOYMENT

Method: Panel Least Squares

Date: 02/20/16 Time: 12:40

Sample (adjusted): 1994 2013

Periods included: 20

Cross-sections included: 10

Total panel (balanced) observations: 200

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.07541	0.794797	15.19308	0.0000
TRADE(-1)	-0.034964	0.009975	-3.505067	0.0006
GDPGROWTH_RATE	-0.798914	0.139031	-5.746300	0.0000

Effects Specification

Period fixed (dummy variables)

R-squared	0.304503	Mean dependent var	7.666000
Adjusted R-squared	0.222450	S.D. dependent var	4.665456
S.E. of regression	4.113942	Akaike info criterion	5.770107
Sum squared resid	3012.564	Schwarz criterion	6.132922
Log likelihood	-555.0107	Hannan-Quinn criter.	5.916932
F-statistic	3.711055	Durbin-Watson stat	0.205570
Prob(F-statistic)	0.000001		

Panel data regression with Granger causality and

unemployment lag.

Dependent Variable: UNEMPLOYMENT

Method: Panel Least Squares

Date: 02/18/16 Time: 18:58

Sample (adjusted): 1994 2013

Periods included: 20

Cross-sections included: 10

Total panel (balanced) observations: 200

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.273521	0.272067	4.680915	0.0000
TRADE	0.030605	0.015398	1.987549	0.0484
TRADE(-1)	-0.032570	0.015729	-2.070672	0.0398
GDPGROWTH_RATE	-0.350492	0.033856	-10.35256	0.0000
UNEMPLOYMENT(-1)	0.974830	0.017798	54.77186	0.0000

Effects Specification			
Period fixed (dummy variables)			
R-squared	0.961598	Mean dependent var	7.666000
Adjusted R-squared	0.956580	S.D. dependent var	4.665456
S.E. of regression	0.972162	Akaike info criterion	2.893578
Sum squared resid	166.3373	Schwarz criterion	3.289376
Log likelihood	-265.3578	Hannan-Quinn criter.	3.053751
F-statistic	191.6152	Durbin-Watson stat	0.975658
Prob(F-statistic)	0.000000		

Panel Data Regression on Low Income Countries.

Dependent Variable: UNEMPLOYMENT

Method: Panel Least Squares

Date: 02/17/16 Time: 19:38

Sample: 1993 2013

Periods included: 21

Cross-sections included: 10

Total panel (balanced) observations: 210

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.853582	0.292444	20.01609	0.0000
TRADE	-0.009409	0.001992	-4.724498	0.0000

Effects Specification

Period fixed (dummy variables)

R-squared	0.125769	Mean dependent var	4.818571
Adjusted R-squared	0.028115	S.D. dependent var	2.847695
S.E. of regression	2.807378	Akaike info criterion	5.001237
Sum squared resid	1481.698	Schwarz criterion	5.351887
Log likelihood	-503.1299	Hannan-Quinn criter.	5.142992
F-statistic	1.287906	Durbin-Watson stat	0.169854
Prob(F-statistic)	0.187336		

Regression with Gdp growth rate

Dependent Variable: UNEMPLOYMENT

Method: Panel Least Squares

Date: 02/18/16 Time: 19:43

Sample: 1993 2013

Periods included: 21

Cross-sections included: 10

Total panel (balanced) observations: 210

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.084492	0.385055	18.39863	0.0000
TRADE	-0.007567	0.001934	-3.913427	0.0001
GDPGROWTH_RATE	-0.280545	0.060766	-4.616780	0.0000

Effects Specification

Period fixed (dummy variables)

R-squared	0.215219	Mean dependent var	4.818571
Adjusted R-squared	0.122892	S.D. dependent var	2.847695
S.E. of regression	2.666981	Akaike info criterion	4.902820
Sum squared resid	1330.091	Schwarz criterion	5.269408
Log likelihood	-491.7961	Hannan-Quinn criter.	5.051018
F-statistic	2.331054	Durbin-Watson stat	0.318604
Prob(F-statistic)	0.001199		

Regression with Trade Growth rate and Unemployment

lag.

Dependent Variable: UNEMPLOYMENT

Method: Panel Least Squares

Date: 02/20/16 Time: 12:42

Sample (adjusted): 1994 2013

Periods included: 20

Cross-sections included: 10

Total panel (balanced) observations: 200

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.632869	0.173928	3.638672	0.0004
TRADE	-0.000208	0.000533	-0.390275	0.6968
GDPGROWTH_RATE	-0.060283	0.017967	-3.355221	0.0010
UNEMPLOYMENT (-1)	0.932882	0.019198	48.59382	0.0000

Effects Specification
Period fixed (dummy variables)

R-squared	0.946017	Mean dependent var	4.814000
Adjusted R-squared	0.939307	S.D. dependent var	2.821366
S.E. of regression	0.695069	Akaike info criterion	2.218221
Sum squared resid	85.51238	Schwarz criterion	2.597527
Log likelihood	-198.8221	Hannan-Quinn criter.	2.371720
F-statistic	140.9913	Durbin-Watson stat	2.436145
Prob(F-statistic)	0.000000		

Regression with Trade lag and Growth rate

Dependent Variable: UNEMPLOYMENT

Method: Panel Least Squares

Date: 02/20/16 Time: 12:43

Sample (adjusted): 1994 2013

Periods included: 20

Cross-sections included: 10

Total panel (balanced) observations: 200

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.256058	0.408705	17.75376	0.0000
TRADE(-1)	-0.007711	0.001930	-3.995633	0.0001
GDPGROWTH_RATE	-0.309885	0.064938	-4.772027	0.0000

Effects Specification

Period fixed (dummy variables)

R-squared	0.226098	Mean dependent var	4.814000
Adjusted R-squared	0.134795	S.D. dependent var	2.821366
S.E. of regression	2.624332	Akaike info criterion	4.870996
Sum squared resid	1225.907	Schwarz criterion	5.233811
Log likelihood	-465.0996	Hannan-Quinn criter.	5.017822
F-statistic	2.476350	Durbin-Watson stat	0.263129
Prob(F-statistic)	0.000692		

Regression result with Granger causality and

unemployment lag

Dependent Variable: UNEMPLOYMENT

Method: Panel Least Squares

Date: 02/18/16 Time: 19:55

Sample (adjusted): 1994 2013

Periods included: 20

Cross-sections included: 10

Total panel (balanced) observations: 200

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.637381	0.173516	3.673323	0.0003
TRADE	0.007117	0.005333	1.334512	0.1838
TRADE(-1)	-0.007367	0.005337	-1.380412	0.1692
GDPGROWTH_RATE	-0.062960	0.018026	-3.492801	0.0006
UNEMPLOYMENT(-1)	0.933072	0.019149	48.72663	0.0000

Effects Specification			
Period fixed (dummy variables)			
R-squared	0.946595	Mean dependent var	4.814000
Adjusted R-squared	0.939616	S.D. dependent var	2.821366
S.E. of regression	0.693298	Akaike info criterion	2.217452
Sum squared resid	84.59646	Schwarz criterion	2.613250
Log likelihood	-197.7452	Hannan-Quinn criter.	2.377626
F-statistic	135.6341	Durbin-Watson stat	2.473568
Prob(F-statistic)	0.000000		