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DOES THE EUROPEAN UNION POSITIVELY AFFECT THE ECONOMIES OF DEVELOPING NATIONS WHEN THEY ENTER THE UNION?

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Abstract

The European Union is a coalition of countries in Europe that have entered into trade agreements with each other. Moldova, the poorest country in Europe, is actively trying to become a member of the EU. This paper seeks to answer the question of what would happen to the Moldovan economy, specifically to its GDP, exports, and openness levels if it were admitted in the EU by comparing the effects that EU membership had on nine different European countries. I first explain the requirements needed to enter the EU, and show how Moldova is already on the track to EU membership. I then prove that it is reasonable to assume that the effects that happened to the nine other countries in the EU would also happen to Moldova if it were admitted by giving a historical and economic comparison of Moldova and three of the other countries, Hungary, Czech Republic, and Slovenia. Next I give a summary of trade agreements, specifically Free-Trade Agreements and the positive effects they have on countries within the agreement when trade barriers are taken down. I also explain the risk of trade diversion, and show through data how Moldova has suffered from trade diversion because its neighboring countries have been admitted into the EU.

Next I introduce the methodology of Change Point Regressions that will be used, and explain how I created a variable *d* representing EU membership. Throughout the course of this research, I ran 45 hypothesis tests, each split into three groups and three sub-groups. My research concluded that there is a statistically significant negative GDP growth the year immediately preceding admittance and in the year of admittance, as well as a statistically significant positive Openness growth the year before and the year of admittance. All tests surrounding export growth proved to not be statistically significant. Further tests showed that GDP continues to decline each year of being a member of the EU, but begins to decline at a

slower rate in years six and seven. Openness growth for each year of EU membership was almost directly proportional to GDP growth, but this did not prove to be statistically significant, which led me to conclude that (exports + imports) do not stay constant through the years of EU membership. Furthermore, combining this to the previous tests, I concluded that there is a large influx of imports during the first year of EU admission, but this will steady eventually. This will eventually stop the decrease of GDP growth after a certain number of years of EU membership, and this, combined with improvements in production capabilities, will help a country's economy in the long run. Interestingly, it was discovered that Moldova does not suffer from Trade Diversion due to a large influx of countries entering the EU in 2004. Unfortunately, this data is limited because the countries that are used were either admitted in 2004 or 2007, so there is not enough data to see the effects in the long run.

Bringing these findings to Moldova shows that if it were admitted into the EU, it would see an initial decline of its GDP, though this is not necessarily a bad thing. This is probably a result of an increase in imports, since it will be exposed to strong economies with a large number of products. Further research might be able to prove that in the long run, GDP will begin to increase while trade stays constant. Because of this, I am confident that in the long run, EU admission has a positive effect on the economy of a developing country.

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Acknowledgments

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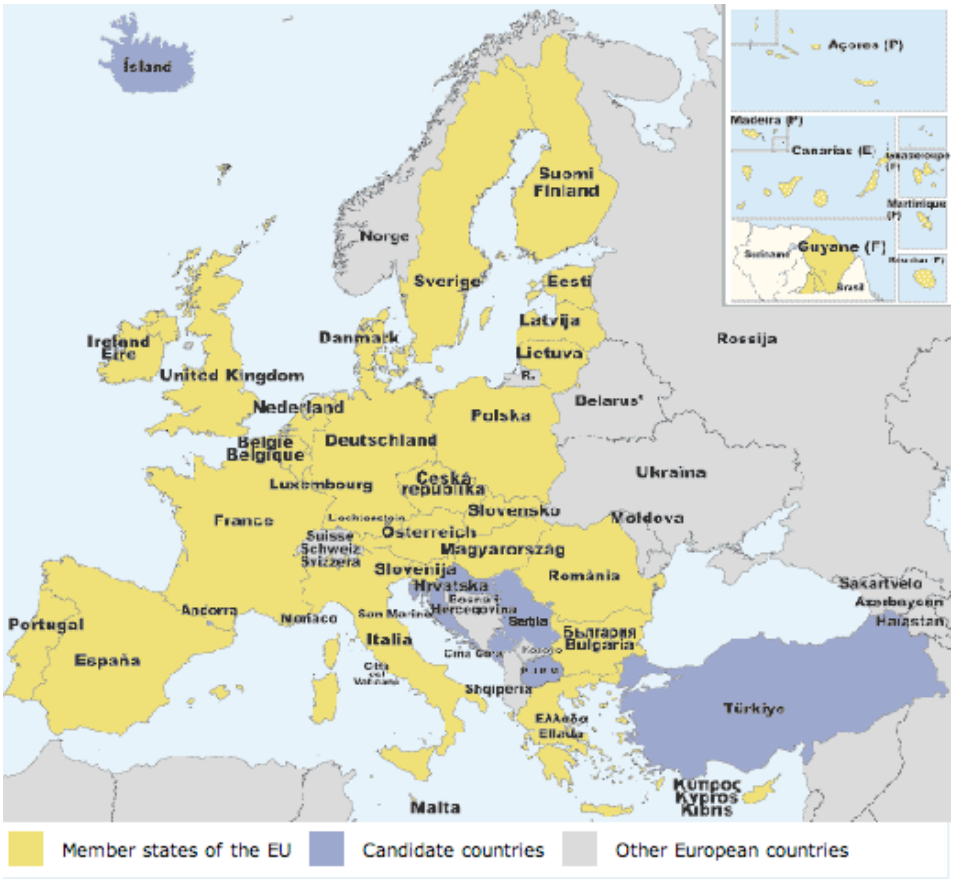
As this represents the culmination of my education at Penn State, I cannot ignore the two individuals who have always pushed me to strive in my life, Elena and Vlad Dragalin, my mother and father, and without whom I might not even be in Schreyer Honors College. Because of their drive and determination, I am able to graduate from a top university in the United States, thousands of miles away from the impoverished country we come from.

I. Introduction

The Republic of Moldova is a former Soviet Union satellite country and currently the poorest country in Europe. The state of the economy is one of the major issues that the Moldovan government has to deal with, and there are still many issues that stand in the way of development. One of these issues is the impediments to trade that are inherent in the country, and the loss of trade that the economy has felt as it's neighbors have entered into the European Union. Moldova aspires to join the EU, and has taken the first steps necessary to one day be a member of this coalition. This paper seeks to examine the economic implications that come about when a developing country enters the European Union, specifically analyzing the effects this has on GDP growth, export growth, and openness to trade.

The first step is to research the European Union in general, and it's strict requirements for admittance. Next, I will compare the economy and political history of Moldova to three other Eastern European countries that have been admitted into the EU, Hungary, Czech Republic, and Slovenia, to show that it is reasonable to assume that the effects that these countries have felt through admission into the EU can also happen to Moldova if it were to enter. Next, I will give a quick overview of trade agreements in general, and the positive economic effects that are felt within a country when it decreases its trade barriers, and the negative effects that occur to surrounding countries when trade diversion has occurred. Next, I will test the hypotheses that I have created using a change point analysis to see if admission into the EU does affect GDP, export, and openness growth. I will test if Moldova suffers from trade diversion after the large number of countries enters the EU in 2004. I will conclude with a discussion analyzing the data, as well as some thoughts for further research. This analysis and the conclusions to follow should give Moldova, and other developing countries, an idea of what to expect when entering the EU.

II. European Union

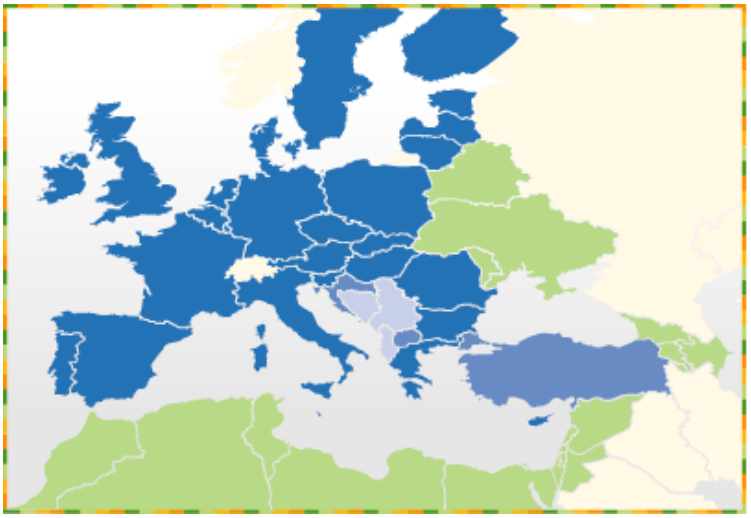


(Countries, 2012)

The European Union is a confederation of 27 states that was formally created in 1993 with the Maastricht Treaty, though efforts to unify parts of Europe in coalitions have been evident since the end of WWII. Not all members have been a part of the union since it's creation, and have been admitted at different times, with the most recent addition being Croatia in 2011. The Eurozone describes the sub-coalition of 17 countries that share the same currency, the euro. The Treaty on the European Union sets admission requirements to, "any European country which respects the principles of liberty, democracy, respect for human rights and fundamental freedoms, and the rule of law." The *Copenhagen Criteria* that were set out in 1993 state that a candidate country must have:

> "stable institutions that guarantee democracy, the rule of law, human rights and respect for and protection of minorities; a functioning market economy, as well as the ability to cope with the pressure of competition and the market forces at work inside the Union; the ability to assume the obligations of membership, in particular adherence to the objectives of political, economic and monetary union" (European Commission – Enlargement, 2010).

The European Neighbourhood Policy (ENP) is a group of developing countries that sign agreements with the EU to more closely integrate their economies. Some do so with the intent to one day become members. Moldova signed the agreement in 2004. To be part of this policy group, a country must agree to political, economic, trade, and human rights reforms. Moldova has implemented the first three-year Action Plan that is required for it to be a member of the ENP (European Neighbourhood Policy, 2010).



Reviewing the requirements necessary of admission into the EU is important, because this shows that Moldova has the ability to be a member state if it continues to reform and improve its economic and political stability. Though it is not considered a candidate for admission yet, its membership in the ENP is a good sign for possible admission in the future.

III. Comparative Analysis

Here, I will present a review of the political and economic histories of Hungary, Slovenia, and the Czech Republic, and compare them to the histories of Moldova. See *Figure A* in *Appendix* for a brief summary of facts.

History

i. Hungary

After WWII, a provisional government was put in place where the Soviet Union, United States, and Great Britain had representatives that had complete sovereignty over Hungary. In 1947, in an election that had massive fraud, blackmail, and false claims to discredit the opposition, the Hungarian Communist Party (MKP) took over the government. They implemented a Soviet-style constitution and reformed the Hungarian economy according to the Soviet model. Freedom of the press, religion, and assembly were all but forbidden. Hungary joined the Warsaw Pact Treaty Organization in 1955. Fighting broke out in 1956, and popular uprising led to a new election of a prime minister, who withdrew the country from the Warsaw Pact. On November 3, 1956, the Soviet Union launched a military attack on Hungary where these reformist leaders were executed, along with thousands of other people who were either executed or imprisoned. By 1987, civic activism took control (U.S. Department of State, 2011). Liberal reform Communists initiated a transition from the top down. They started a dialogue with oppositional dissidents and intellectuals who were not wholly against the Communist party in Hungary, because it was the most open, liberal, and democratic of the Communist Parties in Eastern Europe. This revolution was peaceful and was concentrated in

political reform and did not include participation of the people (Johnson). The following year, Parliament adopted a democracy package that promised "trade union pluralism; freedom of association, assembly, and the press; a new electoral law; and a radical revision of the constitution." The Soviet Union agreed to withdraw Soviet forces by June of 1991. A national summit of political leaders occurred in June of 1989 to discuss changes to the Hungarian constitution in preparation for free elections and a democratic political system. In the election, held in 1990, a democratic parliament took over and began the steps for a free market economy (U.S. Department of State, 2011).

ii. Czech Republic

Czechoslovakia was formed in the aftermath of WWI on October 28, 1918. After WWII, there were national elections in the spring of 1946, where some hoped that democratic officials would be appointed to parliament. The Czechoslovak Communist Party won 38% of the votes and held key positions in government, and ended up silencing anti -communist forces. Through some questionably legal political maneuvering, the Communist Part seized

power in February 1948. The Soviet Union had its first forceful act in the country when, in 1968, Soviet, Hungarian, Bulgarian, East German, and Polish troops invaded Czechoslovakia. Czechoslovakian reformers were taken to the Soviet Union where they were forced to sign documents allowing temporary stationing of Soviet troops in the country. During the twenty years following this Communist forceful takeover, political, social, and economic life stagnated. The Velvet Revolution began with

human rights activists, when in 1977 protesters criticized the government for failing to implement human rights provisions of certain documents that had previously been signed. In November of 1989, the communist police broke up a peaceful demonstration by violently beating participants. This led to the formation of the Civic Forum group as well as several other groups, and a general discontent with the Communist government (U.S. Department of State, 2011). The revolutions in Czechoslovakia were instigated by small groups of dissidents and popular protests. This made it impossible for other Communist leaders to come into power (Johnson, 1996). Communist officials resigned shortly after, and a coalition government was formed in December 1989, with the Communist Party holding a minority of the positions. In June of 1990, the first free elections in almost 50 years occurred with Civic Forum members winning a large portion of seats in the federal parliament. In 1993, the Czech Republic and the Republic of Slovakia were simultaneously founded (U.S. Department of State, 2011). In the same year, the Czech Communist Party was destroyed. The prime minister continued neo-liberal, free-market based economic strategies that concentrated on privatization, investment, and attracting foreign capital. This greatly increased the private sector in the economy, but caused major social problems due to an over-concentration on economic growth (Mahoney, 2011).

iii. Slovenia

During the communist era and the existence of Yugoslavia, Slovenia had been the most prosperous republic of the coalition. In 1980, the head of the coalition's government, stationed in Belgrade, wanted to increase its sovereignty over Slovenia, but Slovenia underwent democratic growth and an opening of its society in cultural, civic, and economic ways. In 1989, the General Assembly of the Yugoslav Republic of Slovenia edited their

constitution, stating that it was legal for Slovenia to secede from Yugoslavia if it so chose. In 1990, 88% of the Slovenian population voted to secede and gain independence from Yugoslavia, and the government declared independence in 1991. A war ensued, but Yugoslav forces withdrew 10 days later. As a new country, Slovenia pursued economic stabilization, and furthered its relationship with the West. It has created a stable, multi-party, democratic political system. It is considered a parliamentary democracy and constitutional republic. Tied to its desire to be associated with Western countries, Slovenia has established democratic institutions, improved human rights, established a market economy, and implemented Western standards in its military. Slovenia became a member of the North Atlantic Treaty Organization (NATO) in 2004, the same year it became a member of the European Union (U.S. Department of State, 2011). Lonnie Johnson, a historian of Central Europe, considers Slovenia to be "the most successful reform state with by far the highest per capita income of the reformers" He also groups Hungary, Czech Republic, and Slovenia along with Poland as the leading countries of reforms after communism, and cites their growing success in the early 1990s to their proximity to the "economic West" of the European Union (Johnson, 1996 293).

iv. Moldova

In 1940, Moldova was taken by the Union of Soviet Socialist Republics (USSR) by force and was established as the Moldavian Soviet Socialist Republic (U.S. Department of State,

2011). After decades of Soviet control of the country, a revolution in 1990 allowed a free election to take place. A Popular Front government came into power in March of 1990 during Supreme Soviet elections in the parliament. The driving economic idea of the party was mercantilist and its main goal was to completely disband from the Soviet Union and unify with Romania, making economic concerns fall second in importance. The state of the economy worsened under the Popular Front government, shown in a 29% drop in GDP/capita in 1992. This led to a drop in support of the government, and a re-election of officials and in 1993, the Agrarian Democrats secured a majority of the seats in the legislature. Throughout the decade, there was a constant tug of war between liberalism and communism and this showed in the representatives of the legislature. Thus, policy changes occurred every few years with these elections. Prior to 1992, the goal was to join the Commonwealth of Independent States (CIS) and increase trade with Romania, but this faced great resistance from the Popular Front-dominated parliament. It wasn't until 1994, after a new election brought the Agrarian Democrats to power, that Moldova joined the CIS and did so primarily for economic reasons. Also after the 1994 elections, trade with Romania dropped from 21.5% of its exports being sent to Romania in 1993, to only 13.9% in 1995. A combination of exports and imports show a 35% drop in Romania's share of Moldova's trade. Trade with CIS states, including and most drastically with Russia, began to increase after 1994. This marks a stark change from trade with the West to trade with the East.

Between 1997 and 2000, the economic goal of the country was World Trade Organization membership, which led to more liberal ideas influencing the government. This led to approval for WTO membership in May of 2001 (Darden, 2009). As can be seen, Moldova is not the only country with a history of communism and a strong reliance on the Soviet Union. The difference politically between Moldova and the three other countries is that they were the fastest in reforming away from a communist system. Though they are ahead of Moldova, it does not mean that Moldova can't accomplish the same reforms since they all have very similar histories.

Industry and Economy

i. Hungary

As of 2010, Hungary boasts a GDP per capita of around $13,042 with a population of just over 10 million (*Data | The World Bank*, 2011). Its economic success can be attributed to a great demand for its exports that are based in machine industry. The industry of Hungary began with textile and food production but has since developed into more skilled markets. In the early 1950s, the communist government forced rapid industrialization following the standard Stalinist pattern in an effort to encourage a more self-sufficient economy, and state farms and state-owned enterprises or cooperatives conducted most economic activity. In 1968, this idea of self-sufficiency was replaced by the "New Economic Mechanism," which "gave limited freedom to the workings of the market, reopened Hungary to foreign trade, and allowed a limited number of small businesses to operate in the services sector." Hungary has benefited with more than $60 billion in Foreign Direct Investment since 1989. Some U.S. investors include GE, Alcoa, General Motors, and Coca-Cola. The overall level of direct U.S. investment is around $9 billion. Through large liberalization movements, the private

sector accounts for 80% of Hungary's output. The Agriculture and Forestry sector made up 2.94% of GDP in 2010, producing things like meat, corn, wheat, and sunflower seeds. Also in 2010, the Industry and Construction sector made up 25.9% of GDP, producing machinery, vehicles, chemicals, and precision and measuring equipment (U.S. Department of State, 2011).

ii. Czech Republic

In 2010, the Czech Republic had a GDP per capita of around $18,257 and a population of 10,525,090 (*Data | The World Bank*, 2011). The principle industries in the Czech Republic include motor vehicles, machine-building, iron and steel production, and metalworking. The main agricultural products are sugar beets, fodder roots, potatoes, wheat and hops. In 1948, the government began stressing heavy industry over agricultural and consumer goods production, which has led to the concentration on industry over agriculture in the Czech market today. In the early 1990s, most state-owned industries were privatized. While during the communist era 97% of businesses were state owned, now the non-private sector is less than 20%. When trying to become a member of the European Union, the Czech Republic lowered most barriers to trade in industrial goods. A negative side effect to this openness is that free trade in services and agricultural goods has, combined with increased labor costs, upped the competition for Czech producers. Today, economic growth is greatly influenced by demand for Czech exports and the flow of foreign direct investment (U.S. Department of State, 2011).

iii. Slovenia

In 2010, Slovenia had a GDP per capita of $23,267 and a population of 2,052,821 (*Data | The World Bank*, 2011). Agriculture, Forestry, and Fishing account for 2% of Slovenia's

GDP, and they produce wheat, corn, meat, milk, potatoes, orchard fruits and wine. The Industrial Sector accounts for 37% of GDP, and includes electrical equipment, chemical products, textiles, and food products. The Service Industry takes up the most of GDP, with 61% of total GDP, and this includes retail, transportation, communications, and real estate. Since its secession in 1991, Slovenia has been working towards a market economy, with healthy economic growth. Liberal trade and encouraging enterprise has helped with this growth. Also improving economic growth is the well-educated and productive work force. The United States Department of State describes Slovenia as "one of the best economic performers in Central and Easter Europe." Foreign trade is a big factor in Slovenia's success. About three-quarters of its trade is with the EU. Because it is so open to trade with different areas, the economy is very sensitive to economic conditions in the countries that it trades with, and the health of the Slovenian economy will depend on the ability of its export market to recover from the recession (U.S. Department of State, 2011).

iv. Moldova

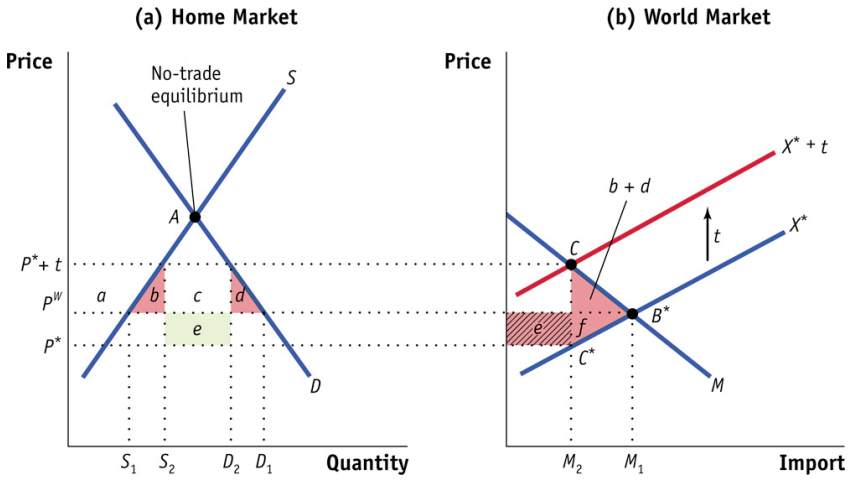
In 2010, the GDP of Moldova was $5,808,796,184, making it the poorest country in Europe in terms of GDP, with a GDP per capita of $1,631 and the population was 3,562,062 (*Data | The World Bank*, 2011). The Moldovan economy used to be hugely reliant on industry and agriculture, but now the service sector has begun to increase. The Agricultural sector which takes up more than 25% of its labor force produces vegetables, fruits, wine and spirits, grain, sugar, and several other products. The Industrial sector which takes up less than 15% of its labor force produces processed foods and beverages, diary and meat products, tobacco items, and furniture. Obviously, these industries are not as advanced as those of the three European Union countries (U.S. Department of State, 2011). Moldova's

primary enterprise is agricultural. In 1997, privatization of agricultural enterprises began and the government began to liquidate state farms and distributed ownership titles to private farmers. This was expanded nationwide in 1998 with a goal to transfer titles over to more than 1 million farmers in 2000 (Darden, 2009). Several factors work against economic growth in this country, such as the fact that it is landlocked, it is the second smallest of the former Soviet republics in terms of square footage, but it is the most densely populated. Due to its location and climate, it is ideal for agriculture and food processing, which can be seen in its industrial sector. Its best-known product is wine, and this explains why the economy was so negatively affected when Russia boycotted Moldovan wines in 2006. The Moldovan economy is highly dependent on the rest of the former Soviet Union for energy and raw material. Economic growth is driven by consumption that is maintained by income from Moldovan migrant workers sending money back home. Though the country was greatly affected by the global financial crisis in 2009, a GDP growth of 6.9% occurred in 2010, and this growth is expected to continue in 2011, which can be seen as a sign of the resilience of the economy and its ability to overcome the global economic crisis. Though the government has created a market economy after its independence, the economy is riddled with corruption and overregulation, so few additional jobs have been created, which has led to the high number of migrant workers overseas. In 2008, remittances from migrant workers reached almost one third of the total GDP. When Romania became a part of the EU in 2007, foreign direct investment increased in Moldova as well, growing to a record $861 million. This dropped dramatically in the following years, and this can be blamed on "ineffective enforcement of the law, bureaucratic obstacles, corruption, economic and political uncertainty, and government interference" (U.S. Department of State, 2011). Though

Moldova has several issues that the other three countries do not necessarily have to deal with at a large scale, such as corruption, its industries are similar to the other countries' industries from before their economic developments. Their success versus Moldova's struggles lies in the development of the industry sector while Moldova still relies on its agricultural goods. However, this is not detrimental, and it is possible that Moldova can improve in these industries as the other countries did.

IV. Overview of Trade Agreements

Trade Agreements can exist either as a multilateral trade agreement, such as the World Trade Organization, that involves many countries that agree to lower tariffs between all members, or as a smaller regional trade agreement like the North American Free Trade Agreement and the European Union. These agreements lead to free trade among the countries who are members of the agreements.



(Feenstra, 2008; 395)

These graphs show the negative effects that a tariff can have on the home market as well as the world. For home, there is a deadweight loss of areas *b* and *d*, and a gain of *e*. In the world market, there is a deadweight loss of *f* that occurs from inefficient production levels. Without trade agreements, countries have incentive to impose tariffs because of a prisoner's dilemma due to their payoff matrix, because if they know the foreign country will impose a tariff and they do not, they will incur a very large loss. If they do not impose a tariff and the other country doesn't either, both don't really lose anything, and if home imposes a tariff and foreign does not, home wins big. Trade agreements prevent this prisoner's dilemma from happening. For example, when countries enter the WTO, they are required to reduce their own tariffs, but in return they are assured of receiving lower tariffs from other WTO members. In a Regional Trade

Agreement, like the EU, several countries eliminate tariffs among themselves but maintain tariffs against other countries outside the agreement. In a these agreements, countries face zero tariffs and thus treat each other better than the other WTO members. Regional Trade Agreements are allowed and encouraged because it is thought that the removal of trade barriers among regional groups is a stepping-stone towards achieving freer trade worldwide. There are two types of Regional Trade Agreements, the first being a Free-Trade Area, where a group of countries agrees to eliminate tariffs and other barriers within the group but keep any other barrier they had already had with the rest of the world. A Customs Union is similar to a Free-Trade Area, except that the countries within the union also agree to "a common schedule of tariffs with each country outside the union" (Feenstra, 2008; 398). The European Union is an example of a Customs Union; so all countries in the EU have the same tariffs with each country outside the union. The benefit of a Customs Union is that it prevents countries from attempting to trick the system by exporting to the lowest tariff country that will then export to another country, because in this case, the tariffs on outside members are the same for all countries in the union, so there is no need to import a good into the lowest-tariff country (Feenstra, 2008).

When a Regional Trade Agreement is formed, trade increases between member countries in two ways. The first is through Trade Creation. This occurs when a member country imports a product from another member country that it had formerly produced itself. This causes a gain in consumer surplus for the importing country, because they have a higher amount of the good at a lower price, as well as a gain in producer surplus for the exporting country from increased sales. The other possibility is trade through Trade Diversion. This occurs when a member country imports a product from another member country that it had formerly imported from a country outside of this new trade region. Sometimes this trade diversion is bad for the union, if the

country is diverting from a country that is most efficient in producing that product. That would cause a net welfare loss between the two countries in the trade agreement (Feenstra, 2008). Whether or not the union is positively or negatively affected, Trade Diversion always produces a negative effect for the country that had originally been the one exporting.

Trade with European Union countries is very important to the Republic of Moldova. In 2010, Moldova had $1.582 billion of total exports, of which 47% went to EU countries (Background Notes, 2011). Thus, when countries with similar export capabilities, such as the Czech Republic and Slovenia, enter into a trade union with these countries making trade between them easier, Moldova is susceptible to losing trade with these countries due to Trade Diversion.

Moldova Exports (in percent of total)									
Product	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Foodstuffs	42.6	42.1	44.5	41.5	39.8	35.1	36.3	26.3	20.6
Chemicals	2.7	1.7	1.5	1.1	1.1	0.9	1.4	2.0	2.0
Textiles	13.9	17.7	18.4	16.7	16.4	17.3	17.8	21.7	20.6

(Republic of Moldova: Statistical Appendix, 2008)

Foodstuffs, including hard and soft drinks, vinegar, tobacco and its substitutes have had the highest percentage of things being exported in Moldova, at 42.6% in 1999. These products took a sharp decrease in 2003, and have since continued to decline to 20.6% in 2007. Exports in chemicals have steadily decreased, with a large decrease from 2002-2004. Interestingly, textile trade has increased in percentage of total exports, starting at 13.9% in 1999 and going to 20.6% in 2007.

Czech Republic Exports (in millions of US dollars)					
Product	**1998**	**1999**	**2000**	**2001**	**2002**
Foodstuffs	940	733	885	967	1033
Chemicals	2170	1867	2135	2294	2482
Textiles	-	-	-	-	-

(Czech Republic: Selected Issues and Statistical Appendix, 2004)

Slovenia Exports (in millions of euros)					
Product	**2000**	**2001**	**2002**	**2003**	**2004**
Foodstuffs	9492	10347	10962	11285	12537
Chemicals	1063	1197	1354	1552	1690
Textiles	-	-	-	-	-

(Republic of Slovenia: Selected Issues and Statistical Appendix, 2005)

Trade Divergence can be seen by the fact that exports of foodstuffs from the Czech Republic have steadily increased since 1999, while they do not export textiles. Also, Slovenian trade in chemicals has steadily increased, with a large jump in 2003 and 2004 when Slovenia entered the EU, while they also do not export textiles. This can explain why Moldovan foodstuff and chemical trade decreased, because EU countries found foodstuffs and chemical from a fellow EU country more appealing, but since the Czech Republic and Slovenia don't export textiles, the export market in Moldova was not effected in that sector. Thus, Moldova has suffered from the effects of trade divergence after these countries were admitted into the EU.

V. Hypothesis Tests

Change Point Regression Methodology

A Change Point Regression analyzes data where "the regression slope is not expected to be constant but to change suddenly at a given point" (Juloius, 2001). If the location of the change point is known, the model can be simplified. For this hypothesis test, the change point is associated with admission in to the European Union. This form of testing is more accurate when the data sets that are used have different change point values. For these tests, ten countries will be used, including Moldova. In some of the tests, I will make a separate variable for Moldova's change point, since based on my research on Trade Diversion, I would assume Moldova would suffer a negative effect when the other countries received a positive effect. I will also include tests that do not include a change point for Moldova, to see if Trade Diversion is really happening. For the data, two countries were admitted in 2007, and the other seven were admitted in 2004. The data sets begin in 1995 and go until 2010 and the effects that I am testing are GDP growth, Export growth, and growth in Openness level. The data was collected from the World Bank. I chose these three variables to analyze because collectively, they are the best indicators for economic growth and the effects of a Free Trade Agreement on countries.

The nine admitted countries that were selected are not all members of the Eurozone, but are all members of the European Union. It would have been interesting to see the effects of being a member of the Eurozone versus just being a member of the EU. However, only three of these countries are part of the Eurozone, and the data ends in 2010, so Slovenia would have been the only country that could account for the effects of Eurozone membership. These few observations would not have been sufficient basis for inference.

Country	Moldova	Slovenia	Czech Republic	Hungary	Lithuania	Slovak Republic	Estonia	Latvia	Romania	Bulgaria
Year of EU Admittance	-	2004	2004	2004	2004	2004	2004	2004	2007	2007
Year of Eurozone Admittance	-	2007	-	-	-	2009	2011	-	-	-

There were three Hypothesis Test Groups, with a combined total of 45 hypothesis tests. The first group tests the statistical significance of the change point being the year of admission in the EU. Within this group, there are three sub-groups, the first testing GDP growth, the second testing Exports growth, and the third testing Openness growth, which for these tests equals (exports + imports) / GDP. Each of these subgroups had six hypothesis tests that had three groups as well, the first testing admission into the EU as an independent variable (*d,* further explained below), the second testing *d* and dummy variables for country, and the last testing *d,* the dummy variables for country, and the dummy variables for year. Within these three groups, there was a test done that assumed there was no Trade Diversion or change point for Moldova (a), and another test that assumed there was (b). A list of the equations that are explained below is included in *Figure 2* in the *Appendix*.

Hypothesis Test Group 1 - Year of Admission is the Change point

The first hypothesis sets the change point to be at the year of admission into the EU. The first variable that is analyzed is GDP. The null hypothesis is that there is no change in slope of log(GDP) at the year of admission.. After taking change of log(GDP) and creating a variable entitled "*d*" that would change from 0 to 1 on the year of admittance and stay at the value of 1 for the remaining years, I ran a regression testing *d* as the independent variable.

Equation 1a: $\Delta \log(GDP) = \beta_1 d_{\text{year of admission}} + \mu$

Δlog(GDP)	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
d	-.0129894	.010053	-1.29	0.198	-.0328553	.0068766
_cons	.0414244	.0056868	7.28	0.000	.0301865	.0526623

This did not prove to be significant, and thus the null hypothesis could not be rejected. I then added the variable that would test to see if Moldova suffered from Trade Diversion and was negatively affected in its GDP. This variable was entitled *MA* and tested for change at the year 2005, because the biggest Trade Diversion would be suffered after so many countries entered the EU in 2004. This also proved to be statistically insignificant.

Equation 1b: $\Delta\log(GDP) = \beta_2 d_{\text{year of admission}} + \Omega_1 MA + \mu$

Δlog(GDP)	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
d	-.0139624	.0107218	-1.30	0.195	-.0351627	.0072379
MA	.0392462	.0309512	1.27	0.207	-.0219537	.100446
…	…	…	…	…	…	…

I then created nine dummy variables entitled "*country1*" *"country 2"* etc. to eliminate inherent differences between countries. I reran the regression with *d* and *country*, testing the same null hypothesis as the first regression.

Equation 2a: $\Delta\log(GDP) = \beta_3 d_{\text{year of admission}} + \alpha\ \text{country} + \mu$

Equation 2b: $\Delta\log(GDP) = \beta_4 d_{\text{year of admission}} + \Omega_2 MA + \alpha\ \text{country} + \mu$

Again, this was not statistically significant, even Equation 2b that included the change point for Moldova. Lastly, I added another group of dummy variables entitled "*year*" that eliminate inherent differences between the years in the data, which is important, because world markets fluctuate together, so some years, like 2008 which saw a world market crash, would alter the regression.

Equation 3a: $\Delta\log(GDP) = \beta_5 d_{\text{year of admission}} + \alpha\ \text{country} + \pi\ \text{year} + \mu$

Δlog(GDP)	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
d	-.0369541	.0127553	-2.90	0.004	-.0621984	-.0117097
...	...	...	...	...	...	...

Equation 3b: $\Delta\log(GDP) = \beta_6\, d_{\text{year of admission}} + \Omega_3\, MA + \alpha\, country + \pi\, year + \mu$

Δlog(GDP)	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
d	-.0299822	.0165386	-1.81	0.072	-.0627168	.0027524
MA	.0153962	.0231716	0.66	0.508	-.0304669	.0612593
...	...	...	...	...	...	...

The test for Equation 3a proved to be statistically significant, so the null hypothesis was rejected. Surprisingly, I discovered that there is a negative effect on GDP growth when these countries are admitted to the European Union. The test for Equation 3b showed a negative effect on GDP growth but it wasn't as strong of a result as Equation 3a, but the change point for Moldovan Trade Diversion was not statistically significant.

Next, I ran the same regressions with log(exports) as the dependent variable instead of log(GDP).

Equation 4a: $\Delta\log(exports) = ß_7\, d_{\text{year of admission}} + \mu$

Equation 4b: $\Delta\log(exports) = ß_8\, d_{\text{year of admission}} + \Omega_4\, MA + \mu$

Equation 5a: $\Delta\log(exports) = ß_9\, d_{\text{year of admission}} + \alpha\, country + \mu$

Equation 5b: $\Delta\log(exports) = ß_{10}\, d_{\text{year of admission}} + \Omega_5\, MA + \alpha\, country + \mu$

Equation 6a: $\Delta\log(exports) = \beta_{11}\, d_{\text{year of admission}} + \alpha\, country + \pi\, year + \mu$

Equation 6b: $\Delta\log(exports) = ß_{12}\, d_{\text{year of admission}} + \Omega_6\, MA + \alpha\, country + \pi\, year + \mu$

All three variations of this hypothesis test failed to reject the null hypothesis, failing to prove that there was a significant change in log(exports) slope. This also showed that Moldova does not suffer from a statistically significant Trade Diversion in its exports.

Lastly, I ran the same three regressions with log(openness) as the dependent variable.

Equation 7a: $\Delta \log(\text{openness}) = \beta_{13}\, d_{\text{year of admission}} + \mu$

Equation 7b: $\Delta \log(\text{openness}) = \beta_{14}\, d_{\text{year of admission}} + \Omega_7\, MA + \mu$

Equation 8a: $\Delta \log(\text{openness}) = \beta_{15}\, d_{\text{year of admission}} + \alpha\ country + \mu$

Equation 8b: $\Delta \log(\text{openness}) = \beta_{16}\, d_{\text{year of admission}} + \Omega_8\, MA + \alpha\ country + \mu$

Equation 9a: $\Delta \log(\text{openness}) = \beta_{17}\, d_{\text{year of admission}} + \alpha\ country + \pi\ year + \mu$

Equation 9b: $\Delta \log(\text{openness}) = \beta_{18}\, d_{\text{year of admission}} + \Omega_9\, MA + \alpha\ country + \pi\ year + \mu$

Though the first two groups of regressions (using just *d* as an independent variable and then using *d* and *country*) failed to reject the null hypothesis, Equation 9a was statistically significant and was able to reject the null hypothesis, with a positive effect on log(openness).

Δlog(openness)	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
d	.0341373	.0150471	2.27	0.025	.0043571	.0639175
...	...	...	...	...	...	...

Again, none of the "b" equations proved to be statistically significant, so it cannot be said that Moldova suffers from Trade Diversion enough for it to affect its openness level.

Interestingly, there is a change point at the year of admission for growth in openness. From the previous tests, it is shown that GDP decreases at the change point, while nothing can be said about exports, so the growth of openness can be attributed to the decrease in GDP and also possibly a growth in imports. When these smaller countries enter in a trade agreement with the European Union, it is understandable that their imports would increase, since they would be exposed to a larger market of goods that they would rather trade for than produce, but this has not been yet proven to be the reason for this increase in openness, because it may be solely attributed to the decrease in GDP.

Hypothesis Test Group 2 -Year before Admission is the Change point

After finding the statistical significance of the year of admittance as the change point for GDP and openness growth, I wanted to run the same tests with the change point as the year *before* admittance in the EU. After seeing that the requirements for EU admission included trade openness and improving the economy of the country, I wanted to see if these dependent variables were changed in order to be admitted, the year before admission. For this group of regressions, I did not include the variable *MA* since it did not prove to be significant in the previous equations.

The first null hypothesis, where log(GDP) growth does not change at the year before admission, was rejected when using the independent variable *d* and the dummy variables *country* and *year*.

Equation 10: $\Delta \log(GDP) = \beta_{19}\, d_{\text{year before admission}} + \alpha\ \text{country} + \pi\ \text{year} + \mu$

Δlog(GDP)	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
d	-.0385122	.0125085	-3.08	0.003	-.0632682	-.0137563
...	...	...	...	...	...	...

Again, the hypothesis test analyzing growth of log(exports) was not statistically significant enough to reject the null hypothesis.

The null hypothesis stating that log(openness) growth does not change at the year before admission was rejected when using *d*, *country*, and *year*.

Equation 11: $\Delta \log(\text{openness}) = \beta_{20}\, d_{\text{year before admission}} + \alpha\ \text{country} + \pi\ \text{year} + \mu$

Δlog(openness)	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
d	.0393978	.0147015	2.68	0.008	.0103016	.0684939
...	...	...	...	...	...	...

So, negative growth in GDP and positive growth in openness can be attributed to changes done before admittance in order to be admitted, and also from the positive effects that come from being admitted into the union.

Hypothesis Test Group 3 -

After running these change point regressions, I decided to see how growth of GDP, exports, and openness is affected for each year of being in the EU. I created 8 dummy variables, where *dM1* represents the year before being admitted to the EU, *d1* represents the year being admitted, *d2* represents the year having been in the EU for two years, *d3* three years, etc until *d7*, having been in the EU for seven year. The null hypothesis that there is no change in log(GDP) throughout the years is rejected, when using the 8 "d" independent variables and *country* and *year*.

Equation 12: $\Delta \log(GDP) = \beta_{21}\, dM1 + \beta_{22}\, d1 + \beta_{23}\, d2 + \beta_{24}\, d3 + \beta_{25}\, d4 + \beta_{26}\, d5 + \beta_{27}\, d6 + \beta_{28}\, d7 + \alpha\ country + \pi\ year + \mu$

Δlog(GDP)	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
dM1	-.007935	.0197536	-0.40	0.689	-.0470524	.0311824
d1	-.0289781	.0197536	-1.47	0.145	-.0680956	.0101393
d2	-.0524051	.0206126	-2.54	0.012	-.0932237	-.0115866
d3	-.0339884	.0238565	-1.42	0.157	-.0812307	.0132539
d4	-.0496526	.0238565	-2.08	0.040	-.0968949	-.0024103
d5	-.0847057	.0284747	-2.97	0.004	-.1410933	-.0283181
d6	-.0602894	.0300448	-2.01	0.047	-.1197863	-.0007924
d7	-.0631978	.0300448	-2.10	0.038	-.1226948	-.0037008

This shows that GDP growth continues to be negative with each year of being in the EU, but it is negative to a lesser degree in years six and seven after the initial spike after five years.

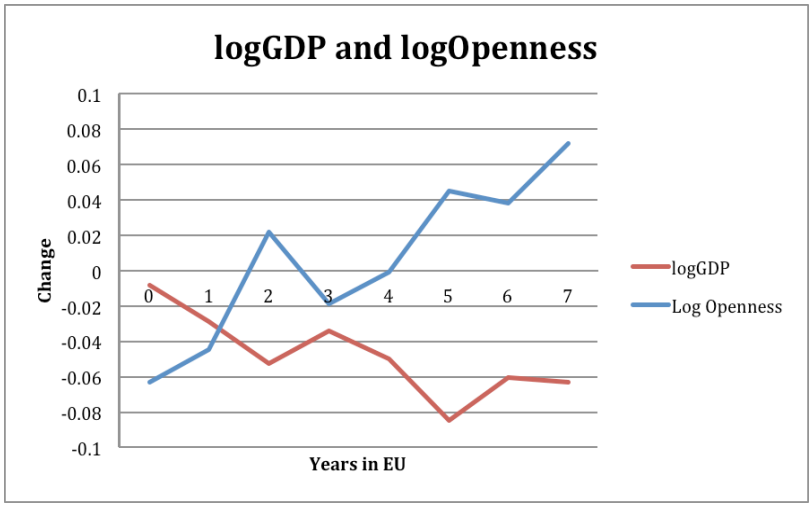
Again, the tests for growth in exports were not statistically significant enough to reject the null hypothesis that there is no change in export growth with each year of being in the EU.

Surprisingly, the test for the null hypothesis that openness growth does not change with each year of EU membership proved to not be statistically significant enough to reject the null hypothesis.

Equation 13: $\Delta \log(\text{openness}) = \beta_{29}\, dM1 + \beta_{30}\, d1 + \beta_{31}\, d2 + \beta_{32}\, d3 + \beta_{33}\, d4 + \beta_{34}\, d5 + \beta_{35}\, d6 + \beta_{36}\, d7 + \alpha\ country + \pi\ year + \mu$

Δlog(openness)	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
dM1	-.0627144	.0353324	-1.77	0.078	-.1326308	.0072021
d1	-.044545	.0353324	-1.26	0.210	-.1144614	.0253715
d2	.0219921	.0368481	0.60	0.552	-.0509237	.0949079
d3	-.0184005	.0424831	-0.43	0.666	-.1024669	.0656659
d4	-.0006989	.0424831	-0.02	0.987	-.0847653	.0833676
d5	.0451452	.0507069	0.89	0.375	-.0551946	.145485
d6	.0383454	.0533769	0.72	0.474	-.0672778	.1439685
d7	.0722957	.0533769	1.35	.178	-.0333275	.1779188

I wanted to graph both the growth in GDP and Openness together, even if the Openness test did not prove to be significant.



This graph shows that growth in GDP and growth in Openness are mirror images of each other, which makes sense if (imports + exports) are unchanging. Since Openness is (imports + exports) / GDP in this case, a decrease in GDP would cause a proportional increase in Openness if (imports + exports) did not change. However, this graph and these changes are not statistically significant, so this proportional relationship is not necessarily true. The most logical explanation is that (imports + exports) does not remain unchanged in the years during and after admission in the EU.

As a side-note, I wanted to run these three equations for growth in GDP, exports, and openness with the country and year dummy variables with the initial change point variable for Trade Diversion, *MA*.

Equation 14: $\Delta \log(GDP) = \beta_{37}\, dM1 + \beta_{38}\, d1 + \beta_{39}\, d2 + \beta_{40}\, d3 + \beta_{41}\, d4 + \beta_{42}\, d5 + \beta_{43}\, d6 + \beta_{44}\, d7 + \Omega_{10}\, MA + \alpha\, country + \pi\, year + \mu$

Δlog(GDP)	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
dM1	-.0114434	.0210589	-0.54	0.588	-.0531495	.0302627
d1	-.0324866	.0210589	-1.54	0.126	-.0741927	.0092196
d2	-.0590649	.0247085	-2.39	0.018	-.1079987	-.0101311
d3	-.0424235	.0294311	-1.44	0.152	-.1007103	.0158633
d4	-.0580877	.0294311	-1.97	0.051	-.1163745	.0001992
d5	-.0946906	.0350306	-2.70	0.008	-.1640669	-.0253143
d6	-.0714579	.0377208	-1.89	0.061	-.146162	.0032462
d7	-.0743663	.0377208	-1.97	0.051	-.1490704	.0003378
MA	-.0135574	.02753	-0.49	0.623	-.0680791	.0409642

Equation 15: $\Delta\log(\text{exports}) = \beta_{45}\, dM1 + \beta_{46}\, d1 + \beta_{47}\, d2 + \beta_{48}\, d3 + \beta_{49}\, d4 + \beta_{50}\, d5 + \beta_{51}\, d6 + \beta_{52}\, d7 + \Omega_{11}\, MA + \alpha\ country + \pi\ year + \mu$

Δlog(exports)	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
dM1	.0109624	.0231972	0.47	0.637	-.0349785	.0569033
d1	-.010546	.0231972	-0.45	0.650	-.0564869	.0353949
d2	.0523941	.0272173	1.93	0.057	-.0015084	.1062965
d3	-.0095402	.0324195	-0.29	0.769	-.0737454	.054665
d4	-.0038271	.0324195	-0.12	0.906	-.0680323	.0603781
d5	.0226757	.0385876	0.59	0.558	-.053745	.0990964
d6	-.0215538	.0415509	-0.52	0.605	-.1038432	.0607357
d7	-.0029108	.0415509	-0.07	0.944	-.0852002	.0793787
MA	.0131742	.0303253	0.43	0.665	-.0468835	.073232

Equation 16: $\Delta\log(\text{Openness}) = \beta_{53}\, dM1 + \beta_{54}\, d1 + \beta_{55}\, d2 + \beta_{56}\, d3 + \beta_{57}\, d4 + \beta_{58}\, d5 + \beta_{59}\, d6 + \beta_{60}\, d7 + \Omega_{12}\, MA + \alpha\ country + \pi\ year + \mu$

Δlog(openness)	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
dM1	.0143743	.0244309	0.59	0.557	-.0340098	.0627583
d1	.0359959	.0244309	1.47	0.143	-.0123882	.08438
d2	.0965398	.0286648	3.37	0.001	.0397707	.1533088
d3	.0228152	.0341436	0.67	0.505	-.0448045	.0904349
d4	.0509214	.0341436	1.49	0.139	-.0166983	.1185411
d5	.0997109	.0406397	2.45	0.016	.0192261	.1801957
d6	.0577348	.0437606	1.32	0.190	-.0289309	.1444004
d7	.0784928	.0437606	1.79	0.075	-.0081728	.1651585
MA	.0230655	.0319381	0.72	0.472	-.0401861	.0863172

For the most part, these regressions did not prove to be statistically significant. This shows once again that Moldova does not suffer from Trade Diversion to a large extent when the seven countries entered the EU in 2004.

VI. Discussion

During this analysis, several questions have come up that do not have a definite answer. The first two groups of tests show the statistical significance of the decrease in GDP and the positive growth of Openness both immediately before and during the year of admission into the EU. The data was unable to reject the null hypothesis that export growth also changes immediately before and during admission. The question then arose, after these first two groups of tests, of whether the increase in openness is solely due to the decrease in GDP, or if something else, such as an increase in imports could be the reason. The third group of hypothesis tests gave a better understanding to this question. Each year of being in the EU continued to decrease the GDP growth, while the test could not conclude what happened to openness. If the test was statistically significant, it could be shown that (imports + exports) were constant before, during, and after admission, and the sole reason for the increase in Openness was the decrease in GDP. However, this was not statistically significant. Further research may be able to prove this, but it is reasonable to conclude that (imports + exports) do not stay constant, and the admission into the EU for these smaller countries cause a huge influx of imports from the larger, already economically successful countries. In a few years, it might be beneficial to research the effects of being in the Eurozone versus being an EU member, and this might show stronger effects on GDP that could account for factors other than just trade effects.

After researching the effects of Trade Diversion and analyzing several exports that are common in Moldova, I was surprised to find that there was not a statistically significant effect of Trade Diversion to Moldova's GDP, Export, and Openness growth. This shows that though a few industries could be selected that are affected by these countries entering the EU, on a whole, Moldova does not suffer greatly from Trade Diversion.

Further research might also better explain what the driving force is behind the decrease in GDP during and after admission. One can assume that this will eventually stabilize and increase, but there is not enough data yet to see this. The slight improvement in the rate of decrease in years five and six after admission might represent the beginning of positive growth in GDP. It is reasonable to infer that imports have an initial influx at admission, and this is probably what causes the drop in GDP for these initial years, and also the increase in Openness. However, this import influx must eventually stabilize, which will stop the decrease in GDP. It is hopeful to imagine that these economies will then reap the benefits that increased openness has offered for the past several years, and be able to improve their production capabilities and have a stronger GDP and increase their exports as well.

VII. Conclusions

Looking at all of these tests together allows for some interesting interpretations, and some valuable findings for developing countries, such as Moldova, to understand as they evaluate the significance of entering into the European Union. After analyzing the necessary improvements that these developing nations must first accomplish before they are admitted, it is understandable that the effects of EU membership can be seen before the year of admission. Comparing the economies and politics of Moldova to some of the other countries that have been used in this study has allowed me to make comparative statements that assume that if Moldova would be admitted in the EU, it would feel the same effects as the results of these tests.

Though Moldova has suffered from trade diversion on a small scale in a few industries because its neighbors have reaped the benefits of EU membership, taking export capabilities away from Moldova, it is possible that EU membership will retract these slight negative affects while positively helping the country, as it has for these other nine countries. Though Moldova or any other comparable developing country entering the EU might suffer from a decrease in GDP initially, this is not necessarily a bad thing, because it might just be showing the positive effects of opening trade barriers and importing new products. This also might not be the case in the long run. These countries should not eliminate the option of EU membership due to a fear of GDP decreases in the short run, because the positive effects of openness to trade and a possibility of improved GDP in the long run can be very beneficial to their economies.

VIII. Appendix

Figure A	Hungary	Czech Republic	Slovenia	Moldova
GDP/capita (2010)	$13,042	$18,257	$23,267	$1,631
Population (2010)	10 million	10.5 million	2 million	3.5 million
Abolition of Communism	1987	1990	1991	1994
Primary Industries	Industry and Construction	Machine building	Service Industry	Agriculture
EU Membership	2004	2004	2004	-

Figure B	
Hypothesis Test Group 1	Equation 1a: $\Delta\log(GDP) = \beta_1 d_{\text{year of admission}} + \mu$ Equation 1b: $\Delta\log(GDP) = \beta_2 d_{\text{year of admission}} + \Omega_1 MA + \mu$ Equation 2a: $\Delta\log(GDP) = \beta_3 d_{\text{year of admission}} + \alpha\ \text{country} + \mu$ Equation 2b: $\Delta\log(GDP) = \beta_4 d_{\text{year of admission}} + \Omega_2 MA + \alpha\ \text{country} + \mu$ Equation 3a: $\Delta\log(GDP) = \beta_5 d_{\text{year of admission}} + \alpha\ \text{country} + \pi\ \text{year} + \mu$ Equation 3b: $\Delta\log(GDP) = \beta_6 d_{\text{year of admission}} + \Omega_3 MA + \alpha\ \text{country} + \pi\ \text{year} + \mu$ Equation 4a: $\Delta\log(\text{exports}) = ß_7 d_{\text{year of admission}} + \mu$ Equation 4b: $\Delta\log(\text{exports}) = ß_8 d_{\text{year of admission}} + \Omega_4 MA + \mu$ Equation 5a: $\Delta\log(\text{exports}) = ß_9 d_{\text{year of admission}} + \alpha\ \text{country} + \mu$ Equation 5b: $\Delta\log(\text{exports}) = ß_{10} d_{\text{year of admission}} + \Omega_5 MA + \alpha\ \text{country} + \mu$ Equation 6a: $\Delta\log(\text{exports}) = \beta_{11} d_{\text{year of admission}} + \alpha\ \text{country} + \pi\ \text{year} + \mu$ Equation 6b: $\Delta\log(\text{exports}) = ß_{12} d_{\text{year of admission}} + \Omega_6 MA + \alpha\ \text{country} + \pi\ \text{year} + \mu$ Equation 7a: $\Delta\log(\text{openness}) = ß_{13} d_{\text{year of admission}} + \mu$ Equation 7b: $\Delta\log(\text{openness}) = ß_{14} d_{\text{year of admission}} + \Omega_7 MA + \mu$ Equation 8a: $\Delta\log(\text{openness}) = ß_{15} d_{\text{year of admission}} + \alpha\ \text{country} + \mu$ Equation 8b: $\Delta\log(\text{openness}) = ß_{16} d_{\text{year of admission}} + \Omega_8 MA + \alpha\ \text{country} + \mu$ Equation 9a: $\Delta\log(\text{openness}) = \beta_{17} d_{\text{year of admission}} + \alpha\ \text{country} + \pi\ \text{year} + \mu$ Equation 9b: $\Delta\log(\text{openness}) = ß_{18} d_{\text{year of admission}} + \Omega_9 MA + \alpha\ \text{country} + \pi\ \text{year} + \mu$
Hypothesis Test Group 2	Equation 10: $\Delta\log(GDP) = \beta_{19} d_{\text{year before admission}} + \alpha\ \text{country} + \pi\ \text{year} + \mu$ Equation 11: $\Delta\log(\text{openness}) = \beta_{20} d_{\text{year before admission}} + \alpha\ \text{country} + \pi\ \text{year} + \mu$
Hypothesis Test Group 3	Equation 12: $\Delta\log(GDP) = \beta_{21} dM1 + \beta_{22} d1 + \beta_{23} d2 + \beta_{24} d3 + \beta_{25} d4 + \beta_{26} d5 + \beta_{27} d6 + \beta_{28} d7 + \alpha\ \text{country} + \pi\ \text{year} + \mu$ Equation 13: $\Delta\log(\text{openness}) = \beta_{29} dM1 + \beta_{30} d1 + \beta_{31} d2 + \beta_{32} d3 + \beta_{33} d4 + \beta_{34} d5 + \beta_{35} d6 + \beta_{36} d7 + \alpha\ \text{country} + \pi\ \text{year} + \mu$ Equation 14: $\Delta\log(GDP) = \beta_{37} dM1 + \beta_{38} d1 + \beta_{39} d2 + \beta_{40} d3 + \beta_{41} d4 + \beta_{42} d5 + \beta_{43} d6 + \beta_{44} d7 + \Omega_{10} MA + \alpha\ \text{country} + \pi\ \text{year} + \mu$ Equation 15: $\Delta\log(\text{exports}) = \beta_{45} dM1 + \beta_{46} d1 + \beta_{47} d2 + \beta_{48} d3 + \beta_{49} d4 + \beta_{50} d5 + \beta_{51} d6 + \beta_{52} d7 + \Omega_{11} MA + \alpha\ \text{country} + \pi\ \text{year} + \mu$ Equation 16: $\Delta\log(\text{openness}) = \beta_{53} dM1 + \beta_{54} d1 + \beta_{55} d2 + \beta_{56} d3 + \beta_{57} d4 + \beta_{58} d5 + \beta_{59} d6 + \beta_{60} d7 + \Omega_{12} MA + \alpha\ \text{country} + \pi\ \text{year} + \mu$

IX. References

"Background Notes." *U.S. Department of State*. Web. 5 Nov. 2011. Assisted <http://www.state.gov/r/pa/ei/bgn/>.

Burnside, Craig, and David Dollar. "Aid, Policies and Growth." *World Bank Policy Research Department Macroeconomics and Growth Division*. Print.

Competitiveness and Private Sector Development: Republic of Moldova 2011 Fostering SME Development. Paris: OECD, 2011. Print.

Corporate Governance in Slovenia 2011. Paris: OECD, 2011. Print.

"Countries." *Europa*. European Union. Web. 1 Mar. 2012. <http://europa.eu/about-eu/countries/index_en.htm>.

"Czech Republic: Selected Issues and Statistical Appendix." *IMF -- International Monetary Fund*. 9 Jan. 2004. Web. 29 Jan. 2012. <http://www.imf.org/external/pubs/cat/longres.aspx?sk=17112.0>.

Darden, Keith A. *Economic Liberalism and Its Rivals: the Formation of International Institutions among the Post-Soviet States*. Cambridge: Cambridge UP, 2009. Print.

Data | The World Bank. The World Bank. Web. 20 Sept. 2011. <http://data.worldbank.org>.

Development in Eastern Europe and the South Caucasus: Armenia, Azerbaijan, Georgia, Republic of Moldova and Ukraine. Paris: OECD, Development Centre, 2011. Print.

Enterprise Surveys - The World Bank Group. 2011. Web. 16 Sept. 2011. <http://enterprisesurveys.org/>.

"European Commission - Enlargement." *Europa - European Commission - Homepage*. Web. 30 Oct. 2010. <http://ec.europa.eu/enlargement/the-policy/conditions-for-enlargement/index_en.htm>.

"European Neighbourhood Policy." *European Commission*. European Union, 30 Oct. 2010. Web. 1 Mar. 2012. <http://ec.europa.eu/world/enp/index_en.htm>.

Feenstra, Robert C., and Alan M. Taylor. "International Agreements: Trade, Labor, and the Environment." *International Economics*. New York, NY: Worth, 2008. 391-429. Print.

Gould, John A. *The Politics of Privatization: Wealth and Power in Postcommunist Europe*. 3rd ed. Boulder, CO: Lynne Rienner, 2011. Print.

"IMF DataMapper V3.0." *International Monetary Fund*. Web. 15 Sept. 2011. <http://www.imf.org/external/datamapper/index.php>.

Johnson, Lonnie. *Central Europe: Enemies, Neighbors, Friends*. 3rd ed. New York: Oxford UP, 1996. Print.

Julious, Steven A. "Inference and Estimation in a Changepoint Regression Problem." *Journal of the Royal Statistical Society: Series D (The Statistician)* 50.1 (2001): 51-61. Print.

Lewer, J. J., and H. V. Berg. "How Large Is International Trade's Effect on Economic Growth?" *Journal of Economic Surveys* (2003): 363-96. Print.

Mahoney, William M. *The History of the Czech Republic and Slovakia*. Santa Barbara, CA: Greenwood, 2011. Print.

"Online Training Section - DSS at Princeton University." *DSS Data Subject Guides*. Princeton University. Web. 29 Jan. 2012. <http://dss.princeton.edu/training/>.

"Republic of Moldova: Statistical Appendix." *IMF -- International Monetary Fund*. 18 Apr. 2008. Web. 29 Jan. 2012. <http://www.imf.org/external/pubs/cat/longres.aspx?sk=21904.0>.

"Republic of Slovenia: Selected Issues and Statistical Appendix." *IMF -- International Monetary Fund*. 28 July 2005. Web. 29 Jan. 2012. <http://www.imf.org/external/pubs/cat/longres.aspx?sk=18440.0>.

Rodriguez, Francisco, and Dani Rodrik. "Trade Policy and Economic Growth: A Skeptic's Guide to the Cross-National Evidence." *NBER Macroeconomics Annual 2000* 15 (2000): 261-338. Print.

"Top Reformers from Doing Business 2010 - World Bank Group." *Doing Business - Measuring Business Regulations - World Bank Group*. 2011. Web. 15 Sept. 2011. <http://www.doingbusiness.org/reforms/top-reformers-2010>.

Transparency International. 1 Dec. 2011. Web. 12 Feb. 2012. <http://www.transparency.org/policy_research/surveys_indices/cpi>.

Academic Vita of Michaela Dragalin

EDUCATION:

Pennsylvania State University, State College, PA
Schreyer Honors College, August 2008-Present

- B.S. in Economics, B.A. in International Politics, expected, 2012
- Paterno Fellowship
- Excellence in Communication Certificate
- Honors Program in Economics
- Modules in Macroeconomics, Money and Banking, and International, Development and Transition Economics

Methacton High School, Philadelphia, PA
September 2004-June 2008

ACTIVITIES/VOLUNTEER WORK:

Pennsylvania State University Journal of International Affairs, Penn State University
Associate Editor, April 2011-Present

State College Area High School Varsity Cheerleading, State College, PA
Assistant Coach, April 2009 - Present

Economics Association, Penn State University
Member, September 2009 - Present

Phi Alpha Delta Pre-Law Fraternity, Penn State University
Member, April 2011 - Present

Pennsylvania State University College of the Liberal Arts Internship, Bellefonte, PA
Tutor at the Centre Country Development Center for Adults, August 2011-January 2012

Civic Engagement *New York Times* Public Speaking Contest, Penn State University
Fourth Place, May 2011

WORK EXPERIENCE:

Embassy of Moldova, Washington, D.C.
Intern, June 2011 - August 2011

United Nations Population Fund Moldova, Chisinau, Moldova
Y-PEER Associate, May 2010 - July 2010

College Works Painting, State College, PA
Recruiter, August 2009 - Present

College Works Painting, Philadelphia, PA
Branch Manager, January-August 2009

LANGUAGES:

Fluent in Romanian
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