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THE IMPACT OF TRADE ON GROWTH: A GRAVITY MODEL-BASED INSTRUMENT APPROACH ON POST-COMMUNIST EUROPE

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The views expressed herein are solely those of the author and do not necessarily reflect the views of the Bank of Albania.

CONTENTS

ABSTRACT

This study is based on the literature started by Frankel and Romer (1999) on using instruments for predicted trade to analyze its effect on growth. It uses panel data to better control for possible time-invariant characteristics. The fall of communism is used as an exogenous shock to the system. The study finds that not all attempts at creating good instruments are successful. However the instruments that perform well lead to results comparable with the existing literature. Trade is found to have a positive and significant effect on a country's income.

Once one starts to think about [economic growth]
he can't think about anything else
- Robert Lucas, University of Cambridge speech

1. INTRODUCTION

The impact that trade and openness has on economic growth has been one of the most important, most debated, and most researched questions for economists in academia circles. Its importance to policy makers as well cannot be overstated. Today policy makers mostly tend to believe that trade has a positive impact on growth. Various studies, some of which will be mentioned throughout this paper as well, have established a positive relationship between the two variables. International institutions such as the IMF, the OECD, and the World Bank have tried to assist developing countries with providing advice based on the belief that economic openness has a positive impact on economic growth. An OECD report on the subject (1998, p. 36) states that: "More open and outward-oriented economies consistently outperform countries with restrictive trade and foreign investment regimes." This is a belief shared by the IMF as well (1997, p. 84): "Policies toward foreign trade are among the more important factors promoting economic growth and convergence in developing countries."[1]

This question has long been a concern for academic economists as well. In the 1990s work by Israeli economist Dan Ben-David was highly praised for trying to correctly estimate the relationship between trade, growth, and, subsequently, economic convergence. In a seminal paper Ben-David (1993) finds that "examining episodes of major post-war trade liberalization within specified groups of countries, the findings suggest a strong link between the timing of trade reform and income convergence among countries." Similar results are found in another paper published a year later.[2] Ben-

[1] Quotes from Rodriguez, Francisco and Dani Rodrik, "Trade Policy and Economic Growth: A Sceptic's Guide to the Cross-National Evidence," NBER Macroeconomics Annual, 2000, 15, 261–325.

[2] Ben-David, Dan "Income Disparity Among Countries and the Effects of Freer Trade", Economic Growth and Structure of Long Run Development, 1994, 45-64

David (1996, 1997, 1998) continues to examine the relationship between major trade partners. He finds that " ... the majority of these trade-based groups exhibited significant convergence. Furthermore, a comparison of these trade-based groups with different [random] country groupings... shows that the former were more likely to exhibit convergence than the latter."[3]

Krueger (1998) claims that it is empirically straightforward to prove that countries with a larger emphasis on trade strategies achieve better economic growth. Stiglitz (1998) in an empirical study shows that "most specifications of empirical growth regressions find that some indicator of external openness... is strongly associated with per capita income growth." According to Fischer (2000), "integration into the world economy is the best way for countries to grow." Dollar (1992) and Sachs and Warner (1995) try to test for results' robustness by building indices for "openness". Widely cited in the literature, Dollar's paper principal contribution is the construction of two separate indices. The paper shows that each is negatively correlated with growth over the 1976-85 period in a sample of 95 developing countries. Sachs and Warner (1995) are also widely cited in the literature of trade and growth. Their index is a dummy variable in which the value is zero if the economy is closed according to various criteria they use in the paper. The Sachs-Warner dummy index is shown to have a high and robust relationship when used in growth regressions. The index of openness constructed therein has now been widely used in the cross- national research on growth. Glick and Taylor (2005) create an extensive dataset on bilateral trade between over 200 countries, with data starting from the 19th century. They then try to evaluate the impact of war on bilateral trade and, by using the gravity model, the eventual impact that the decline of trade has on welfare. They find a large and persistent impact of war on trade, and hence on national economic and global welfare. A main contribution of their paper has been the creation of the data set, which subsequent studies have relied on for further research.

However, empirically the issue is far from having been settled. Criticism of these studies pointed out that they would suffer from

[3] Ben-David, Dan (1996), "Trade and Convergence Among Countries," Journal of International Economics, 40, 279-298.

a common problem. Trade and growth are thought to be highly correlated, and thus reverse causality could be a problem. Richer countries are more often than not countries that trade more. They have more resources to focus on improving trade-helpful infrastructure, a richer population to buy imported products, and developed sectors of the economy that export goods and services. This endogeneity between the two variables has made it difficult for empirical researchers to fully assess the relationship between them. Omitted variable bias is also a problem, as there are thought to be a myriad of factors that can affect growth as Sala-i-Martin (1997) shows in another widely cited paper. Therefore, simple regression analysis is not enough to examine the relationship between the two. What we need is an instrumental variable.

This paper will try to use recent development in the methodology of instrumenting for trade through the use of geographical and, in this case, political factors. The use of political factors in the design of trade instruments is a novelty, but one which will not be very easy to accomplish. Eventually, a good pattern for designing an instrument will emerge, and that type of instrument will be successful in establishing a strong positive effect of trade on income, with a coefficient that compares well to the ones in the existing literature.

1.1 RELEVANT LITERATURE REVIEW

Frankel, Romer and Cyrus (1996) initially experimented with the idea of an instrument for trade based on the gravity model. They applied their empirical strategy on a data set of East Asian countries and find that "the effect of openness on growth is even stronger when corrected for the endogeneity of openness compared to standard OLS estimates." As we will see later on, this is most likely due to trade acting in a broader sense as a proxy for economic openness. Frankel and Romer's paper (1999) was perhaps even more influential and has been widely and regularly cited in literature, and is one of the key papers that this study is based on. Their strategy is similar to the previous paper and attempts to resolve for possible endogeneity through the use of a geographic instrument. They use the distance between countries as

well as other geographic, time-invariant variables such as common borders, whether a country is landlocked, to predict bilateral trade between country pairs. More formally, they conduct a regression[4]

$$ln(\tau_{ij}/GDP_i) = a_0 + a_1 lnD_{ij} + \beta X_{ij} + e_{ij} \quad (1)$$

where τ_{ij}/GDP_i is the share of bilateral trade between countries *i* and *j* in country *i*'s GDP. D_{ij} is the distance between the two countries, usually measured as the point to point distance between each country's most important economic centre, and X_{ij} stands for other geographic bilateral controls they use such as common border, country size etc. They then construct what they hope is an exogenous instrument for aggregate trade share in each country by summing up predicted trade shares per each country.

$$\hat{T}_i = \sum_{j \neq i} e^{\hat{a}' X_{ij}} \quad (2)$$

Equation (2) implies that trade shares are un-logged from Equation (1) and then summed up by each country. This instrument, Frankel and Romer suggest, should be uncorrelated to other determinants of growth such as role of institutions, human capital. As we will see with our own regressions, this conclusion suggests that we can estimate regressions simply by using instrumented trade as a variable, with the impact of the other omitted variables effecting only the error term. Rodriguez and Rodrik (2000)[5] and others have shown that Frankel and Romer (1999)'s results are not robust to the inclusion of geographic controls in the second stage. While their instrument is free of reverse causality, it is correlated with geographic differences in outcomes that are not generated through trade. Countries that are closer to the equator generally have longer trade routes and may have low income due to unfavourable disease environments or unproductive colonial institutions. This debate has been difficult to resolve because the instrument is limited to a single cross section.

[4] Equation from Frankel and Romer (1999) with other controls used not explicitly written above.

[5] Anderson and Van Wincoop also have a very important paper criticizing the inclusion of non time-invariant factors, among other things.

Omitted variable bias is essentially impossible to avoid and results will always be sensitive to the inclusion of additional regressors as Sala-i-Martin (1997) has proved.

Feyrer in two papers (April 2009, September 2009) tries to control for the problems that arose with Frankel and Romer by using a panel instead of a cross-section of data. The use of country dummies, or country pair dummies, to control for time-invariant characteristics has proved a highly successful strategy with his papers becoming highly regarded. In both his papers Feyrer uses exogenous shocks to the system to try to assess the impact trade has on income through the use of instruments similar to Frankel and Romer. In the first paper he uses improvements in airplane transport technology to see how a drastically different trade route because of airplane transportation compared to shipping impacted trade and therefore income. The second paper uses a much better exogenous shock, in fact as perfect as you can find in economics. The closure of the Suez Canal in Egypt during the Six Day War between Israel and Arab countries led to a major increase in shipping distance for vessels between certain countries. The canal closure was a complete surprise, but other than distance it did not cause major disruption in any other growth related factor. Both papers find that distance has a negative effect on trade, whereas trade has a positive one on income.

1.2 POST-COMMUNIST COUNTRIES

The recent literature by Feyrer has established that finding an exogenous shock to trade and modelling its impact is one of the best methodologies to follow. Unfortunately it is not easy to find such shocks, let alone design a successful instrument around that shock. The Suez Canal closure was a perfect exogenous shock because it changed shipping distances without changing any other variable for most countries. Therefore, the identification strategy is very easy. In the case of comparing sea trade to air trade, there was an immediate problem, i.e. distances did not change but their significance did over time. A similar situation occurred after the fall of communism in Eastern Europe. Countries that had been closed

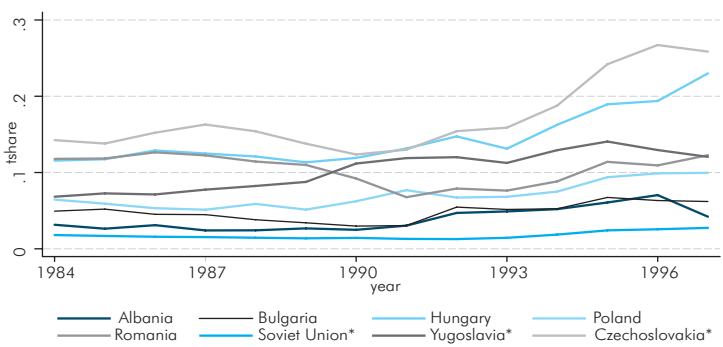
off from the West for 50 years were once again free to exchange goods and trade with. They were also fortunate as their very close neighbours were rich countries. If we believe the argument by Frankel et al (1996), being in proximity of other developed countries has a positive effect on growth due to spillovers and economic interaction. After the fall of communism, a similar opportunity lay before the former Eastern Bloc. While they had been close to Western Europe before, they could never take advantage of that factor. The opening of borders would bring a shock to trade patterns across Europe with people on both sides of the former Iron Curtain trying to take advantage of the new opportunities.

However, modelling the collapse of the communist system and its impact on trade and, therefore, income is not very easy, as we will see throughout the paper. The first obvious problem is that a changing political regime can impact income in many ways, not only through trade. Therefore there will be doubts on how successful we can be in designing a truly exogenous instrument. Similar to Feyrer's paper on air transport compared to shipping transport, where it is easy to argue that improvements in technology can affect income in many ways, trying to control for the impact of changing political regimes is the first challenge. The paper tries to deal with that problem by constantly using panel data while designing the instrument, and by conducting panel IV regressions. Through the constant use of fixed effects, for country or bilateral pair, as well as time effects the hope is that, eventually, a pattern for successfully designing an instrument can arise.

The second important problem is that not all Eastern European countries dealt with the collapse of communism in a similar manner. The collapse of a political system did have some short -run consequences for all countries, as replacing a centralized economic system with private enterprises takes a certain amount of time. Income per capita decreased in most countries in aftermath of the collapse, only to begin growing again later on but the length of the process was very different for different countries. As Figure (1) suggests, some of them immediately seized upon the opportunity of freer trade by increasing the share of trade in their national GDP. Other countries, however, either were not recovering from the

political shock or had yet to seize the opportunity. Most severe in this lack of uniformity is the political turmoil that followed. Yugoslavia had a bitter war, former Soviet Union descended into anarchy with new dictators replacing old ones in the newly established republics, and Albania was on the brink of civil war in 1997 after years of bitter political dispute. All these negative shocks did not allow for the process of freer movement to really take hold, keeping incomes low throughout the decade and creating negative incentives for trade and commerce. Some countries did profit however. They used their advantageous position to trade more, and eventually become richer. Keeping this in mind, the challenge for the rest of the paper is to design an instrument that can correctly predict for trade in the first stage of regressions and subsequently perform well in the income regressions of the second phase.

Figure 1: Trade share (Trade/GDP) for Eastern European countries



* indicates agglomerated data for extinct countries

In order to avoid diluting the data with countries where the impact of the collapse of communism would not be very strong, the data set chosen includes only European countries. That is, the study tries to see how the trade patterns within this region of economic opportunities for the Eastern European countries are impacted by the existence and ultimately collapse of the communist system. While this will mean that the coefficients of trade on income will be lower, the results will be able to focus more on the region that was truly impacted by the political shifts.

2. DATA[6]

The bilateral trade data was provided by Alan Taylor, who had initially obtained it from a study by Glick and Taylor (2008). The data set has one information data point for bilateral trade between two countries per year. The bilateral trade data is compiled through the use of the IMF Direction of Trade (DOT) data. As Glick and Taylor explain, "for each bilateral pair in the DOT data there are potentially four observations in each year – imports and exports are reported from both sides of the pair. An average of these four values is used, except in the case where none of the four is reported. These trade values are taken as missing."

In order to measure bilateral great circle distances (the measure of air distance between the countries) we can use the data that is found at a French institution, CEPII.[7] The data provided by CEPII contains various criteria for measuring the distance between two countries. The simple criteria, which Frankel and Romer (1999) use, is that of the distance between the most important cities. There is also a more complicated but slightly better measure of a population weighted distance, which takes in consideration the internal distribution of the population within countries. Using either of the two measure does not change results by much in previous studies. This study relies on the distance measure that controls for the distribution of the population. Also, from CEPII, we have various bilateral dummies controlling whether the two countries share a common border, share a common language, any of the two countries is an island, etc. These bilateral dummy controls are used in some regression specifications. CEPII provides other information as well, especially regarding colonial history, but in the context of intra-European trade it is assumed that this is not very relevant.

Extensive work was undertaken with the data set in order to shape it in its final form. Initially, after selecting all the European countries as part of the data set for the desired time period (1984-1997) all the data points were doubled. That way we had a full panel for each country. That is for every country in the data set we had

[6] I am very grateful to Prof. Alan Taylor for his help in securing the initial data set.

[7] http://www.cepii.fr/anglaisgraph/bdd/distances.htm

information on bilateral trade with each of the other 26 countries across the 14 years. Information regarding distance and other dummies was kept intact.

The other important process that was undertaken with the data was agglomerating trade information for countries that broke up as communism collapsed, that is the Soviet Union, Yugoslavia, and Czechoslovakia. The initial data set included the former countries as well as the new ones, which meant 49 countries in the original data set. However, since it was important for our purpose to correctly model the patterns of trade before and after communism collapse, a breakdown in the data was extremely undesirable. Therefore, the new countries that emerged in the 1990s were grouped together, and bilateral trade with the other countries was summed up for each year, by partner country. That means that the trade between the new countries themselves was excluded from this summation, since that would not have been considered as foreign trade for the former countries. This is somewhat problematic however. One could assume that this new type of trade between countries that used to be united would have a relatively negative effect on income. What once was free trade and economic activity within a single large country is now disrupted by the existence of new borders and therefore trade barriers. However, including this information in the agglomerated trade would lead to a significant upward bias in the results. After this process had been completed, the information on agglomerated trade was merged with the former country, therefore, creating a continuous time series data for each country. Information on distance and other controls was copied from the former country. Table (1) shows the countries used in the data set. The codes for each country are the ones the IMF uses throughout their publications and are known as International Financial Statistics, IFS, country codes. The codes for Soviet Union, Yugoslavia and Czechoslovakia are created on purpose for this study, and do not reflect IFS country codes.

Tablë 1: IFS country codes for countries in the data set

IFS Code	Country	IFS Code	Country
112	United Kingdom	178	Ireland
122	Austria	181	Malta
126	Belgium-Luxembourg	182	Portugal
128	Denmark	184	Spain
132	France	186	Turkey
134	Germany	423	Cyprus
136	Italy	914	Albania
138	Netherlands	918	Bulgaria
142	Norway	944	Hungary
144	Sweden	964	Poland
146	Switzerland	968	Romania
172	Finland	974	Soviet Union (agglomerated)
174	Greece	975	Yugoslavia (agglomerated)
176	Iceland	976	Czechoslovakia (agglomerated)

Lastly, in order to have a continuous time series on country income it was vital to have GDP per capita information for the newly created countries as well. Using the Penn World Tables (since that is what Taylor and Glick used to create their original data set) information was obtained on GDP and population for all the newly created countries. GDP and population were summed up and were included in the data set. Having completed this process, it was easy to generate a GDP per capita variable for the former countries even after they had ceased to exist in real life. This is by no means a perfect process. For example, in a large country like the Soviet Union, GDP per capita in the Baltic countries was consistently relatively higher than most other republics, and the difference became even more pronounced later on. And due to their small population size, information on their increasing income will be "drowned" out. Nonetheless, the alternative is having no continuous time series on GDP per capita, which would severely damage our ability to conduct regression analysis. Without agglomerating the information for these countries, the results are not as significant and become harder to interpret. It is an imperfect but acceptable solution given the situation we are faced with.

3. CREATING AN INSTRUMENT

3.1 THE GRAVITY MODEL

The gravity model has long been used in empirical studies that focus on trade policy. The assumption behind the model is that the distance between two countries is one of the most important variables influencing bilateral trade between said countries. This assumption has been established as a correct one by all the studies using the model, with distance being found to have a strong and negative (as distance grows bilateral trade decreases) effect on trade. Distance is a constant variable in all variations of gravity models used in the literature. This study will use distance in a relatively new manner, by interacting it with a countries' political status, to see whether changing political conditions can lead to changing trade patterns. However, researchers have tried to use other variables in various forms of gravity models. Frankel and Romer (1999) present a gravity model based entirely on "geographical" factors. In their gravity model, they use dummy variables to control for various characteristics such as a country being landlocked, an island, whether a common border exist, as well as variables for country size as well as population. Lastly, as we will see, gravity models have also used data on countries' GDP. Intuitively, it is reasonable to understand why GDP is assumed to have an effect on trade, as we mentioned earlier.[8]

Anderson and Van Wincoop (2003) criticize previous studies that have relied on gravity models as lacking a theoretical foundation. They develop a theoretical model to derive the gravity model that is consistent, efficient and solves for omitted variable bias problems. The theoretical gravity relationship as calculated by them is:

$$trade_{ijt} = \frac{y_{it}\, y_{jt}}{y_{wt}} \left(\frac{\tau_{ijt}}{P_{it}\, P_{jt}} \right)^{1-\sigma} \qquad (3)$$

[8] However, Frankel and Romer(1999) also theorize and find evidence that a large GDP might have a negative effect on trade because it leads to larger in-country economic activity. Smaller countries in terms of area or population, but with high GDP per capita, were thought to be the most active in international trade.

where according to Anderson and Van Wincoop $trade_{ij}$ is the volume of bilateral trade between countries *i* and *j* at time period *t*; y_{it} and y_{jt} are countries *i* and *j* income level at time period *t* and y_{wt} is world income at time *t*, τ_{ijt} is a labelled as a bilateral resistance term, while P_{it} and P_{jt} are country specific multilateral resistance terms. The next step is to turn this relationship into a tractable econometric model, and we consider its log linear form

$$ln\,(trade_{ijt})=ln(y_{it})+ln\,(y_{jt})-ln\,(y_{wt})+(1-\sigma)(ln\,(\tau_{ijt})+ln\,(P_{it})+ln\,(P_{jt})) \quad (4)$$

Following Feyrer (2009), we assume the bilateral resistance term, τ_{ijt}, in Equation (4) will represent a function of distance between a country pair with the exact relationship changing over time. The key assumption in Anderson and Van Wincoop (2003) as well as Feyrer (2009) is that all country pairs share the same bilateral resistance function for each time period. In some of the instruments that are developed later on in the study that assumption is challenged, and distance is allowed to interact with the political status of countries:

$$ln\,(\tau_{ijt}) = f_t\,(distance_{ij})=\beta ln\,(distance_{ij}) + \beta X_{ij} \quad (5)$$

The change in this function over time is assumed to be driven by changes in transportation technology[9] and conditions that are shared across all countries. Following the existing gravity model literature, the bilateral resistance term is assumed to be log linear in distance. The vector X_{ij} is a set of bilateral controls for time invariant characteristics. In the regressions specifications dummies are included for common language, common border, and whether a country is an island or landlocked as said vector of time invariant characteristics. Specifications for communist countries, and whether there was a closed, communist regime in place during the time period, vary across regressions. The paper also presents two regressions where country pair fixed effects are used, in order to better capture possible time invariant characteristics between countries. The specifications for communism vary in the two regressions.

[9] This was important in studies that tried to observe how increase of air transport would affect trade that relied mostly on sea or land transport. Given that we are dealing with countries that mostly relied on land transport for trade among them, also in a period where little technological innovations affected the transportation industry, it is safe to assume that changing technology is not the main cause driving change in β.

The problem with the gravity model from this paper's viewpoint is that it includes GDP as a variable. We described above how trade and GDP have an endogenous relationship, which is why a causal study is difficult between the two. Following the models used by Frankel and Romer (1999) and Feyrer (2009) the *P* and *y* terms from the gravity model will be controlled for by using country dummies in most of the specifications. While this is a simplification, since it assumes that the variables are time invariant, it is the best solution within our context in trying to achieve an exogenous instrument. In addition, all regressions will be considered as "two way fixed effects" regressions because they also include time effects which control for common growth rates across all countries in the data set; all the same, idiosyncratic growth rate differences will go into the error term.[10] As mentioned before, two instruments will use country pair as fixed effects, therefore replacing the dummy variables for individual countries. This is conducted with the hope that it will lead to a better control for all time invariant trade resistance factors. The estimating equations are therefore:

$$ln(trade_{ijt}) = \alpha + \theta_t + \theta_i + \theta_j + \beta_t ln(distance_{ij}) + \beta X_{ij} + \beta \Gamma_{ij} + \varepsilon \quad (6)$$

$$ln(trade_{ijt}) = \alpha + \theta_t + \theta_i + \theta_j + \beta_t ln(distance_{ij}) + \gamma \beta_t ln(distance_{ij}) + \beta X_{ij} + \varepsilon \quad (7)$$

$$ln(trade_{ijt}) = \alpha + \theta_t + \theta_{ij} + \beta_t ln(distance_{ij}) + \gamma \beta_t ln(distance_{ij}) + \varepsilon \quad (8)$$

where Equation (6) includes country effects, bilateral control dummies, and dummies for Communist states and years; Equation (7) includes country effects and interactive variables to better control the effect of distance for communist countries during communist years; Equation (8) includes bilateral pair effects and the interactive variables.[11] By interacting time with distance we generate variation for a variable that would be dropped otherwise since it is a constant. This allows us to measure for the changing impact of distance across time. We can take this argument further,

[10] Hausman tests were conducted on the gravity instruments regression, and the results concurred with the assumption that fixed effects should be used. This is consistent with econometric theory that suggest fixed effects estimators as better suited in dealing with country data sets where homogeneity across individuals is not an easy assumption.

[11] Results from regressions with pair effects and communism dummies were not satisfactory.

and generate another variable (which will be referred to as the interactive variable from now on) where we interact time and distance with a communism dummy if one of the countries involved in the bilateral trade is a former communist country. Therefore, we can better analyse possible heterogeneity in the data, which would lead to the conclusion that former communist countries face a different impact of distance on trade. Full results for the estimating equations are shown in the Appendix. We should remember, as Frankel and Romer point out, that the goal is to describe the correlation between trade and the different distance measures over time, and not to necessarily demonstrate the causality between the two. We then can use that variation generated by these instruments to generate exogenous instruments for predicted trade.

3.2 THE EXOGENOUS INSTRUMENTS

To allow for more options, six instruments are designed, two based on each equation presented in Section 3.1. Equation (6) is evaluated once with dummy variables that control for communist countries only during communist years, and with another variation that adds a dummy for former communist countries in post-communist years as well. The same logic is applied to the other two regressions. For Equation (7), one instrument is designed with the interactive variable for the communist period and a dummy after, one with the interactive variable applied to the whole time period. For Equation (8), we simply use pair dummies instead of single countries. Having conducted all the regressions, following the methodology established by Frankel and Romer (1999), unlogged predictions of each regression will be summed up by country by year, to create instruments of predicted trade. Actual trade will also be summed up, in order to have a total trade variable for all of the countries, for all of the years,

$$\hat{T}_i = \sum_{j \neq i} e^{\hat{a}' X_{ij}}$$

while total intra-European trade will also be summed up

$$Totaltrade_{it} = \sum_{i \neq j} trade_t \qquad (9)$$

Having created the instruments, we need to see how well correlated they are to actual trade. Figures (2) to (7) show graphically the cross-correlation between actual trade and predicted trade according to the instruments. The true values of the cross correlation values are shown in Table (2). With the exception of Instrument 5, which is based on Equation (8) but does not apply the interactive variable across the whole time period, all the other instruments are fairly well correlated. Not surprisingly, the instruments based on country dummies perform better at this phase, as having dummy variables for both countries involved in bilateral trade allows the regression to capture more of the variation. The cross correlation function for them is around 0.5, 0.3 for Instrument 6, and a troubling 0.1 for Instrument 5.

The signs on the coefficients are well within the expectations, with distance having negative coefficients in all the regressions, independent of the type of interaction. Communist-era dummies are also negative, before or after the collapse of communism. This suggests that in the short time frame analysed, not surprisingly, they still lag behind their Western counterparts in trade and economic activity. Having common borders has a positive effect on trade in all regressions in which it is included. Former communist countries bordering the West should enjoy most of the benefits from the new political regime. It suggests that these countries should approach income levels of the West quicker than their counterparts located further east.

The most interesting results from this phase (which Frankel and Romer caution against making causality claims) are the coefficients in Instruments 4 and 6, which are the exact replica of Equations (7) and (8). For these instruments we are using interactive variables across the whole sample and a very interesting result emerges. In other interactions between time and distance, the coefficients are negative but mostly constant. In this case, the coefficients are also negative, but their absolute value rises, their effect becoming larger until it stabilizes in the mid 1990s. We will get back to this result in more detail after we have conducted the IV analysis, because then we can truly say which instruments perform well and which do not. However, the increasingly negative effect of distance for communist countries is consistent with the idea that countries benefit more if they are closer to richer neighbours. As efforts to liberalize the

communist political system grew, countries that were close to richer countries were using the opportunity well. Meanwhile, those located in more remote areas where falling even more behind.

As we get ready to use the instruments in the income regressions, it appears that the first phase of the project has been a relative success, with most instruments appearing to have good correlation with actual European trade, having encountered good signs on the coefficients. An interesting theory has emerged on the effect of distance for communist countries, which we can prove in more detail in the next section.

Figure 2: Correlation of Instrument 1 with Total Trade

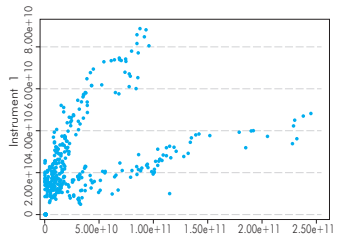


Figure 3: Correlation of Instrument 2 with Total Trade

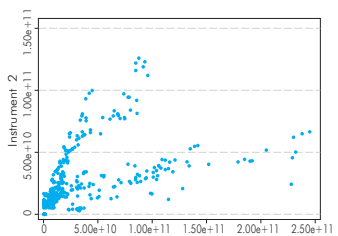


Figure 4: Correlation of Instrument 3 with Total Trade

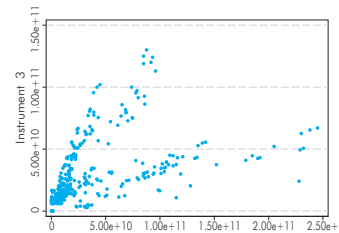


Figure 5: Correlation of Instrument 4 with Total Trade

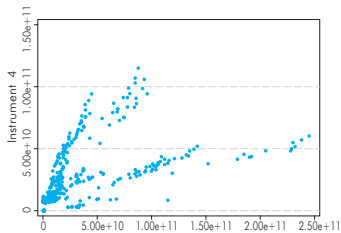


Figure 6: Correlation of Instrument 5 with Total Trade

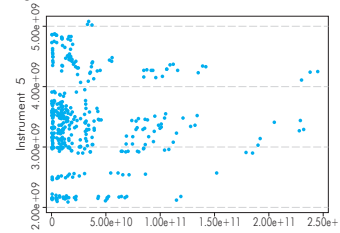


Figure 7: Correlation of Instrument 6 with Total Trade

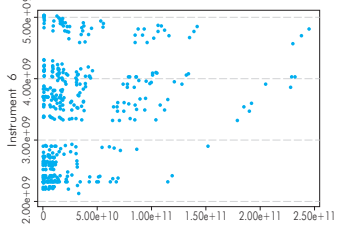


Table 2: Correlation between Trade and Instrumented Trade

Total intra-European trade	
Instrument 1	0.451
Instrument 2	0.507
Instrument 3	0.506
Instrument 4	0.524
Instrument 5	0.101
Instrument 6	0.370

4. THE IMPACT OF TRADE ON INCOME

We now turn our attention to the ultimate goal of the study. We will use the total predicted trade according to our instruments to study the effect that trade has on income and growth in post communist Europe. The goal is to have exogenous instruments, which capture difference in trade due to distance between countries, a one-time change of political regimes as well as other time invariant characteristics between the countries.

The use of instruments for predicted trade constitutes a recent methodology development in the literature of trade. Doubts persist on its reliability, and whether the instruments can truly be exogenous is a question open for debate. As shown earlier, this study, like others that followed, tried to improve one of the main flaws of the Frankel and Romer (1999) paper by using panel data instead of cross-sectional ones. Using this approach, we can include country dummies in both phases, the estimation of instruments and the effect of trade on income. This is useful in order to solve for possible omitted variable bias in deriving an instrument only due to "geographical factors". It allows us to capture other time invariant characteristics. Most importantly, it corrects for possible robustness issues with the instrument specifications. Rodrik et al (2004) conduct a review of the original Frankel and Romer study, and concluded that geography had other ways of influencing trade beside distance. Proximity to the Equator, remoteness and other similar variables all had a strong and significantly negative impact on economic performance. Therefore they cast doubt on whether it is possible to truly have an exogenous instrument based simply on geographical characteristics.

Both Feyrer (2009) and Frankel and Romer (1999) admit that there is another possible problem with their instrument. The instrument for trade might be affected from the general economic interaction between two countries, such as foreign direct investments or other spillover-type activities. This is probably even a bigger issue with the data set chosen for this study, since we are dealing with countries that lie in close proximity to each other, and where various types of interactions

are a common occurrence. Therefore the problem that these types of studies deal with is that the instruments might be a proxy for all types of interactions. What we might be dealing with is the classic Adam Smith argument, i.e. countries learn their competitive advantage through trade and competition and therefore become more efficient and wealthier. As seen in the Literature Review section, studies by Ben-David in particular tried to focus on this approach. The studies would use trade as more or less an indicator of economic openness, and would attempt to identify the effect that increased trade had on economic convergence. Frankel, Rose et al (1996) also suggest that East Asian countries benefited tremendously through spillovers by being located close to each other, and countries with similar starting conditions would probably not achieve similar results even if they were to follow trade-oriented policies.

From the perspective of this study, the issue of whether instrumented trade is a good variable to use, or whether it is in fact something closely resembling a proxy is a slight worry. In trying to identify what role intra-European trade plays in growth, the possibility of having an unreliable variable could lead to incorrect results and conclusions. However, seen from a broader perspective, this might not be as problematic as initially it is thought to be. To the extent that trade instruments might capture effects from general economic openness and interactions, it should not affect the final conclusions of the study more than is necessary. If the study proves that economic openness had a positive impact on Europe following the communist collapse, even though the channel might be more than simply physical trade between the countries involved, nonetheless it will have reached a meaningful and important conclusion.

There are no important or heavily cited studies in the field of trade that try to use change in political regimes as an instrument for trade. One can easily observe why that is the case. Other studies that have tried to focus simply on geography, benefit from a reasonable assumption of "ceteris paribus", i.e. every other factor is considered to be more or less constant or invariant. For example, the closure of the Suez Canal during the Six Day War studied

by Feyrer (2009), affected only shipping routes and distances for the majority of world countries, with very few countries also suffering through the consequences of war. As mentioned during the introduction, this is not a very simple assumption to make for our case. The collapse of a political regime, as closed or as isolated it might have been, creates severe unrest in the societies that experience it. That was the case in Eastern Europe as well, with most of the former Soviet Union republics suffering through years of political turmoil, and newly established authoritarian regimes. Former Yugoslavia descended into war, and Albania suffered through civil unrest that could arguably considered a civil war. All of these factors should play a role in income and growth, and in fact they did with most Eastern European countries seeing their income fall in the early 1990s only to recover later as the process of creating a new political system was solidified. However, it is interesting to study this period in history because it is easier to assume that the collapse of communist regimes is the closest we can get to an exogenous shock with regards to changing political regimes. Using panel data to control for country interactions during the process of creating instruments, as well as for the growth regressions allows us to control for these factors. Also, as Acemoglu et al (2001) point out the role of institutions play in income is a long term one, while in our case the change in institutions had been a relatively recent one. There is arguably not enough of a time period to lead to a positive impact in income like a sudden, exogenous openness policy towards trade might. Nonetheless, the assumption that country dummies can control for these factors perfectly is still a simplifying one that can be improved in future studies. Keeping that in mind, we move on to the panel results for growth regressions.

4.1 OLS REGRESSIONS

The focus of the study has been to design instruments of predicted trade based on geographic and political conditions. The reason why this approach is chosen is because trade and income are considered by many to be endogenous variables; therefore

coefficients of simple regression of trade on growth are expected to yield biased coefficients.[12]

In order to make a similar comparison with our IV estimations later on, we first conduct OLS regressions. The regression specification for the country level regression is:

$$ln(y_{it}) = \alpha + \theta_t + \theta_i + \beta ln(trade_{it}) + \varepsilon_{it} \quad (10)$$

where y_{it} is per capita GDP, which as described in the Data section is taken from Penn World Tables with the exception of the agglomerated countries. The other variables, θ_t and θ_i are the same used during the estimation of instruments and stand for year and country effects[13]. The results for estimating Equation (10) are shown in Table (3). Two different specifications are used, one with and one without year dummies. The inclusion of year dummies to control for time effects reduces the coefficient on trade but not by a significant amount in this case. The coefficient, 0.297, is statistically significant and it compares favourably to other studies where the coefficient on trade in similar regressions is approximately 0.4 If we consider that we are only using intra-European trade this coefficient is indeed large. It shows how big of a role intra-European trade plays for a lot of European nations, with smaller nations theoretically benefiting the most from having many rich neighbouring countries to trade with to complement the lack of a big internal market. Unfortunately, these results are also most likely biased, as the variables are endogenous with the direction of causality being indeterminate.

[12] The easy assumption to make is that this would be the case of an upward bias, with coefficients over-estimating the impact of trade on income, due to reverse causality. However, Frankel and Romer found out that in fact it was underestimating it. There were two possible explanations they argued. The first was possible measurement error, which leads to downward bias. The second possible explanation they suggested was the possibility that, as described in this study, trade is simply a proxy for vaster economic interaction.

[13] In order to avoid using country dummies, the regression can be designed as fixed effect panel data regression.

Table 3: OLS Results

Log of Real GDP per Capita		
ln (trade)	0.311 (0.015)***	(0.024) 0.297***
Year Dummies	No	Yes
Years	14	14
Country Dummies	Yes	Yes
Countries	27	27
Observations	363	363
R^2	0.56	0.58

***significant at 1%
Standard errors clustered by country

Table (3) also shows information on the agglomerated data set that we will be using in the second phase of the study. Bilateral trade information is dropped from the data set, and now we have a panel of 27 countries and 14 years, with information on total trade

4.2 INSTRUMENTAL VARIABLE REGRESSIONS

The strategy that Frankel and Romer set up to design, which was widely cited, was to create a truly exogenous instrument. As Sala-i-Martin (1997) showed, there are endless variables that can be included into growth regressions and have statistically significant impact. Therefore he concluded, many studies would always be faced with robustness issues, since empirical researchers could always find omitted variables that change results for any study into growth. This made it very hard for any study to reach definite conclusions on the impact a variable would have on a country's income. From the policy recommendations perspective, there were persistent doubts on what policies governments should effectively follow to aid the growth process.

The innovative idea behind Frankel and Romer's instrument was that by being truly exogenous, as they hoped it would be, there would be no subsequent need to include other variables in the regressions. That is not to say that factors other than trade would not have an effect on income growth. They would of course, but

the exogenous nature of the instrument would make it so that the coefficients were uncorrelated, and the impact of all other variables would enter the error term in the second stage of the IV growth regressions. While later literature showed that the instruments were not completely exogenous, their intuition remained praise worthy. It is the same type of intuition that Feyrer has followed, and the same that this study follows as well. Therefore, growth regressions will not use other variables besides instrumented trade to go along with year and country dummies, with the belief that the impact of other variables will be included in the error term in our case as well.

In order to solve the problem of endogeneity between trade and income we turn to the instruments designed in Section 3. The strategy followed is similar to the one used for the OLS regressions, with Equation (10) being estimated again. This time, the total predicted bilateral trade for each country is used as an instrument in place of total trade volume. The results for these regressions are shown in Tables (4) and (5). Table (4) shows results obtained by using variations of the instruments derived through the use of Equations (6) and (7), the ones that use country dummies in their specifications. Table (6) uses variations of instruments derived from Equation (8), the one with country pair dummies.

Let us first turn our attention to Table (4). Columns (1) through (4) use the two instruments derived from Equation (6), with dummies used in the first case for former communist countries before communism collapse, and with dummies for both, before and after collapse[14]. Since time effects were not very important during the OLS regressions, the Tables present results with and without year dummies involved in order to evaluate if the use of instruments drastically changes the results presented in Table (3).

The first clear observation is that inclusion of year dummies leads to results that are drastically different in the case of IV regressions compared to the OLS case. Without year dummies, all the variations of the instruments appear to perform well in the first stage (presented in the lower part of the Table). They also suggest a statistically significant and positive impact that trade plays in

[14] In the correlation Table (2), these are Instruments 1 and 2

income. However, the inclusion of the year dummies alters that assessment. There are clearly strong time effects that should be taken in consideration with the data set chosen. Columns (2) and (4) show that Instruments 1 and 2, derived from Equation (6) are neither particularly good instruments, nor do they explain very well the variations in income when year dummies are included in the regressions. Using dummies to try to capture the effect of trading with a communist country before or after the collapse is not a good enough strategy.

Columns (5) through (8) use variations of instruments derived from Equation (7). Again, Columns (5) and (7) do not include year dummies whereas (6) and (8) do. The first two columns lead to a similar conclusion as the one made before, i.e. the inclusion of year dummies is significant and it drastically reduces the effectiveness of the instrument. Column (6) in fact suggests that the instrument is extremely weak, and the results derived from it deserve little attention. However, results improve with the last column. Inclusion of year dummies does not make the instrument weak. An F-stat value of 45.9 is well over the rule of thumb value 10. The coefficient on the instrument is statistically significant and so is effect of trade on income in the second stage. The value of coefficient on the log of trade, 0.265, compares favourably to the studies by Feyrer and Frankel, who estimate this coefficient to be close to 0.4. Taking in consideration that this is simply intra-European trade, the coefficient's value is expected to be lower, but not by much.
Observing Table (4), one can clearly arrive at the conclusion that the instruments with interactive variables in them are much stronger, and their results in the second stage of regressions are well within the values estimated by the existing literature. However, the other instruments appear to be weak and with little value for the purpose of the study. Also, the coefficient on the log of the instrument in the first stage, even for the strong instrument in Column (8) has a value that is relatively lower compared to the literature. The coefficient's value, 0.272, does not compare very well to the best instruments put forth by the papers cited earlier. The value of the coefficient in Feyrer is close to or above 1 for the most relevant instruments.

Table 4: Panel Data Results Using Instruments of Predicted Trade

	1	2	3	4	5	6	7	8
IV Results								
	Log of Real GDP per Capita							
ln (trade)	0.259	1.363	0.353	0.033	0.346	2.05	0.311	0.265
	(0.027)***	(0.650)**	(0.028)***	(0.215)	(0.025)***	(9.38)	(0.021)****	(0.069)***
R^2	0.545	0.249	0.55	0.43	0.553	0.248	0.56	0.578
First stage								
	ln (trade)							
ln (instrument)	0.507	0.126	0.428	0.112	0.446	0.011	0.54	0.272
	(0.041)***	(0.053)**	(0.036)***	(0.046)	(0.025)***	(0.04)	(0.028)****	(0.040)***
Instrument F-Stat	150.5	4.63	141.4	5.8	187.4	0.6	388	45.9
R^2	0.409	0.631	0.297	0.635	0.355	0.628	0.537	0.675
Country Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	No	Yes	No	Yes	No	Yes	No	Yes
Instrument Characteristics								
Interactive Variable	No	No	No	No	Pre 1991	Pre 1991	Full Sample	Full Sample

***significant at 1%, **significant at 5%
Standard errors clustered by country

In order to get comparatively better results from our instruments we must turn our attention to the specifications derived from Equation (8). These instruments, instead of country dummies for both countries involved in bilateral trade and other control variables, use pair dummies as well as interactive variables for distance. Therefore we hope to capture all possible time-invariant interactions between the countries through the use of a pair dummy. This is a significant improvement on the methodology established by Feyrer, since our data set is a panel instead of a cross-sectional one.

Results from the IV regressions using those specifications are shown in Table (5). The presentation of the results follows the same pattern established in Table (4). Columns (1) and (2) show results derived from the first specification, where we used an interactive variable for only the period before communism collapse, and a dummy thereafter. Column (1) shows results from a regression without year dummies and Column (2) includes said dummies. The same pattern is chosen for the last two columns, but now the instrument used relies on interactive variables throughout the whole time period.

On a first glance, we can immediately identify that year dummies are statistically significant once again. This is consistent with the findings from the previous table. Therefore we can conclude with some certainty that there are important time effects that should be controlled for. However, compared to the previous table, the instruments perform well even with the inclusion of the year dummies. The F-Stat on both Columns (2) and (4) while significantly reduced due to the inclusion of the year dummies, continues to be well above 10, with the coefficients of course being statistically significant to the 1% confidence interval level. Most importantly, all results now compare very favourably other results from the literature. The coefficient on the log of the instrumented trade is well above 1 and higher after the inclusion of year dummies. The F-stats are comparatively high as well. Most importantly the coefficient on the log of trade in the second stage experiences a slight increase from the results of Table (4). It is now around 0.3, which continues to be a highly significant number.

The important lesson behind the value of the coefficients though is the design of the instrument. Pair effects seem to perform much better than country dummies and bilateral controls. This is slightly different to Feyrer, but it is worth mentioning that the differences were very small in his case. In our case the differences are much larger. This suggests that pair dummies capture changing political regimes much better. As a result, all possible time-invariant interaction between the two countries are included in the pair dummies. Equally as, or arguably more, important is that the key variable included in the instrument regressions was the interactive variable for time period, distance and political regimes. The effect that distance played for the richer, western European countries was significantly different from the effect that it plays for the Eastern European countries. The latter would experience an increasingly negative effect from distance, whereas the western European countries also had a negative relationship with distance, but one which was mostly constant throughout the data set. Lastly, the effect of being a former communist country continues to be felt even after the collapse of communism. This was something that had to be included in the modelling of the instruments. The last two arguments seemed to be crucial in designing a strong instrument, which led to meaningful results in both the first and second stage of IV regressions. Before discussing at length about the coefficients on the log of trade, and the implications of those results there is one more specification that is worth considering.

Table 5: Panel Data Results Using Country Pair Instruments

	1	2	3	4
IV Results				
	Log of Real GDP per Capita			
ln (trade)	0.328	0.297	0.322	0.329
	(0.018)***	(0.024)***	(0.017)***	(0.040)***
R^2	0.559	0.568	0.56	0.578
First stage				
	ln (trade)			
ln (instrument)	1.062	2.02	1.03	1.59
	(0.037)***	(0.156)***	(0.032)***	(0.113)***
Instrument F-Stat	829.4	166.4	961.5	198.2
R^2	0.712	0.756	0.748	0.769
Year Dummies	No	Yes	No	Yes
Country Dummies	Yes	Yes	Yes	Yes
Instrument Characteristics				
Interactive Variable	Pre 1991	Full Sample	Pre 1991	Full Sample

***significant at 1%, **significant at 5%
Standard errors clustered by country

4.3 FIRST DIFFERENCES

Since we are dealing with data that have a significant time component it is recommended to estimate the model in first differences, as it often occurs in the trade literature. The standard errors reported will be robust to possible serial correlation. The results from these regressions are shown in Table (6). In this case year dummies are included along a set of country dummies in Columns (1) through (6) as previous results showed that they were indeed important and the lack of inclusion led to severely biased coefficients. Therefore, columns correspond to the number of instruments as described in Section 3.2.

Unfortunately, some of the most problematic findings from Section 4.2 are repeated again. Instruments 1 through 4 are found to be particularly weak in the first stage, and yielding statistically insignificant results in the second. However, Instruments 5 and 6 continue to perform substantially better, with Instrument 6 being by far the best. It is a very strong instrument in the first stage, with a statistically significant coefficient in the second. The coefficients of interest in both stages for Instrument 6 also compare well to the ones provided by the previous regressions as well as by the existing literature. These results continue to strengthen the belief that in modelling the trade patterns between European countries in the period before and after the fall of communism it is important to use pair effects and interactive variables for the whole time period for Eastern European countries.

As far as analysing the results derived from all types of regression, we can say that for strong instruments our coefficients compare well to the ones already present in literature. The coefficient of log trade on log income measure as real GDP per capita is around 0.2-0.3. For instruments predicting total trade this coefficient is around 0.4. For European trade this number is truly impressive, as mentioned earlier. The results show that trade has a significantly positive impact on a country's growth. For European countries this is arguably even more important since they are located in proximity to other rich countries. This reason is probably the driving force for the strong coefficient. It can also help us understand some of the

growth patterns for Eastern European countries. If our model is truly correct in modelling trade patterns and its subsequent impact on income, then we can derive that former communist countries that were located in proximity to the richer Western European countries were able to engage in more trade, and enjoy the beneficial effect of their location the most. On the other hand, countries located far away from the richer West did not enjoy most of the benefits. Also, this negative impact of distance on trade became more pronounced as countries became more open. That is, during the communist era it was rather difficult for countries to truly use their geographic position to their benefit. Trading decisions, just like every other economic decision, were heavily centralized with a lot of planned trade ongoing between communist countries, as well as limited but planned trade with Western countries. As these barriers started to drop and countries began using the geographic location to their advantage, the negative impact of distance on trade grew increasingly. Therefore, we should not be surprised that countries like Poland and Czech Republic are quickly approaching Western living standards, whereas others like Ukraine and Moldova have a long road in front of them.

Table 6: First Difference Results

	1	2	3	4	5	6
IV Results						
	Δ Log of Real GDP per Capita					
Δln (trade)	1.777	0.423	0.678	0.441	0.092	0.189
	(5.469)	(0.252)*	(0.457)	(1.173)	(0.045)**	(0.065)***
R^2	0.271	0.272	0.279	0.254	0.298	0.287
First Stage						
	Δln (trade)					
Δln (instrument)	0.009	0.042	0.029	0.16	1.404	1.106
	(0.028)	(0.019)**	(0.019)	(0.254)	(0.187)***	(0.147)***
Instrument F-Stat	0.09	4.41	2.31	0.39	56.1	56.5
R^2	0.52	0.527	0.524	0.521	0.598	0.597
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Instrument Characteristics						
Interactive Variable	No	No	Pre 1991	Full Sample	Pre 1991	Full Sample

***significant at 1%, **significant at 5%
Standard errors clustered by country

5. FINAL REMARKS AND CONCLUSIONS

This paper has tried to follow the methodology created by Frankel and Romer (1999), on creating instruments for predicted trade to use in income regressions. The shock that it tried to examine was the collapse of the communist system in Eastern Europe, and its impact on trade patterns in intra-European trade. The paper focused on Europe, because it was important to try to understand the impact on trade of being close to richer western countries could have. Including a larger data set, while the shock that the paper dealt with was mostly regional, would most likely dilute the results and make them statistically insignificant.

The first part of the study focused on the gravity model, and how it has been used to create trade instrument in the past. Using the standard theoretical model available, the paper formulates three estimating equations for instruments. Each equation is then given a slight variation in its formulation, and six instruments are created. Unlogged forms of these regressions are summed up by country and by year to create a predicted trade instrument. Actual trade is also summed up to create a variable for total actual trade. The cross correlation functions between actual and predicted trade perform well, but in panel IV regressions that is not the case. Instruments derived from the use of country dummies are not successful at all. The results improve when pair dummies are used. However, the variable that truly leads us to a successful instrument is an interaction of communist countries, time dummies, and distance. It is probably the key contribution of the whole study, given its findings as well.

The paper had already been using an interaction of time and distance following the model created by Feyrer (2009) in order to create variation in distance when there are no physical changes to trade routes, but just qualitative ones. While the sign on those variables was the expected negative one, the coefficients were constant, without important differences between them. The inclusion of the communism dummy changes that result. When the interactive variable is applied to the whole data sample, the coefficients grow increasingly negative, until they stabilize in the middle of the 1990s. That means that in the period that communist

countries were opening their borders, the effect of distance became more important. Countries with rich neighbours could benefit more. This would re-enforce a theory already expressed by Frankel et al (1996) that countries benefit from being close to richer neighbouring countries.

The coefficients found in the second stage of IV regressions are mostly consistent with the current findings in the empirical literature. They find a positive effect of 0.2-0.3 for intra-European trade on income, which compares favourably to the 0.4 found in papers dealing with world trade. Therefore, this paper agrees with the current belief in the academic circles that economic openness is positive for growth. Since countries are not able to choose their location, having policies conducive to trade is one of the main actions a policymaker might undertake.

Lastly, in terms of the methodology used, improvements can be made. While the use of fixed effects controls for most other country effects, as do the year dummies, the assumption is a simplifying one. However this new development in the empirical literature can be taken forward in hopes of creating a better and more exogenous instrument in the future. One problem that this study had to deal with was the fact that Eastern European countries were still reeling from the collapse of a political system and isolating the positive effect of trade on income was difficult in that environment. The accession of the 10 new members in the European Union in 2004, which also significantly reduced trade barriers for Eastern European countries, would probably be a better situation to study in the future.

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APPENDIX

	1	2	3	4	5	6
	Instrument Regression Results					
	ln trade					
dist1985	-1.453	-1.351	-1.274	-1.243	-0.049	-0.049
	(0.068)****	(0.069)****	(0.056)****	(0.054)***	(0.045)	(0.045)
dist1997	-1.292	-1.227	-1.232	-1.108	0.128	0.119
	(0.067)***	(0.069)***	(0.068)***	(0.067)***	(0.051)	(0.051)**
common language	0.136	0.101	0.136	0.185	-	-
	(0.041)***	(0.041)***	(0.041)***	(0.040)***		
common border	0.07	0.169	0.137	0.091	-	-
	(0.043)	(0.044)***	(0.043)***	(0.041)***		
island	-4.487	-5.094	-5.109	-5.134	-	-
	(0.070)***	(0.055)***	(0.054)***	(0.052)		
pre-communism	-0.315	-1.398	-	-	-	-
	(0.029)***	(0.053)***				
post-communism	-	-1.117	-1.44	-	0.174	-
		(0.047)***	(0.05)***		(0.030)***	
cdist1984	-	-	-0.141	-	-0.092	-
			(0.011)***		(0.017)***	
cdist1985	-	-	-0.163	-0.19	-0.184	-0.017
			(0.010)***	(0.010)***	(0.021)***	(0.007)**
cdist1986	-	-	-0.185	-0.212	-0.195	-0.037
			(0.009)***	(0.009)***	(0.059)***	(0.008)***
cdist1987	-	-	-0.198	-0.225	-0.199	-0.052
			(0.010)***	(0.010)***	(0.054)***	(0.007)***
cdist1988	-	-	-0.205	-0.0232	-0.255	-0.058
			(0.010)***	(0.011)***	(0.067)***	(0.008)***
cdist1989	-	-	-0.207	-0.0234	-0.297	-0.059
			(0.010)***	(0.009)***	(0.078)***	(0.008)***
cdist1990	-	-	-0.233	-0.0259	-0.333	-0.085
			(0.010)***	(0.010)***	(0.011)***	(0.006)***
cidst1991	-	-	-	-0.268	-	-0.094
				(0.009)***		(0.008)***
cdist1992	-	-	-	-0.269	-	-0.094
				(0.011)***		(0.006)***
cdist1993	-	-	-	-0.268	-	-0.092
				(0.009)***		(0.008)***
cdist1994	-	-	-	-0.237	-	-0.062
				(0.009)***		(0.008)***
cdist1995	-	-	-	-0.23	-	-0.054
				(0.010)***		(0.007)***
cdist1996	-	-	-	-0.22	-	-0.044
				(0.011)***		(0.008)***
cdist1997	-	-	-	-0.223	-	-0.046
				(0.009)***		(0.006)***
R^2	0.83	0.85	0.82			
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country Dummies	Yes	Yes	Yes	Yes	No	No
Pair Dummies	No	No	No	No	Yes	Yes

***significant at 1%, **significant at 5%
cdist[year] is the interaction with communist countries
country and year dummies not shown
ln trade in this case stands for bilateral trade, not total
dist[year] variables are interaction between years and distances, no important variation

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