The Effect of the Single Market and the Single Currency on the Convergence of Prices in the European Union

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April 1, 2013

Abstract

Implementation of international treaties in the European Union was expected to promote integration of consumer markets. Using Economist Intelligence Unit city data, I analyze the convergence of prices for a range of traded goods. Large price differentials remain across Europe. Using high income non-euro European countries as a control group, I test the effect of the euro and the earlier implemented Single European Act on the convergence of prices in the European Union. Using a difference-in-difference estimation strategy, I find that the Single European Act, rather than the common currency, reduced price differentials and promoted price convergence.

JEL Classifications: E31, C23, F15

1 Introduction

By removing trade barriers and letting goods and factors of production move across borders, the Single European Act, the Maastricht Treaty, and the euro were expected to promote trade, increase competition, ultimately causing price levels to converge. Large price differentials are still observed across the euro member states which calls into question the impact of the single market and the single currency on price convergence.

The European Commission strongly believed that "one market needs one money". The goal of this paper is to test whether it was the single currency or the single market that was necessary to deepen market integration. Following previous research, I use price differentials between the cities to measure how well the consumer markets are integrated. The Economist Intelligence Unit data (EIU), which covers the period from 1990 to 2011, allows me to test the impact of both the Single European Act as well as the euro on the convergence of prices.

The Single European Act (SEA) was ratified by most of "old" Europe in 1986, with Austria and Finland ratifying in 1994. The main objective of the SEA was to create a functioning single market by 1992. All of the participants of the single market later signed the Maastricht treaty which required them to adopt a single currency (euro). [1] In 1999 eleven members of the European Union (EU) gave up their domestic currencies to accept the euro. In 2001 Greece made it twelve.The only exceptions were the United Kingdom and Denmark which were granted an opt-out that allowed them to keep their currencies.

By using the difference-in-difference estimation strategy I find that it was the Single European Act, rather than the euro that promoted price convergence. To account for global and regional trends, non-euro EU states serve as the control group for the euro states and European Free Trade Agreement members serve as the control group for the EU members.

Even though the literature has already shown the positive impact of the euro on trade (Baldwin (2006) and Rose (2000)), the impact of the euro on price convergence remains unclear. Several previous studies estimate the causal effect, however, there is no consensus. Allington et al. (2005) and Lutz (2003) use similar estimation strategies, however, Allington et al. (2005) find a significant integrating effect of the euro while Lutz (2003) finds no support of that claim.[2] Parsley and Wei (2001) also find no converging euro effect once they control for EU membership.

This paper overcomes the limitations that previous studies have faced. The first limitation stems from the lack of data that would cover prices for multiple goods over a long period

[1] The Maastricht Treaty is also known as the Treaty on European Union as it transformed the European Community into the European Union.

[2] While in Lutz (2003) the results do vary across goods, no overall support for the integrating effect of the euro is found.

of time. Previous research is based either on aggregate data, a very small sample of traded goods, or the price of a single good. The prices collected by the EIU closely represent an average consumer basket of an average European, with coverage of 108 traded goods. The second limitation is based on the small number of post-euro years. My data covers an additional 13 years since the introduction of the euro in 1999. To check the sensitivity of my results, I distinguish between two stages of the euro implementation. The introduction of the euro into financial markets on January 1st, 1999 was the first stage, and the second stage occurred when the physical currency entered into circulation on January 1st, 2002.

While European countries are considered to be a highly integrated group of countries, large price differentials still exist. On average, the Eurozone has the lowest price level compared to both EU as well as non-EU European countries. European Free Trade Association members, represented by Switzerland, Iceland and Norway have the highest prices. This pattern is not driven by any particular group of goods, and appears to be consistent over time.

To measure price differentials I construct bilateral relative prices by comparing the price for a certain good in any city in Europe to the price for the same good in a euro-city. While price differentials in the Eurozone are the lowest, they do not show a strong pattern of decreasing. The convergence occured prior to 1996 and no additional convergence is seen after the introduction of the euro in 1999.

I use difference-in-difference estimation technique to measure the total effect of the single market (SEA) and single currency (euro) on the relative prices between the EU members. The difference-in-difference strategy allows me to estimate the causal effect of the policy by comparing the before-after impact on the treatment group (either Eurozone or the EU members that ratified the SEA) to the before-after impact on the control group (non-euro EU for the euro effect and the EFTA members for the SEA effect). All the specifications include city-pair and time fixed effects that allow me to control for any unobservable global trends and city-pair characteristics that I do not explicitly control for.

The results show a positive converging effect of the SEA on relative prices. Following the ratification of the SEA, relative prices for traded goods decreased by approximately 5%. The effect of the SEA, however, varies significantly depending on the category of goods considered. For example, relative prices for food reduced by 7%, while relative prices for alcohol and tobacco reduced by 14% after the introduction of the single market. No such effect is observed on the relative prices for cars or clothing. These results suggest that any euro price convergence reported in the literature is attributed to the single market policies implemented before the euro, rather than the actual single currency effect. Once the euro was introduced convergence stopped.

The effect of the single currency on relative prices is mixed. For the majority of traded goods, the euro had no significant converging effect. Moreover, the results suggest that the euro had a diverging effect on relative prices for food, alcohol and tobacco. Relative prices for cars, however, decreased by 6% after the introduction of the single currency. Since both the treatment group and the control group are countries that are well-off, the inclusion of real GDP per capita has virtually no effect on the estimates.

According to the European Commission's 1996 Single Market Report, the euro was expected to reduce uncertainty associated with nominal exchange rates and promote cross-border trade between the member states, which should have a positive impact on price convergence in the Eurozone. However, the results do not indicate that the euro reduced price differentials and further promoted market integration.

There are two probable explanations. First, the Single European Act and its amendments promoted trade as well as the movement of labor and capital which minimized price differentials to the point where the introduction of the single currency became irrelevant. Second, the reduction in transaction costs which followed the fixed nominal exchange rate was not as large or important as the European Commission estimated.

Since the positive effect of the SEA was already established, the next logical step is to test the effect of the exchange rate fluctuations on the price differentials. The non-euro EU members, with the exception of Denmark, and all the EFTA members let their currencies float, which allows me to control for the measure of the exchange rate flexibility based on the classification from Reinhart and Rogoff (2004). The coefficient is insignificant, implying that switching from flexible to fixed nominal exchange rate regime had no effect on the relative prices, since the European markets did not feel threatened by the uncertainty it brings.

A number of sensitivity tests are performed to make sure the results are consistent. In my analysis, average absolute price differential is the main dependent variable. Several previous papers choose price dispersion as the dependent variable, measured as standard deviation across goods at a particular moment in time. The main argument for using the standard deviation is that transportation and transaction costs impede perfect arbitrage. Therefore, full convergence in the form of reduction in price differentials is not necessary as long as the distribution of these differentials is more clustered around the no-arbitrage thresholds. Using the price dispersion as the dependent variable affects only the magnitude of the coefficients, but not their direction or significance. Differentiating between the Southern Eurozone and the rest, or removing the recent financial crisis from the data have not affected the results either.

Given the prolonged crisis in the Eurozone, the need for the single currency is being questioned. Using price differentials as a measure of consumer market integration, my research

adds to the literature that finds no evidence that the single European market needs a single currency to maximize its benefits. While the single market deepened market integration, the price differentials remain high, implying that other obstacles unrelated to the single currency prevent full market integration.

2 Single Market, Single Currency

The Single European Act was the first major step towards common market since the Treaty of Rome (1957). Three types of barriers were preventing the European Community from setting up the common market: physical barriers in the form of border controls; technical barriers presented by rules and regulations and the fiscal barriers in the form of different tax rates. De facto free trade among the members of the European Community was non-existent and the lack of consensus made it impossible to implement any regulations that would foster a common market.

By replacing the unanimous voting system with a qualified majority voting and reforming the old institutions, the SEA set the objective to create a single market by 1992. Abolishing these barriers created a true single EU market with the free movement of goods, capital, services and labor. Its purpose was to promote growth, competition and specialization, improve the efficiency of resource allocation, and increase the standards of living.

The SEA led the way for the further political, economic and monetary integration towards the Economic and Monetary Union (EMU) set by the Maastricht Treaty of 1992. The EMU was implemented in three stages. The fist stage liberalized the movement of capital. During the second stage the EMU members converged their economic policies. And in 1999 the third stage started with the introduction of the single currency (euro) and the establishment of the European Central Bank. The European Commission advocated the third stage stating that *"without a completely transparent rule of the law of one price for tradable goods and services, which only a single currency can provide, the single market cannot be expected to yield its full benefits"*.[3]

While the benefits of the single market are not questioned, the need for the single currency is being challenged. The main advantage of the single currency stems from the fact that it is expected to lower the transaction costs by reducing the exchange rate premia on forward contracts and eliminating any costs associated with exchanging the currencies. European Comission (1996) estimated that the total foreign exchange transaction costs add to about 1% of GDP of the EU. Consequently, abolishing the national currencies will make cross-border business more profitable, which will promote trade, improve price transparency and

[3]European Commission "One Market, One Money", 1990.

reduce price discrimination between different countries. Feldstein (1997), however, argues that the member states give up the control over the domestic monetary policy as well as the lack of market response of exchange and interest rates to exogenous demand shocks, leads to cyclical economic instability and thus higher cyclical unemployment.

Price differentials or price dispersion were suggested as a measure of market integration. Reduction of price differentials implies the improvement in integration of the consumer markets(Parsley and Wei (2001)).

Theoretically, however, the effect of common currency on price dispersion can go both ways. The lower transaction costs that follow common currency are expected to promote trade, since the thresholds of profitable arbitrage shrink, resulting in lower price differentials across countries. However, at the same time lower transaction costs can potentially lead to divergence of prices. Friberg and Martensen (2001) show that firms can endogenously introduce greater arbitrage barriers to increase the degree of market segmentation via vertical restraints, bundling with nontradables or technical differentiation.

The evidence that supports the earlier statement by the European Commission (1999) that the single currency can "squeeze price dispersion in EU markets" is mixed. If the causal link between the introduction of euro and the lowering of price differentials represented by the lack of deepening market integration is not established, one perhaps can question the need for single currency in the region altogether. Does one money really lead to one market?

3 Data

3.1 Economist Intelligence Unit Data

The data is collected by the Economist Intelligence Unit (EIU) and includes the price information on over 160 goods and services from 140 cities all over the world. The data is collected twice a year in March and September, however only annual frequency is released to the final user. These months are chosen to make sure the prices are not affected by the traditionally seasonal sales. Moreover, the representatives are mandated to collect the standard retail prices only.

The EIU data covers the time period from 1990 to 2011. It includes prices for traded as well as non-traded goods. The traded goods belong to categories such as Food and Nonalcoholic Beverages, Alcohol and Tobacco, Clothing and Shoes, Cars and Petrol and Other Goods.

The prices for two identical goods are collected from two types of outlets: supermarkets and convenience stores. The data for more expensive goods like cars comes from pricey

specialty shops. All the main results are based on the supermarket data, and to check how robust they are, everything is replicated using convenience store prices.

The EIU does their very best to make sure the goods are comparable across locations. While the goal is to collect prices on identical goods, due to particularities in each country, identical goods might not be available. Nevertheless, the agency makes sure the quality is as similar as possible. This should not be a concern for the European Union subset of the data though. All countries are well developed and open to international trade, to have almost identical goods available on the store shelves.

All the prices are collected in the local currency and include VAT tax. To make them comparable across locations, I convert them into the US dollars. The spot exchange rate is provided by the EIU and is recorded from the Financial Times every first Friday of the survey month.

The dataset that I use covers 18 countries (cities) of the European Union. It includes twelve Eurozone (EZ) members (12 cities)[4] ; countries that belong to the European Union but are not part of the monetary union[5] , and the three members of the European Free Trade Association[6] which are not part of the European Union.[7]

Every EU member state that signed the Maastricht treaty is expected to join the EMU, with the exception of the United Kingdom and Denmark. Both have an opt-out and are not required to give up their national currencies. Sweden, on the other hand, belongs to the European exchange Rate Mechanism II and is not ready to accept the euro. However, once the convergence criteria are met it will be required to become a part of the EMU. A complete list of capital cities, their countries and their European as well as euro- status can be found in table A1 in the Appendix.

The main advantage of this dataset is that it includes actual prices for multiple goods across the European cities. It would be impossible to analyze price convergence based on the aggregate data. For example, HICP is designed to compare inflation levels in the EU, however, it does not provide any information regarding actual price levels across the EU, i.e. it does not allow one to directly compare price levels across countries in order to observe any price convergence. One can only assume that higher inflation rates in the South and lower rates in the North imply that prices in poorer countries are catching up with prices in rich countries. Indices show only changes in price levels over time for a particular country,

[4]Amsterdam, Athens, Berlin, Brussels, Dublin, Helsinki, Lisbon, Luxembourg, Madrid, Paris, Rome, and Vienna.

[5]Copenhagen, London and Stockholm. In the remainder of the paper I refer to them as Non-euro EU.

[6]Switzerland(Zurich), Iceland(Reykjavik), and Norway(Oslo). The data for Liechtenstein is not available.

[7]The list of all available cities as well as their SEA and euro status can be found in Table A1 in the Appendix.

relative to the base year. Consequently, to achieve the results I find with my data would be impossible if one had to use aggregate data only.

The survey has been conducted by the same agency over the past 22 years. The EIU tries to be very consistent in their records and do their best to make sure the goods surveyed in 1990 are present in 2011 as well. However, there are some gaps. Changes in packaging and labeling can make it hard to find identical goods across countries. Also, goods as well as brands can appear and disappear. For example, personal computers do not appear in the data until 2000. Since I am interested in studying the effect of euro on price convergence, I make sure there are enough observations before the introduction of euro as well as after.

Another issue that can reduce the consistency of the survey is the personal preferences of the conductors of this survey. One of the items on the list is a two piece business suit. While the EIU tries to be as specific as possible in their description of the item, they do not include such vital characteristics as for example material or origin of the suit. These characteristics can dramatically affect the price of the suit. Consequently the observed price differentials will be not be a due to the failure of the law of one price per ce, but simply due to the differences in personal preferences of the employees of the EIU who collected the prices. Acknowledging this I do separate all the goods into categories and report the results for each category individually.

To make the sample fairly homogenous and to ensure I have enough observations each year, I require the data for a particular item to be available for 15 out of 18 EU cities in a given year. This selection criterion will get rid of all the goods that appear later due to various reasons and will make sure the sample is consistent. This leaves me with 108 traded goods.

3.2 Other variables

Exchange rate flexibility measure is based on the Reinhart and Rogoff (2004) annual fine regime classification. The index ranges from 1 to 14, where 1 means fixed exchange rate and higher values imply more flexibility. Even though authors provide both, fine and coarse regime classifications, I use fine classification only, since my sample covers only developed European countries. This allows for variability in this variable and makes it less correlated with the main binary variable of interest which equals to one if both countries are members of the Eurozone. Exchange rate flexibility index for the control group of countries that did not introduce euro vary from as low as 4 in Denmark, which pegs its krone to euro, to as high as 12 in Norway, Iceland, Sweden and the UK.[8] Since the price differentials are based

[8]Even though, Sweden does not have an official euro opt-out from the Maastricht treaty it chose to stay out of the ERMII. This setup allows the Swedish krona to float freely giving it an index of 12.

on the city-pairs, I follow Kalemli-Ozcan et al. (2010) to construct a bilateral index of the exchange rate flexibility. It is calculated as a sum of log exchange rate flexibility measures of two countries of interest. The latest available year is 2010. The updated data from Reinhart and Rogoff (2004) can be found at Ilzetzki et al. (2008).

Price arbitrage is expected to be driven by trade. Therefore, following the standard gravity model of trade, the baseline specification is augmented by the measure of real GDP per capita, which is calculated as a log of the product of two real GDP's per capita between two countries of interest. Data is from the World Bank's World Development Indicators Database.

4 Descriptive Statistics

The goal of this paper is to estimate the effect of two policies of interest: implementation of the euro and the ratification of the Single European Act. To estimated the causal effect of these policies, I need to split my countries into the treatment and control groups. Control group includes the countries where the particular policy of interest was not implemented.[9]

When testing the effect of the euro on price convergence, a treatment group includes all the original members of the Eurozone plus Greece which joined the monetary union in 2001. A control group for the euro "treatment" are the remaining members of the European Union that either have an opt-out (UK and Denmark) or chose not to comply with the convergence criteria(Sweden).

When testing the effect of the SEA, the treatment group includes all the EU members, since they all ratified the SEA prior their official EU membership. The control group includes other European countries that are not EU members. Switzerland, Norway and Iceland belong to the European Free Trade Association, but not to the EU. Please refer to the Table in Appendix for the list of treatment and control groups.

Table 1 reports the descriptive statistics of the log-price across these three groups. 25th and 75th are included in the table to give a better idea on how prices within each group are distributed. Before the logs were taken, all prices were converted in the US dollars. The range of prices for traded goods is fairly large with cars are on the right side of the distribution and food is on the left side.

Across all traded goods in the sample, on average, the Eurozone has the lowest prices, while the EFTA members have the highest. Since over 40% of traded goods belong to Food and Beverages category, the median log-price is lower than mean. This indicates the dominance of cheaper goods over more expensive ones.

[9]Please refer to the Table A2 in the Appendix for the list of treatment and control groups.

Since the range of prices for traded goods is fairly large, I check if the above-mentioned pattern is driven by a particular category of goods. Among traded categories, Food and Beverages has the largest number of goods, 48 out of 108. Also, on average, this category is the cheapest, while prices for cars are the highest. Independently of the category of traded good considered, the distribution of prices across three groups of cities remain unchanged.

Figure 1 plots how the mean log-price for each of the three groups of cities changes over time. The relationship between the price levels of the euro and as non-euro EU fairly constant over time, with the latter being almost always a bit more expensive. Prices across the EFTA members are consistently higher than the average EU level, although this difference shrinks over time. Price level in the non-euro EU reached the EFTA level in 2007. Consistently low average Eurozone price level is mostly driven by a group of Southern members such as Greece, Portugal and Spain. Plotting median log-price results in the essentially the same pattern, although the median values are lower in their magnitudes.

To address the convergence of prices I need to calculate price differentials, or relative prices, between the cities of interest. Borrowing the notation for the Law of One Price literature lets define:

$$q_{it} = p^l_{it} - p^m_{it} + s^{lm}_t \tag{1}$$

where p^l_{it} is a log of a price for good i at time t in city l , p^m_{it} is a log of a price for good i at time t in city m , s^{lm}_t is a spot exchange rate between l and m. q_{it} is a relative price for a good i between two cities in Europe. This way I construct bilateral relative prices for three groups of city-pairs.

Calculating average deviations would be not informative, as positive and negative values will cancel each other out; therefore, in Table 2 I present summary statistics of the *absolute* deviations. The main question when calculating q_{it} is what cities to choose as a base for comparison. The choice depends on interpretation of q_{it} best fitted for the needs of a particular research.

In the descriptive section, my base city, m, is one of the Eurozone cities.[10] Then, the interpretation of q_{it}, is the percentage price difference between any city l and a city in the Eurozone. Then, q_{it} for the Eurozone will show how these price differentials behave over time for a particular good i within the Eurozone. If q_{it} shows a decreasing pattern, then prices within the Eurozone are converging.

The average as well as median absolute relative prices for all traded goods are the lowest within the Eurozone (0.35) followed by the non-euro EU (0.39). The deviations are the largest for the EFTA, at 0.42. As was reported earlier, prices in the non-euro EU and across

[10]When estimating the effect of the SEA and the euro in difference-in-difference framework, I use all bilateral pairs, i.e. city m is any city in Europe.

EFTA members are higher, than they are in the Eurozone, therefore, larger price differentials are observed for these two groups.

The relationship holds for the median values as well. Since all the available goods were included in the descriptive statistics, it explains large standard deviations as well as min/max values. The number of goods included in Table **??** is slightly different from Table 1. If the data for p_{it}^l is present but p_{it}^m is missing, constructing q_{it} is impossible, and consequently some goods were dropped. Large difference between the 25^{th} and 75^{th} possibly implies large deviations within the 22 year period. To observe the deviations over time, for each city-pair, I construct average absolute deviations:

$$q_t = \frac{1}{n} \sum_{i=1}^{n} |q_{i,t}| \tag{2}$$

where n is the number of all traded goods available that passed the availability criteria. Consequently, q_t measures the average absolute deviations from the law of one price among traded goods between any city and a city in the Eurozone, at time t. Figure 2 plots the path of the average absolute price deviations from 1990 to 2011. Little price convergence is observed within the Eurozone. Even though prices differed more in early 90-s than they do now, the convergence stopped in 1996.

One of the most interesting features of Figure 2 is the fact that no price convergence is observed after the introduction of the euro in 1999. These findings correspond to the earlier paper by Engel and Rogers (2004), whose data covers only the time period from 1990-2003. The authors find no support that the markets have become more integrated since the introduction of the euro. However, they caution that perhaps it is too early to tell, and more pronounced effects of the euro will be observed later as prices converge. By extending the data to 2011, I can see that there is no delayed reaction to the euro introduction that Engel and Rogers (2004) posit may occur. Prices in Eurozone cities did not converge further than the pre-1999 level. Moreover, it appears that the recent crisis could have a negative effect on price convergence. As Figure 2 demonstrates, the deviations for all three groups of city-pairs actually increased following 2008.

While the price differentials between the non-euro EU and the Eurozone are larger than those within the Eurozone, on average, they follow a similar trend. Relative prices between the EFTA and the Euzosone, also were decreasing until 1998. Much more variability is seen for these relative prices though. Perhaps it can be explained by changes in nominal exchange rates after 1999.

5 Estimation

Ideally, to estimate the policy effect (treatment) on the variable of interest one would want to compare the outcome after the policy was implemented to the outcome had this policy not taken place. Unfortunately, the latter can not be observed in the real world. Therefore, due to the lack of the true counterfactual, estimation can proceed in two ways.

The first way is to compare the variables prior the policy implementation and afterwards, before-after comparison. The second way is to compare the treated and untreated (control) groups at a certain point in time, cross-section comparison. None of these estimates, however, will give a causal effect. The first estimate suffers from the assumption that no other policies or events took place during this time period that could affect the before-after estimate. And the second estimate assumes that both the treated and control groups were identical prior to the treatment.

In the real world, both of these assumptions fail to hold. Assuming that no other events could affect price differentials would be misleading. For example, the development of the internet makes it easier to track different prices across locations, and hunt for bargains. At the same time, assuming that prices in the European states of interest are identical is wrong as well. Price differentials among the euro-states prior the euro implementation were lower than price differentials among other European states that never intended to join the monetary union. This means that euro members had more integrated markets to begin with. Either way, the policy effect will be overstated.

The baseline equation takes the form of difference-in-difference specification that takes into account the before - after as well as cross-section comparison by removing all initial differences between the two groups as well as adjusting for other events that affected both groups over time. For this estimate to be unbiased, the only assumption that has to hold is that the policy of interest is the only factor that affects the treatment and control groups differently.

$$\begin{aligned} q_{l,m,t} &= \alpha_{l,m} + \alpha_t + \beta_1 SEA1_{l,m,t} + \beta_2 SEA2_{l,m,t} + \beta_3 EURO1_{l,m,t} + \beta_3 EURO2_{l,m,t} \\ &\quad + X'_{l,m,t}\gamma + \varepsilon_{l,m,t} \end{aligned} \tag{3}$$

The dependent variable, $q_{l,m,t}$ is measured as in equation(ref2) and is interpreted as price differentials averaged across all goods or a group of goods as a dependent variable.

Lutz (2003) uses a standard deviation of the log price.

Variable $SEA2_{l,m,t}$ is a dummy variable that take a value of one if cities l and m at time

t were part of the single market and had ratified the SEA, and zero otherwise. There is some variation regarding the date when each individual EU member ratified the agreement. For example, all Euro members ratified the SEA in 1986, with the exceptions of Austria and Finland, which did it in 1994. To control for unilateral effect of the SEA, I introduce another variable $SEA1_{l,m,t}$ which takes the value of one if only one country was a part of the single market. Variable $EURO2_{l,m,t}$ takes a value of one if both countries are members of the Eurozone and zero otherwise. To control for the unilateral effect, in the similar fashion, the variable $EURO1_{l,m,t}$ takes a value of one if only one of the countries is a member of the Eurozone; it takes a value of zero otherwise.

The coefficients of interest measure the effect of the single currency (euro) and the single market (SEA) on price convergence in the Eurozone, compared to its European counterparts that either did not accept the euro or are not part of the single market program. Other characteristics and control variables such as income, flexibility of the bilateral nominal exchange rates are included into the vector $X'_{l,m,t}$. Time fixed effect accounts for common trends such as lowering the transaction costs, development of the internet, etc.; while city-pair fixed effect accounts for other time-invariant bilateral characteristics such as distance, cultural similarities, common border, local preferences, common language, etc.

Table 3 reports the results of impact of the euro and the SEA on price differentials across the European Union. Panel (a) includes all bilateral city-pairs that belong to the European Union only. While the presence of the control for the euro implied causal effect, the SEA2 coefficient is a simple correlation. Control cities for the euro are London, Copenhagen and Stockholm. In the column (1) the dependent variable is the average absolute price differential across all available traded goods. This specification includes year and city-pair fixed-effects, but no other additional covariates. The coefficient on the variable that indicates that both countries ratified the SEA (SEA2) is negative and significant at 1% level. This means that joining a single market reduced the average absolute price differentials between the two EU members by 6%. In contrast, the coefficient on the variable that indicates that countries are using single currency (EURO2) is positive and insignificant, which implies that single currency did not promote the convergence of prices.

As described in the data section all traded goods cover multiple categories of goods, some of which belong to the clothing and shoes category. Prices for clothing and shoes are the least reliable, since these goods are heterogenous. Prices for an item "Dress, ready to wear, daytime" may vary dramatically depending on the material used and its origins. The difference between the cheapest and the most expensive dress in the sample is over 200%. Assuming that these goods, are too different to expect price convergence, removing the clothing and shoes from traded goods would increase the single market effect. Column(2)

reports the results of the estimation, once clothing and shoes were dropped out of the sample. The converging effect of the SEA becomes stronger, at almost 8%. The coefficient on the EURO2 remains insignificant.

In columns (3)−(6), using the same specification, I re-estimated the SEA and the euro effect using average absolute price differential of a particular category of traded goods as a dependent variable. While the coefficients on the SEA2 variable differ in their magnitudes, almost all are negative and significant. Being a part of the single market had the most impact on the convergence of prices for alcohol and tobacco. Since the excise tax is a big part of the retail price for alcohol and tobacco, after becoming a part of the European Union, its members started to slowly converge their tax bases, which promoted the convergence of prices for goods, that are taxed the most. If two countries ratified the SEA their absolute relative price differential decreased by 19%. The coefficient on SEA2 is insignificant for cars. Nevertheless, ratifying the Single European Act had a significant negative impact on absolute price differentials for most goods across the European Union.

The evidence of the bilateral effect of the euro, as common currency, on price convergence is mixed. The coefficient on the average absolute price differentials of alcohol and tobacco is positive and significant. This implies that euro did not bring convergence of prices, but instead is associated with divergence. The coefficient is negative and significant for cars and other traded goods. The converging effect of the euro on prices for cars appears to be large, compared to other goods, at 7%.

Breaking up the goods into categories adds more information on how relative prices for goods responded first to single market and then to single currency. The majority of relative prices show a strong converging effect of the single market with the exception of prices for cars. The opposite is true regarding the effect of single currency. The majority of relative prices show either insignificant or diverging effect, while prices for cars converge strongly.

The unilateral effects of euro (EURO1) and the SEA (SEA1) are both insignificant for the case of the absolute average price differentials across all traded goods. While all the coefficients on SEA1 are insignificant, the EURO1 coefficient on the relative prices for alcohol and tobacco is negative and significant. My assumption is that, more converging tax policies were implemented in the European Union since these countries ratified the SEA. Since the introduction of the euro occurred later, it might be picking up some of that effect.

The conclusion is in line with some of the previous literature. Introduction of euro did not "squeeze price dispersion in EU markets" as the European Commission expected. Single market, on the contrary, did promote the convergence of prices across multiple traded goods. It's effect was especially large on alcohol and tobacco. Panel(a) covers only the EU sub-sample, and since all EU members eventually ratified the SEA, the SEA effect is not

causal, due to the lack of observations for countries that never ratified the SEA. To address this issue, the new sample includes Switzerland, Norway and Iceland to control for the SEA effect. All three belong to the European Free Trade Association. Norway and Iceland are also part of the European Economic Area, while Switzerland is linked to the EU via a number of bilateral treaties.

Table 3 panel (b) reports the results of the baseline specification. The results are comparable to those reported earlier, even though the effect of the SEA is somewhat smaller, at about 5-6%, depending on whether one includes clothing and shoes into the average differential or not. As in panel (a) the effect of the SEA on alcohol and tobacco is the strongest, at 14%, while the effect on the relative prices for cars remains insignificant. The overall bilateral effect of euro remains insignificant. Breaking the goods into multiple categories, leads to somewhat mixed findings. While relative prices continue to converge, more divergence is observed not only in alcohol and tobacco, but in the relative prices for food as well. The unilateral effect of the euro on the relative prices remains negative and significant of almost the same magnitude.

These results show the importance of treatment/control differentiation when estimating causal effect. Panel (a)includes the EU member states only, all of which ratified the SEA but not all are part of the Eurozone. This specification estimates the causal effect of the euro only, while the coefficient on the SEA2 variable is only correlation. In Panel (b) to control for the SEA effect, the sample is augmented by the Switzerland, Iceland and Norway, neither of which ratified the SEA. This control group allows me to net out all the other events that were happening in Europe other than SEA ratification. The estimated effect of the single market falls from almost 8% to 6%.

In the Table 4 I augment the basic specification by including the log of product of the real GDPs per capita of the two countries. GDP enters with a significant negative coefficient into the regression, which means that the difference in price levels are shrinking as countries incomes are growing. Its effect, however, dampens out, once the goods are broken into the categories. It is insignificant for all categories, but last, "other goods". Breaking down other goods even further, shows that real GDP explains the most price differentials for clothing and shoes. The effect of the real GDPs is insignificant on the Alcohol and Tobacco category, which means that the reduction of price differentials in this category is driven not driven by income differences between the countries, but rather other factors like assimilation of excise taxes across the EU.

Including GDP per capital as a control into the regression, results in only small changes of the main coefficients of interest. The effect of the SEA2 becomes slightly less negative but remains at approximately 5%, while the effect of the EURO2 remains positive and insignif-

icant. Inclusion of GDP affected individual categories only marginally as well. The overall picture remained unchanged. The Single European Act is responsible for price convergence in the European Union, none of which is seen after the introduction of the euro.

One of the assumptions on which the Commission based its presumed effects of the single currency was the importance of lowering the exchange rate risk in the area. This, consequently, was expected to reduce the transaction costs and exchange rate premia on forward contracts making doing business more profitable. To test the assumption that the reduction of exchange rate flexibility via adoption of the single currency across all twelve members was indeed a concern of the markets, I augment the baseline equation with the bilateral index of exchange rate flexibility. From Table 4, the coefficient on the exchange rate index (E-Rate) is insignificant. Breaking down the goods into finer categories has no effect on the results. This implies that either the exchange-rate risk had a very small effect on the transaction costs or it was not a root of high price differentials in Europe in the first place, and that is why elimination of that risk by the introduction of the euro did not spur the convergence.

5.1 Sensitivity analysis

Previous literature, for example Lutz (2003) or Parsley and Wei (2001), use price dispersion instead of average price differentials as a dependent variable. Price dispersion is measured as a standard deviation of prices or price differentials across all available goods. This measure comes with its advantages and disadvantages. Parsley and Wei (2001) argue that due to arbitrage costs, price differentials do not necessarily have to decrease or tend towards zero. Arbitrage costs create thresholds inside which arbitrage is not profitable. Consequently, for the euro to have an integrating effect, it is enough for price differentials to concentrate around these thresholds. Decrease in standard deviations, however, only implies that price differentials across multiple locations look more alike. Since over time, transportation costs are falling, the thresholds are expecting to shrink as well, which should correspond to lower average price differentials, but not necessary lower standard deviations. To test whether the choice of the dependent variable affects the main findings, I re-estimate the equation of interest using a standard deviation of average absolute price differentials as a dependent variable.

Table 5 reports the results. Apart from smaller coefficients, no significant difference between Table 4 and Table 5 is observed. Bilateral effect of the SEA decreased price dispersion, making price differentials more clustered around the mean. The bilateral effect of the euro remains insignificant for the majority of goods. As with Table 4, euro promoted the conver-

gence of relative prices for cars. Changing the dependent variable to price dispersion, made the effect of the flexility measure of the exchange rates slightly more pronounced, albeit on the relative prices for cars only.

Combining the results of Table 4 and Table 5 I can say that the SEA not only decreased price differentials over time, but also made them more concentrated around the mean, implying the integrating processes that followed the SEA ratification. Unfortunately, independently of the choice of the dependent variable, apart from the relative prices for cars, no such impact on the relative prices for other goods is observed as a results of the introduction of the euro.

Prices within the Eurozone differ, as it was earlier established by Ogrokhina (2012). Southern euro members tend to have lower incomes as well as lower prices than its northern counterparts. With the euro, promoting trade, one can assume that price differentials between these regimes will be arbitraged away faster. Therefore a more pronounced converging effect of euro on price differentials is expected if I differentiate between the rich euro members, that have consistently higher prices, and poorer, Southern euro member, that are less expensive. To study the bilateral impact of the euro and the SEA, the baseline equation is augmented by a binary variable (SOUTH) that indicates whether the cities of interest belong to the South. Table 6 reports the results.[11] The main coefficients on EURO2 and SEA2 remained virtually unchanged. The coefficients on the interaction terms between South Eurozone and EURO2 or SEA2 differentiate the effects these events had on the Southern Eurozone members comparing to the rest of the Europe. Both of these coefficients are insignificant, when all traded goods are considered. This suggests that neither single currency nor single market affected southern regions in a different way than the rest of the European Union. When goods are broken down into categories, however, a more pronounced effect of the SEA on the South is seen for food and alcohol and tobacco; and a more converging euro effect on the relative prices of cars.

The euro was implemented in two steps. On January 1st, 1999 the euro was first introduced in financial markets as an accounting currency. Then, 3 years later, on January 1st, 2002 euro coins and banknotes became available. If money illusion hypothesis holds, would one expect the integrating process to start after 2002, rather than after immediate euro introduction in 1999? To test this, I allow the banknotes to have a different effect, by augmenting the specification with a dummy variable Euro_note2 if both Eurozone members have euro banknotes in circulation and Euro_note1 if only one does. Table 7 reports the

[11] All sensitivity tests are also re-estimated with a price dispersion as a dependent variable. The results are quantitatively similar, indicating that it does not matter which measure one chooses to go with. To save space, all sensitivity tests, reported further, are using absolute average price differential as a dependent variable only.

results. While bilateral introduction of paper money has a strong diverging effect on all relative prices but cars, unilateral effect is converging. The coefficients on the SEA2 remain negative and significant.

In light of recent events, it is of interest to check if the strong diverging effect of the euro banknotes introduced in 2002, may be driven by not so far away financial crisis. As seen on Figure 3 (a) absolute average price differentials increased after 2008. Table 8 reports the results of the difference-in-difference estimation after cutting the time period to 1990 2007. While the effect of the single currency in the form of paper money is now smaller, it remains positive, meaning price diverged instead of converging. Being a part of the single market promoted price convergence, while a part of the single currency did not. The diverging effect of the euro banknotes did not disappear.

6 Conclusions

While the European Community existed since the treaty of Rome(1957), none of its members truly belonged to a common market. To address this issue, in 1986 the member states signed the Single European Act, the main goal of which was to create a single market by 1992. The SEA preceded the Maastricht Treaty that established the European Union. The goal of the Maastricht Treaty was to create an Economic and Monetary Union, with a single currency, the euro.

The European Commission strongly believed that the benefits of the single market can be maximized only when its members have the same currency. Using the price differentials as a measure of integration of consumer markets I test whether the single market or single currency, or both promoted price convergence and furthered integration in the consumer markets.

The difference-in-difference estimation strategy allows me to estimate the causal effect of these policies. Using the non-euro EU member states to control for the effect of the euro and EFTA member states to control for the effect of the SEA, I find that single market decreased price differentials by 5%, while the single currency had no effect. The magnitude of the effects differ, depending on the category of traded goods considered. The SEA effect is the strongest on the relative prices for alcohol and tobacco, at 14%. Since the creation of the EU, its members began converging their tax bases. A large part of the alcohol and tobacco's retail price is the excise tax. Therefore, as tax policies homogenized so did the prices. While on average, the introduction of the euro had no effect, the relative prices started to converge. The effect is especially strong in the Southern Eurozone. Accounting for the income differences or exchange rate regime has very little effect on the main coefficients of

interest.

I perform a number of sensitivity tests. For example, some of the previous literature choose to approach price convergence in terms of shrinking price dispersion. I re-estimate all the specifications to check wether the effects of the SEA and the euro will be different on price dispersion as opposed to average price differentials. The results are qualitatively similar. The single market not only decreased price differentials, but also made them more concentrated around the mean. The single currency effect remains insignificant.

The differentiation between two-stage euro implementation (first on financial markets and then the introduction of the actual physical money), or removing the recent financial crisis, by reducing the time span of the data, results in more diverging euro effect, while the converging SEA effect remains virtually unchanged.

This paper is in line with the literature that contradicts the European Commission's expectations of higher price convergence once the single currency is introduced. Thirteen years has passed since then, but prices remain as different as ever. Further research should concentrate on answering the question of why the differentials did not converge after 1999. What are the other impediments that prevent prices from converging? While the physical borders have been abolished, European countries kept their identities, local preferences and culture. Therefore, answering the question of how important are " the borders" for Europeans can perhaps shed some light and explain why prices in Europe stay so persistently different.

Figure 1: Mean log-price, 1990-2011

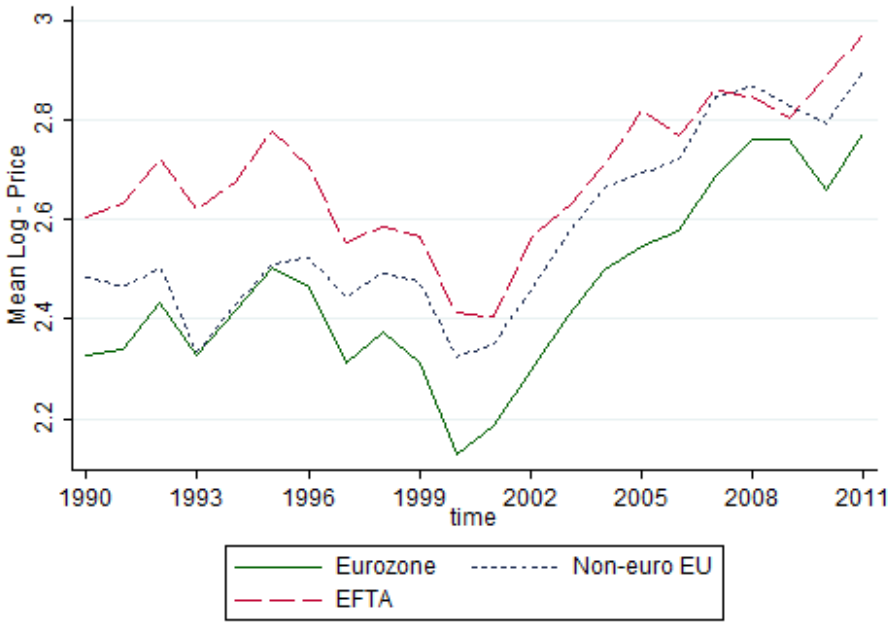

Figure 2: Mean log-price, 1990-2011

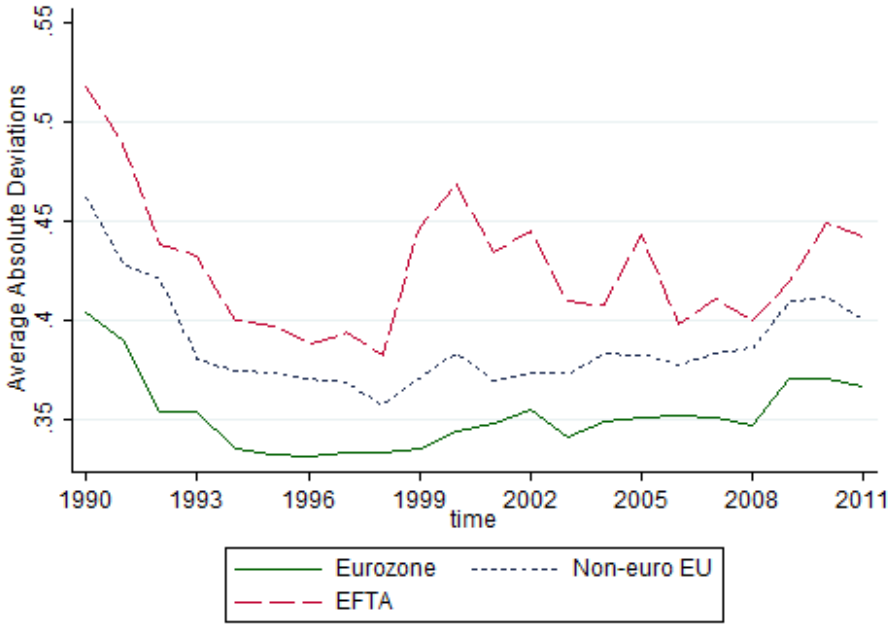

Table 1: Descriptive statistics, log-price, 1990-2011.

	Mean	Median	S.D.	25%	75%	Min	Max	Observations
Eurozone	2.46	1.80	2.77	0.63	3.23	-2.30	12.5	28678
Non-euro EU	2.58	1.92	2.77	0.73	3.43	-2.03	13.0	7146
EFTA	2.69	2.07	2.72	0.87	3.50	-1.28	12.4	6108

Total number of traded goods 70

Table 2: Descriptive statistics, absolute price deviations, 1990-2011.

	Mean	Median	S.D.	25%	75%	Min	Max	Observations
Eurozone	0.35	0.28	0.29	0.13	0.50	0	2.66	151608
Non-euro EU	0.39	0.31	0.31	0.14	0.56	0	2.57	82707
EFTA	0.43	0.34	0.35	0.16	0.61	0	3.26	70719

Eurozone is a base for comparison

Table 3: Panel Fixed - Effect Estimates. Effect of the SEA and Euro on the absolute price deviations

	(1) All Traded	(2) All Traded w/o Clothing	(3) Food and Beverages	(4) Alcohol and Tobacco	(5) Cars	(6) Other Goods
			Panel(a)			
Euro2	0.005	0.001	0.017	0.043*	-0.072***	-0.033***
	(0.70)	(0.12)	(1.51)	(1.87)	(-3.36)	(-4.33)
Euro1	-0.004	-0.008	0.016	-0.102***	-0.017	-0.004
	(-0.13)	(-0.30)	(0.38)	(-4.62)	(-0.41)	(-0.23)
SEA2	-0.061***	-0.075***	-0.087***	-0.172***	0.005	-0.021*
	(-4.26)	(-4.76)	(-4.50)	(-5.37)	(0.24)	(-1.85)
SEA1	0.021	0.023	0.027	0.013	0.025	0.023
	(1.16)	(0.97)	(1.10)	(0.14)	(1.03)	(1.25)
Within-R^2	0.288	0.227	0.159	0.332	0.087	0.244
Observations	2310	2310	2310	2310	2310	2310
			Panel(b)			
Euro2	0.006	0.009	0.022**	0.054***	-0.060***	-0.020***
	(0.91)	(1.26)	(2.46)	(2.93)	(-3.26)	(-2.99)
Euro1	-0.007	-0.006	0.023	-0.106***	-0.012	-0.006
	(-0.41)	(-0.36)	(0.96)	(-3.80)	(-0.55)	(-0.44)
SEA2	-0.049***	-0.057***	-0.070***	-0.138***	0.023	-0.009
	(-3.82)	(-3.96)	(-4.05)	(-4.62)	(1.36)	(-0.82)
SEA1	0.019*	0.015	0.024	0.009	-0.008	0.009
	(1.88)	(1.22)	(1.52)	(0.19)	(-0.29)	(0.66)
Within-R^2	0.241	0.195	0.144	0.300	0.076	0.198
Observations	3213	3213	3213	3213	3213	3213
City-pair FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Panel Fixed - Effect Estimates. Effect of the SEA and Euro on the absolute price deviations

	(1) All Traded	(2) All Traded w/o Clothing	(3) Food and Beverages	(4) Alcohol and Tobacco	(5) Cars	(6) Other Goods
Euro2	0.007	0.009	0.025*	0.056**	-0.075***	-0.019**
	(0.84)	(0.98)	(1.88)	(2.53)	(-3.31)	(-2.21)
Euro1	-0.005	-0.005	0.026	-0.095***	-0.029	-0.005
	(-0.26)	(-0.26)	(1.01)	(-3.04)	(-1.07)	(-0.34)
SEA2	-0.047***	-0.054***	-0.067***	-0.137***	0.022	-0.005
	(-3.58)	(-3.70)	(-3.83)	(-4.58)	(1.35)	(-0.46)
SEA1	0.018*	0.014	0.022	0.002	-0.005	0.014
	(1.67)	(1.17)	(1.44)	(0.04)	(-0.19)	(0.98)
GDP	-0.038*	-0.007	-0.022	0.081	0.064	-0.058***
	(-1.96)	(-0.35)	(-0.77)	(1.62)	(1.40)	(-2.99)
E-Rate	-0.001	-0.001	0.001	0.004	-0.009	-0.003
	(-0.15)	(-0.12)	(0.15)	(0.39)	(-0.92)	(-0.67)
City-pair FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Within-R^2	0.251	0.201	0.146	0.303	0.082	0.163
Observations	3060	3060	3060	3060	3060	3060

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Panel Fixed - Effect Estimates. Effect of the SEA and Euro on the price dispersion

	(1) All Traded	(2) All Traded w/o Clothing	(3) Food and Beverages	(4) Alcohol and Tobacco	(5) Cars	(6) Other Goods
Euro2	0.006	0.012*	0.013	0.027*	-0.044***	-0.005
	(1.00)	(1.77)	(1.59)	(1.85)	(-4.08)	(-0.45)
Euro1	-0.012	-0.005	0.005	-0.001	-0.035***	-0.006
	(-1.04)	(-0.43)	(0.34)	(-0.05)	(-2.90)	(-0.33)
SEA2	-0.029***	-0.033***	-0.032***	-0.026*	0.043***	0.003
	(-3.13)	(-3.20)	(-2.94)	(-1.84)	(4.62)	(0.30)
SEA1	0.006	-0.003	-0.016	-0.024	-0.011	0.014
	(0.60)	(-0.27)	(-1.62)	(-0.88)	(-0.65)	(0.96)
GDP	-0.048***	-0.041***	-0.029*	-0.057*	-0.016	-0.065**
	(-3.30)	(-2.62)	(-1.68)	(-1.75)	(-0.66)	(-2.57)
E-Rate	-0.002	0.001	0.001	0.005	-0.014***	-0.003
	(-0.54)	(0.22)	(0.36)	(0.72)	(-2.99)	(-0.55)
City-pair FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Within-R^2	0.255	0.194	0.102	0.173	0.161	0.106
Observations	3060	3060	3060	3060	3060	3060

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Panel Fixed - Effect Estimates. Effect of the SEA and Euro on the absolute price deviations

	(1) All Traded	(2) All Traded w/o Clothing	(3) Food and Beverages	(4) Alcohol and Tobacco	(5) Cars	(6) Other Goods
Euro2	0.008	0.010	0.023*	0.057**	-0.057**	-0.019**
	(0.90)	(1.00)	(1.66)	(2.49)	(-2.48)	(-2.09)
Euro1	-0.004	-0.003	0.027	-0.092***	-0.027	-0.005
	(-0.21)	(-0.19)	(1.04)	(-2.96)	(-0.98)	(-0.32)
SEA2	-0.044***	-0.050***	-0.061***	-0.128***	0.017	-0.004
	(-3.12)	(-3.21)	(-3.24)	(-4.05)	(1.02)	(-0.37)
SEA1	0.017	0.012	0.020	-0.003	-0.006	0.013
	(1.51)	(1.00)	(1.28)	(-0.06)	(-0.24)	(0.95)
South*Euro2	-0.007	-0.007	0.004	-0.014	-0.078*	-0.002
	(-0.73)	(-0.81)	(0.39)	(-0.63)	(-1.78)	(-0.24)
South*SEA2	-0.031	-0.046	-0.054**	-0.098*	-0.012	-0.010
	(-1.34)	(-1.56)	(-2.11)	(-1.87)	(-0.25)	(-0.25)
GDP	-0.039**	-0.009	-0.024	0.078	0.062	-0.058***
	(-2.00)	(-0.41)	(-0.80)	(1.57)	(1.46)	(-2.99)
E-Rate	-0.000	-0.000	0.001	0.005	-0.007	-0.003
	(-0.08)	(-0.04)	(0.16)	(0.45)	(-0.67)	(-0.66)
City-pair FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Within-R^2	0.253	0.205	0.149	0.306	0.096	0.164
Observations	3060	3060	3060	3060	3060	3060

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Panel Fixed - Effect Estimates. Effect of the SEA and Euro on the absolute price deviations

	(1) All Traded	(2) All Traded w/o Clothing	(3) Food and Beverages	(4) Alcohol and Tobacco	(5) Cars	(6) Other Goods
Euro_note2	0.020**	0.023***	0.024**	0.089***	-0.024*	-0.000
	(2.55)	(2.94)	(2.32)	(5.07)	(-1.73)	(-0.06)
Euro_note1	-0.034***	-0.037***	-0.011	-0.131***	-0.068***	-0.026*
	(-2.89)	(-3.17)	(-0.59)	(-5.09)	(-2.66)	(-1.91)
Euro2	-0.007	-0.007	0.008	-0.007	-0.059***	-0.019**
	(-0.80)	(-0.81)	(0.67)	(-0.34)	(-3.36)	(-2.33)
Euro1	0.017	0.020	0.035	-0.008	0.009	0.010
	(1.02)	(1.15)	(1.43)	(-0.24)	(0.30)	(0.64)
SEA2	-0.047***	-0.054***	-0.067***	-0.137***	0.023	-0.005
	(-3.57)	(-3.70)	(-3.84)	(-4.58)	(1.36)	(-0.45)
SEA1	0.018*	0.014	0.022	0.001	-0.005	0.014
	(1.66)	(1.16)	(1.44)	(0.03)	(-0.21)	(0.97)
GDP	-0.038*	-0.007	-0.021	0.082*	0.060	-0.059***
	(-1.95)	(-0.34)	(-0.73)	(1.67)	(1.31)	(-3.02)
E-Rate	-0.001	-0.000	0.002	0.005	-0.011	-0.003
	(-0.14)	(-0.09)	(0.26)	(0.44)	(-1.13)	(-0.78)
City-pair FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Within-R^2	0.258	0.210	0.150	0.324	0.094	0.166
Observations	3060	3060	3060	3060	3060	3060

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Panel Fixed - Effect Estimates. Effect of the SEA and Euro on the absolute price deviations, , 1990-2007

	(1) All Traded	(2) All Traded w/o Clothing	(3) Food and Beverages	(4) Alcohol and Tobacco	(5) Cars	(6) Other Goods
Euro_note2	0.020***	0.022***	0.029***	0.055***	-0.025*	0.005
	(2.81)	(3.04)	(2.96)	(3.80)	(-1.91)	(0.56)
Euro_note1	-0.019*	-0.022*	0.003	-0.094***	-0.061***	-0.016
	(-1.82)	(-1.96)	(0.15)	(-5.41)	(-2.73)	(-1.21)
Euro2	0.001	0.002	0.013	0.015	-0.042***	-0.010
	(0.08)	(0.22)	(1.04)	(0.82)	(-2.74)	(-1.22)
Euro1	0.020	0.024	0.033	0.005	0.013	0.022
	(1.28)	(1.51)	(1.42)	(0.18)	(0.50)	(1.41)
SEA2	-0.043***	-0.050***	-0.062***	-0.129***	0.018	-0.001
	(-3.25)	(-3.34)	(-3.40)	(-4.51)	(1.18)	(-0.07)
SEA1	0.012	0.009	0.017	-0.023	-0.005	0.017
	(1.17)	(0.75)	(1.11)	(-0.53)	(-0.21)	(1.25)
GDP	-0.035*	0.001	-0.008	0.068	0.088**	-0.057***
	(-1.74)	(0.03)	(-0.27)	(1.44)	(1.98)	(-2.99)
E-Rate	0.002	0.003	0.004	0.012	-0.004	-0.000
	(0.50)	(0.67)	(0.68)	(1.07)	(-0.49)	(-0.05)
City-pair FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Within-R^2	0.282	0.237	0.156	0.338	0.111	0.091
Observations	2601	2601	2601	2601	2601	2601

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix

Table A1: List of all available European cities.

	Single Market		Single Currency	
	Country	EU	SEA(year)	Euro(year)
Vienna	Austria	+	1994	1999
Brussels	Belgium	+	1986	1999
Helsinki	Finland	+	1994	1999
Paris	France	+	1986	1999
Berlin	Germany	+	1986	1999
Athens	Greece	+	1986	2001
Dublin	Ireland	+	1986	1999
Rome	Italy	+	1986	1999
Luxembourg	Luxembourg	+	1986	1999
Amsterdam	Netherlands	+	1986	1999
Lisbon	Portugal	+	1986	1999
Madrid	Spain	+	1986	1999
Copenhagen	Denmark	+	1986	–
Stockholm	Sweden	+	1986	–
London	UK	+	1986	–
Oslo	Norway	–	–	–
Reykjavik	Iceland	–	–	–
Zurich	Switzerland	–	–	–

Norway, Iceland and Switzerland belong to the EFTA.

Table A2: Treatment and Control Groups.

	Single Market		Single Currency	
	Treatment	Control	Treatment	Control
Eurozone	+	–	+	–
Non-euro EU	+	–	–	+
EFTA	–	+	–	+

Both Eurozone and Non-euro EU belong to the European Union.

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