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The euro and saving-investment imbalances over 25 years: The importance of common currency and common markets

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Abstract

The 1992 Maastricht Treaty, laid the foundations for the current European Union with its single market in goods, services, capital and labour and established the framework for the creation of the single currency. We study countries that differ in the extent to which they share a common currency or common markets in labour, capital or goods through membership of the single market. These differences between countries allow us to judge the importance of membership of each of these institutions. We examine the impact of the euro on the labour, capital and goods markets and ask if membership of the euro is reflected in the parameters of some standard econometric relationships in particular the Feldstein-Horioka and purchasing power parity equations.

Keywords: Feldstein-Horioka, capital mobility, eurozone.

JEL Classification: F32, F33, F36, F45

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1. Introduction

The 1992 Treaty of the European Union, or the Maastricht Treaty, laid the foundations for the current European Union with its single market in goods, services, capital and labour. In addition it established the framework for creating a single currency. Part of this framework was the Maastricht criteria which put restrictions on inflation and interest rate differentials, deficits, and exchange rate stability. Monetary unification was combined with the establishment of fiscal rules set in the Stability and Growth Pact. However, European countries differ in the extent to which they share a common currency. These differences between countries allow us to judge the importance of membership of each of these institutions. In particular, we ask if membership is reflected in the parameters of some standard econometric relationships.

The economic history of the past 25 years is a testament of the profound impact of the treaty on economic development in Europe. Intra-EU trade has increased according to several studies. The European Commission has found that that the increase in EU integration measured in trade in goods and services continues unabated and prices continue to converge across the countries.[5] Developments in the labour- and in capital markets have also been pronounced but created more controversy.[6]

While the integration of labour markets and capital markets has generated economic gains, it has also caused political as well as economic turmoil. Intra-Europe trade in goods and services, in contrast, has been less disruptive.[7] The influx of immigrants in the UK was one of the main reasons why that country decided to leave the European Union in 2016, and immigration remains a contentious issue in many other European countries. It is one of the

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[5] See the *Single market Scorecard* by the European Commission (https://single-market-scoreboard.ec.europa.eu/competitiveness/integration_en).

[6] The *Treaty of Rome* introduced the principle of free movement of workers, but its focus was largely on creating a common market for goods. Another step was taken by the *Freedom of Movement of Workers Directive* (1968), which allowed workers from one EEC member state to seek employment in another without needing a work permit. The most important step towards creating a common market in labour was the *Maastricht Treaty*, which came into effect in November 1993. It made free movement a fundamental right of EU citizens and established the concept of *EU citizenship*, allowing any EU citizen the right to live and work anywhere in the Union, irrespective of employment status.

The *Maastricht Treaty* was also the last step in setting up an integrated capital market. It was preceded by the *Capital Liberalization Directive (1988*), which mandated the complete liberalization of capital movements across member states by July 1, 1990.

[7] However, imports from non-EU countries have been found to be disruptive. Colantone and Stanig (2018) investigated the effect of imports from China on electoral outcomes in 15 Western European countries between 1988 and 2007. They found that at the regional level, an increase of imports from China leads to an increase in support for nationalist and isolationist parties, in particular support for radical-right parties.

reasons for the popularity of right-wing, as well as left-wing, anti-immigration populist political parties. In the capital market, massive capital flows in the first decade of the century caused an economic boom in the southern sphere of the eurozone and the sudden stop of these triggered the eurozone fiscal crisis. The economic history of the single market (SM) and the euro can be told either around the gradual gains in efficiency or around the turmoil caused by large movements of labour and capital that have sometimes put the future of the single market and the euro in doubt.

We start with the labour market, then go on to the capital market and finally the goods market as reflected in relative prices in the various countries. Although we discuss the markets separately, they are interconnected since short term capital flows and sudden stops have monetary effects which influence price levels. Labour market movements between countries are reflected in remittances, which also have monetary effects.

2. Labour markets

The impact felt in labour markets has been profound, strengthened by the enlargement of the EU towards the east. The movement of workers from lower to higher productivity countries has benefited the recipient countries by adding to their labour force and the sending countries through remittances and the human capital investment by their nationals. The gain to the migrants themselves takes the form of better career prospects and higher income, which often enables them to accumulate enough savings to be able to return to their country of origin with a better lifestyle.[8]

Dorn and Zweimuller (2021) document the pattern of migration within the EU, especially the sizable migration from east to west in the last twenty years caused by the income disparity between Western Europe and the new eastern member states. They show that the fraction of foreign nationals in the domestic labour market is highest in the highest income-per-capita European countries and lowest in the lower income countries while the proportion of a country's citizens living in other EU countries is largest for the lower income countries. Thus, Romania and Bulgaria have a staggering 18.4% and 12.7%, respectively, of their citizens living abroad.[9] Aksoy and Zoega (2020) show how immigration mitigates the effects of the collapse of fertility in OECD countries with high human capital. Dorn and Zweimuller find

[8] See, amongst others, Hahanec (2012).

[9] Dorn and Zweimuller (2021) estimate the static migration gain, in terms of higher wages of Bulgarians living in other European countries, to be around 8 percent of GDP.

evidence for some but limited convergence in wage rates across countries and static gains from migration.

In spite of the significant welfare gains from migration, migration has become a very contentious issue that threatens to cause major political disruptions. Dustmann and Preston (2019) document the economic benefits of labour mobility in terms of world welfare and contrast this with the politics of receiving countries resistant to immigration. Their explanation for the discontent is the desire by a significant share of the home population to maintain cultural and ethnic homogeneity. Card et al. (2012) found that concerns about cultural homogeneity are more associated with attitudes towards immigration than are concerns about economic issues. The better educated tend to be more accepting of immigrants because they have more positive views about cultural heterogeneity and because they feel less threatened by the influx of immigrants into the labour market. Dustmann and Preston (2007) found a role for cultural prejudice in forming attitudes toward immigration and ethnically different immigrant populations from the natives. Hainmueller and Hopkins (2014) come to a similar conclusion. This goes to explaining why opposition to immigration is strongest in countries where a large share of immigrants come from outside the EU. This applies to the three largest countries in the single market, Germany, France, Italy, as well as to the Nordic countries Sweden and Finland and also to the Netherlands (measured in terms of the difference between the share of non-EU and EU nationalities in a country's population). Each of these countries have a large anti-immigration political party while in some others, such as Denmark, the mainstream parties have managed to stave off the populist threat by adopting stricter policies towards immigration. The same applies to Sweden, but this only occurred after the emergence of the vibrant anti-immigration Sweden Democrats party, which is currently the second largest party in the Riksdag. In the large EU countries, political developments in France and Germany in the summer of 2024 reflect stronger resistance to immigration by the citizens of these countries.

The regional dispersion of refugee immigration can trigger a rise in the popularity of anti-immigration parties. Kenny and Millier (2019) find that for the UK from 2000 to 2015, an increase in the number of asylum seekers dispersed around the country is associated with an increase in the popularity of far-right political parties (but not mainstream right-wing parties) at the local level. The effect is made weaker by ethnic diversity so that the regions with the most diverse ethnic groups are more receptive to asylum seekers. This explains why the regions of the UK with the largest share of immigrants, such as London, voted overwhelmingly to remain in the EU while other regions with fewer immigrants voted to

leave. Similarly, studying the effect of refugee immigration in Denmark, Dustmann, Vasiljeva, and Damm (2019) find that immigration increased support from all parties on the right of the political spectrum, but the gains were concentrated in rural areas.

The UK's decision to allow unhindered migration from the new member states in Eastern Europe in the 2000s made it possible for large numbers of Polish workers to move to the UK following Poland's membership of the European Union (EU) in 2004. As Dorn and Zweimuller (2021) document, migrants from a given country are likely to move to a destination country where many of their compatriots have already settled. The decision by the UK to allow immigration immediately after the East's accession while others, such as Germany, did not, made the UK a popular destination of migrants which then induced more migrants attracted by the initial waves. There is scant evidence for an adverse effect of the wave of immigration on the local population. Dustmann, Frattini, and Preston (2019) find that immigration in the UK had a positive effect on the average wage of native workers although there were some wage declines below the twentieth percentile of the wage distribution.[10,11] Alfano et al. (2016) argue that a desire to stop immigration from the other single market countries and taking control of the borders became the single most important argument in favour of leaving in the Brexit referendum. The EU's refusal to accept temporary curbs on immigration into the UK before the Brexit referendum in 2016 appears in retrospect to have been the final nail in the coffin of the UK's membership of the European Union.

In order to get an idea about the importance of anti-immigration attitude in the electoral process in the EU compared to non-EU countries, we look at parties' electoral manifestos. Specifically, we use data from the Manifesto Project (MP) that performs a quantitative content analysis of parties' election programmes[12]. MP provides data on parties' positive and negative statements on a variety of issues including immigration. The sample includes 67 countries and parties' preferences regarding immigration are available for 2014-2022[13]. We focus on the

[10] Immigration lowered the wage growth in the 20th percentile of the wage distribution by only 0.21%.

[11] Studies from other countries reach similar results. Glitz (2012) found no effect on wages in Germany of the large flow of immigrants from Eastern Europe and the former Soviet Union during the 1990s and the 2000s. Switzerland opened up its labour market in 2005 to EU workers and Beerli et al. (2021) found no adverse effects on the native workforce in the border regions.

[12] See https://manifesto-project.wzb.eu.

[13] The countries are Albania, Argentina, Armenia, Australia, Austria, Azerbaijan, Belarus, Belgium, Bolivia, Bosnia-Herzegovina, Brazil, Bulgaria, Canada, Chile, Colombia, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Mexico, Moldova, Montenegro, Netherlands, New Zealand, North Macedonia, Northern Ireland, Norway, Panama, Peru, Poland, Portugal,

variables' 'negative statements on immigration' (*per601_2*) and 'positive statements on immigration' (*per602_2*). In the following table we show the average percent of negative (positive) statements on immigration as a ratio of all statements on immigration for EU and non-EU countries by considering all political parties and all electoral periods that took place in our sample period: 63 elections in non-EU countries and 51 elections in EU countries. We first construct for each country the ratio of each party's negative (positive) statements over its total statements on immigration. Then we average across all political parties in each electoral period. However, a simple average could be misleading since parties with extreme preference tend to be supported by a small share of voters. Therefore, we weigh each party's statements with its vote share. Finally, we average across electoral periods and countries.

Table 1. Negative and positive statements on Immigration

	EU	Non-EU
Negative (weighted statements)	36.7	14.0
Positive (weighted statements)	27.7	26.2
Only negative (vote share)	40.9	21.0
Only positive (vote share)	37.6	29.3

We can see in the first two lines of Table 1 that immigration as an issue seems to be more important in the electoral platforms in the EU than in the non-EU countries since the sum of negative and positive statements on immigration in the EU (64.4) is higher than in the non-EU countries (40.2). This is expected since labour mobility is an important pillar of European integration and therefore more relevant for the political agenda in the EU. What is perhaps less expected is that negative statements on immigration (36.7) exceed positive statements (27.7) in the EU while the opposite is the case in the non-EU countries (13.96 vs 26.24).

Although positive statements do not differ a lot in the two groups of countries, political parties in the EU include negative statements on immigration in their platforms much more than non-EU political parties. Thus, anti-immigration as a political position seems to be more relevant for the EU countries reflecting perhaps a tendency to blame labour mobility for

Romania, Russia, Serbia, Slovakia, Slovenia, South Africa, South Korea, Spain, Sri Lanka, Sweden, Switzerland, Turkey, Ukraine, United Kingdom, United States, Uruguay.

For a list of variables see https://manifesto-project.wzb.eu/down/data/2024a/codebooks/codebook_MPDataset_MPDS2024a.pdf.

various economic and social problems. In comparison, the lower positive statements on immigration of the EU political parties may indicate that parties supporting labour mobility may fail to communicate the positive effects of immigration to voters.

Next, we look at parties that show a strong preference against or in favour of immigration in the sense that they have either only negative statements on immigration or only positive. As shown in the lower part of Table 1 in all elections in the 2014-2022 period in the EU there were 104 parties with a clear positive preference for immigration and 83 parties with a clear negative preference. In the non-EU countries, fewer parties had a clear stance on immigration in their electoral platforms: 60 parties were pro-immigration and 34 against. Parties with a positive attitude towards immigration gained on average 29.3% of votes in the respective elections in the non-EU countries and 37.6% in the EU countries. At the same time parties with a clear anti-immigration position had on average a much higher vote share in the EU countries (40.9%) than in the non-EU countries (21.03%).

It should be noted that anti-immigration statements could mainly refer to immigrants from outside EU and reflect dissatisfaction with EU policies in this area and not so much to intra-EU labour mobility. Nevertheless, the fact that over 40% of voters in the EU support anti-immigration parties cannot be ignored as an alarming development for the process of European integration.

3. Capital markets

As with labour migration, capital mobility has been shown to benefit economic growth in Europe. Phelps and Zoega (2019) studied convergence of output per capita in a sample of 37 European countries over the period 1999-2014. They found that the post-communist economies are converging more rapidly than other countries in the sample and more so the closer they are integrated into the European Union. Thus, EU membership increased the speed of convergence as did euro membership. They attribute the convergence to foreign direct investment, technology diffusion and an inflow of EU structural funds.[14]

While large migration flows have caused political upheaval in many European countries, excessive capital flows have caused massive economic disruptions in recent decades. Thus,

[14] Several other papers have estimated the speed of convergence in Europe. Crespo Cuaresma et al. (2008) found that being an EU Member State increases long-term economic growth. They attributed this to the transmission of technological knowledge among the EU Member States as well as financial help from the EU to the poorer members. Cavenaile and Dubois (2011) showed that membership of the EU increases long-term growth. Fritsche and Kuzin (2011) detected convergence clusters.

developments in capital markets have also posed a threat to the stability of the euro and the single market. Large capital flows preceded the Great Recession in 2008 and caused a boom-bust cycle both in countries within the eurozone as well as outside it. One way to map the pattern of (net) capital flows is by estimating the relationship between saving and investment for different countries and groups of countries. This draws on the literature started by the seminal paper by Feldstein and Horioka (1980) who studied the relationship between saving and investment.

In a world with perfect capital mobility, saving and investment should be uncorrelated across countries and over time within a county. The FH equation is the following

$$\left(\frac{I}{Y}\right)_{jt} = a_t + b_t \left(\frac{S}{Y}\right)_{jt} + u_{jt} \quad (1)$$

where *i* denotes gross capital formation, *S* is saving, *Y* denotes GDP and *u* is an error term. The coefficients a and b have a time subscript to allow them to change between regimes, such as the single market period and the eurozone years. Feldstein and Horioka found that the estimated coefficient of the saving rate was 0.887 in a cross section of industrialized countries for the period 1960 to 1974 and attributed their finding to barriers to capital mobility.

The relationship has somewhat different interpretations when estimating in a cross-section of countries, on the one hand, and over time, on the other hand. In a cross section, if capital was perfectly mobile across countries, we would find the coefficient *b* to be close to zero because a fall in savings in one country would not affect domestic interest rates or investment. Thus, the relationship can be understood to measure capital mobility when measured in a cross section of countries. This was the interpretation given by Feldstein and Horioka. When measured over time, in contrast, the FH equation can be looked at as a measure of intertemporal solvency for each country. A country that persistently invests more than it saves will accumulate foreign debt and depending on its rate of growth of output, run into balance of payment problems.

Several explanations have been proposed for the non-zero estimated coefficient in the FH paper. Persistent current account deficits and the corresponding net capital inflows generate a deteriorating net investment position, which eventually will raise the rate of interest demanded by foreign creditors making further borrowing difficult, see Coakley et al. (1996). Here capital markets force countries to align saving with investment in the long run. In a similar vein, Tobin (1983) and Summers (1988) argued that governments may dislike deficits for financial stability reasons and surpluses because they indicate room for expansionary policies. Bai and Zhang (2010) show that financial frictions can explain the FH puzzle.

The history of the eurozone offers some explanations for changes in the FH coefficient over time. The different national currencies that the euro replaced differed in interest rates, which reflected differences in monetary policy as well as differences in the expected depreciation of the currency and country risk. Interest rate differentials could then be expected to generate differences in saving and investment across the countries. Without real interest rates being equal, a fall in saving in one country could raise the real interest rate and make investment fall in that country.

The Maastricht Treaty put restrictions on inflation and interest rate differentials and deficits, and increased exchange rate stability. The intuition behind the convergence of interest rates as a Masstricht pre-requisite for participation in the euro area was that in order for countries to fulfil this criterion they should follow policies to facilitate the adoption of a common monetary policy and also to eliminate the country risk. As soon as currencies were accepted in the ERM, country risk fell due to investors' expectations that euro area participation is not consistent with default. This expectation was based on, what later turned out to be, time inconsistent fiscal rules, which in combination with no currency risk allowed interest rates to converge.

Following Frankel (1992), real interest rate differentials can be written as:

$$(i - \pi^e) - (i^* - \pi^{e*}) = (i - i^* - fd) + (fd - \Delta s^e) + (\Delta s^e - (\pi^e - \pi^{e*})) \quad (2)$$

where i and i^* denote domestic and foreign nominal interest rates, π^e and π^{e*} are the domestic and foreign expected inflation, *fd* is the forward discount on the domestic currency and Δs^e is the expected depreciation of the domestic currency.[15] The first term on the right-hand side of the equation is the covered interest differential capturing country-specific factors such as capital controls or default risk. The second and third term represent the exchange rate risk premium and the expected real depreciation. The elimination of the three right-hand side terms, which eurozone membership would bring, generates real interest parity and as a result weakens the relationship between saving and investment across countries.

The introduction of the single market involved the removal of capital controls with obvious implications for the country risk. The introduction of the euro eliminated the exchange rate risk and reduced the expected real depreciation. For the same reason that regional authorities have no reason to worry about current account imbalances, the euro member states could also feel more relaxed, or so they thought, about trade deficits. Because the correlation between

[15] See also Katsimi and Zoega (2016).

saving and investment should for these reasons be as low between countries as between regions within a country, the establishment of the single market in 1994 and the eurozone in 1999 may have coincided with a structural break in the coefficient of saving in the Feldstein-Horioka equation.[16]

3.1 The FH coefficient over time

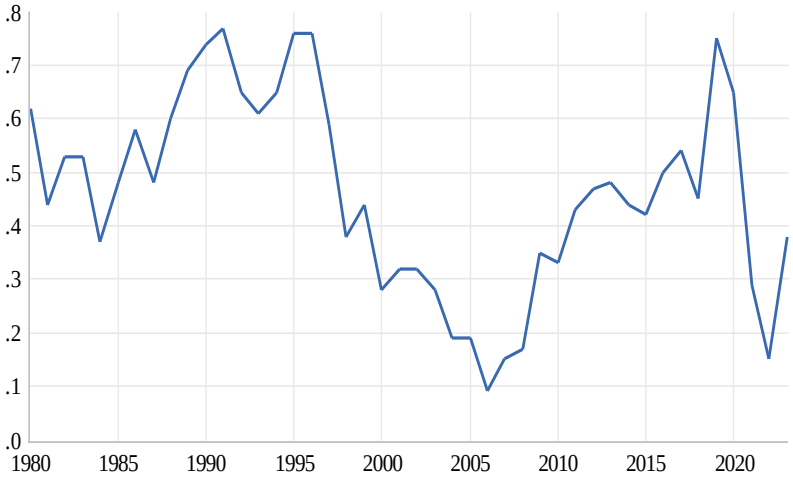
We are not the first to study the change in the FH coefficient in the eurozone. Blanchard and Giavazzi (2002) found that the FH puzzle had disappeared in the euro zone. Kumar and Rao (2009) also found supportive evidence for a negative effect of European monetary integration on the FH coefficient in a sample of 13 OECD countries and Choudhry and Kling (2014) in a sample of 252 countries. Choudhry and Kling find that capital mobility declined following the financial crisis. Johnson and Lamdin (2014) confirm that the financial crisis raised the FH coefficient for the eurozone and the non-euro EU countries. Katsimi and Zoega (2016) study the effect of the beginning of the European single market in 1993 and the introduction of the euro in 1999 on the FH coefficient where countries outside the single market serve as a control group and those within as a treatment group. They find that the FH coefficient fell with the introduction of the single market and the euro and rose with the financial crisis.

Figure 1 shows the FH coefficient estimated in a cross section of OECD countries for every year between 1980 and 2023. The countries include members of the EU, the countries in the European Economic Area (EEA) that do not belong to the EU and several countries outside the EEA.[17] The figure shows that the FH coefficient fell after the creation of the single market and then some more after the introduction of the euro until the financial crisis hit in 2008. It then rose and peaked in 2019 before falling in the COVID-19 years and subsequently rising in 2023.

[16] These results are supported by Helliwell (1998), Bayoumi and Rose (1992) for British regions, Helliwell and McKitrick (1998) for Canadian regions and Sinn (1992) for U.S. regions.

[17] The countries are: Australia, Austria, Belgium, Bosnia, Canada, Chile, Colombia, Costa Rica, Czechia, Denmark, Estonia, Finland, France, Germany, Grece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, UK, and US.

Figure 1. FH coefficient estimated from annual cross sections of OECD countries



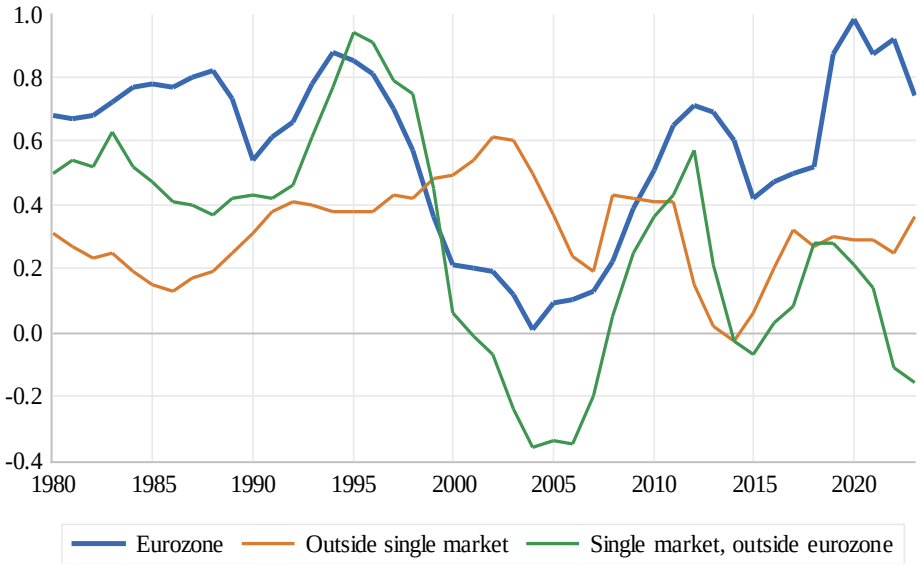
The number for each year is the FH coefficient estimated in a cross section of OECD countries for that year.

In Figure 2 we distinguish between developments in the eurozone, the single market countries that do not use the euro, and countries outside the single market. Each observation is estimated with as a ten-year rolling panel estimated with fixed effects. We include the founding members of the single market and the founding members of the euro and then countries that never belonged to the single market (see list of countries in note below Figure 2).

The ten-year rolling sample, the FH coefficient for the eurozone fell after the launch of the single market and the euro and then rose during the crisis until 2014. It then fell in 2015 but maintained a higher value than before the crisis. The fluctuations of the FH coefficient for the single-market countries that are outside the euro are more pronounced. The coefficient was negative in the early 2000s and then rose after the 2008 crisis only to fall again in 2014 and 2015 to zero, rise again in 2018 and 2019 and return to zero during COVID. In contrast, the FH coefficient for the countries outside the single market fluctuated much less during this period. It did fall somewhat before the financial crisis and it did rise in the crisis, but the magnitude of these changes are much smaller than for the European countries.

It is noteworthy that the last values of the FH coefficient for the eurozone are much higher than for the countries outside the single market. It seems that the single market and monetary integration only had a transient effect on the FH coefficient in the early 2000s.

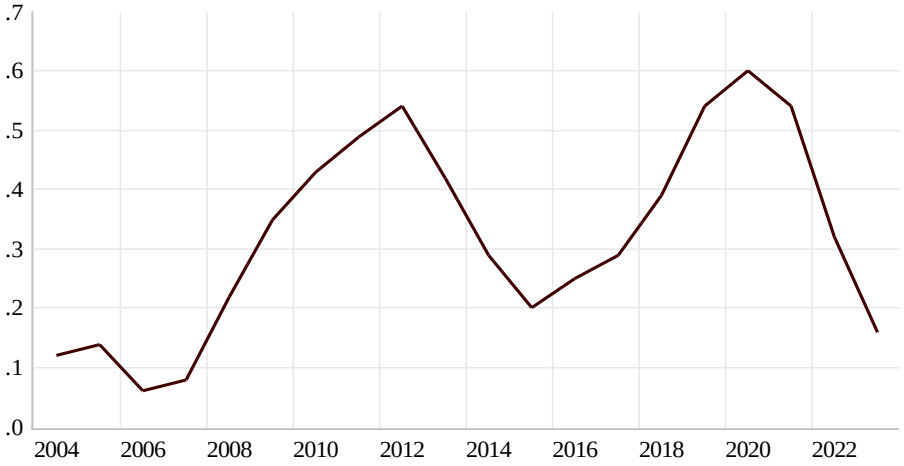
Figure 2. FH coefficient estimated from a ten-year rolling panel of OECD countries



The number for each year is the FH coefficient estimated from a ten-year (backward-looking) rolling panel with a fixed-effects estimator for each of the three country groups. The eurozone group includes Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal and Spain. The non-single market group includes Australia, Canada, Chile, Israel, Japan, Korea, New Zealand and the US. The non-euro group within the single market includes Iceland, Norway, Sweden, Switzerland and the UK.

Finally, Figure 3 shows the FH coefficient for a panel of Eastern European countries also estimated with a ten-year rolling sample. The first observation is estimated for the years 1995-2004. The coefficient rises after the financial crisis, then falls in 2014 and 2015 only to rise again, peak in 2021 and fall thereafter. This is similar to the pattern of the other single market countries in Figure 2.

Figure 3. FH coefficient for Eastern Europe from a ten-year rolling panel



The number for each year is the FH coefficient estimated from a ten-year (backward-looking) rolling panel with a fixed-effects estimator for Bosnia, Bulgaria, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.

3.2 Panel regressions

To further investigate the shifts in the FH coefficient, we estimate the equation using a panel of countries. We observe savings and investment for 36 OECD countries going back to 1960 and ending in 2022.[18] We choose members of each group of countries that have been consistently members of the group.[19] See Table A1.

Table 1 shows the results of (unbalanced) panel estimations of the FH equation for all OECD countries as well as subgroups of countries.[20] We allow for five time dummies to test for structural breaks: One dummy variable marks the first years of the single market before the advent of the euro in 1993-98. Another marks the early years of the euro before the financial crisis, 1999-2007. The third stands for the crisis in the eurozone from 2008-14. The next covers the recovery years 2015-19 and the final dummy variable marks the COVID-19 period 2020-22. The time dummies are also interacted with the saving rate to test for structural breaks in the coefficient *b* in Equation (1). A Wald test for the single market and the eurozone countries rejects the hypothesis of a constant intercept term as well as a constant coefficient of the saving rate across time (1% level of significance).

For the whole sample of 36 OECD countries we get a coefficient of 0.559 for the saving rate in Table 1. For the period as a whole, countries in the single market but outside the eurozone have a coefficient lower than countries using the euro (0.321 compared to 0.665 in Table 1. Comparing the single market to the countries outside it, countries in the single market have a higher coefficient, 0.568, than those outside it, 0.415. It follows that a common currency is not a prerequisite for capital mobility.

In the second column of Table 1, the creation of the single market and the introduction of the euro affect *b* for the single-market countries. The coefficient of the saving rate falls significantly from 0.57 to 0.47 in 1993-98 and further to -0.06 in 1999-2007. About half of the fall in *b* due to euro area creation is offset by the crisis after 2008 when it rises to 0.25. One can see in columns (4) and (5) that the effect of the introduction of the euro was greater than that of the single market, and greater in the eurozone than in other single market countries. The FH coefficient fell from 0.67 to -0.02 in the euro countries in 1999-2007 and from 0.32 to

[18] We omit Luxembourg from the 38 OECD countries and also Turkey because it turned out to be a large outlier in our estimation.

[19] The one exception is the UK, which belongs to our group of single-market countries until its exit in 2020 and to the non-single market countries in the 2021-2022 period.

[20] In Table 2, we estimate equation (1) with OLS while in Table A2 we perform IV estimations using the lagged savings ratio as instrument in order to address a possible endogeneity problem pointed out in the literature (see Feldstein and Horioka, 1980; Frenkel, 1992; Kasuga, 2004).

-0.03 in the non-euro countries. The financial crisis made the coefficient rise to 0.24 for the non-euro countries and to 0.41 for the euro countries. The crisis appears to have had a greater effect in the euro countries.

Eurozone creation coincided with a decrease in the value of *b* in the whole sample of 36 OECD countries, but this effect is much weaker for the non-single market countries as could be expected. It is much stronger for the eurozone than the non-euro single market countries. Column (3) of Table 1 shows that the adoption of the euro also coincides with a decrease of the coefficient of the saving ratio for countries outside the single market from 0.42 to 0.24, which is, however, much higher than the same coefficient for single market countries. As described above, this effect is much greater within the eurozone. Finally, the financial crisis leads to a rise in the saving ratio coefficient throughout the EU, but it does not affect non-single market countries.

At the bottom of the two tables, we perform a differences-in-differences (DiD) analyses as in Katsimi and Zoega (2016) to show the pattern in the data more clearly. This can be explained by the equation below where superscript *i* denotes a group of European countries (the treatment group), the control group, NSM, is the group of countries outside the single market and *t* measures the time period; 60–92, 93–98, 99–07 or 08–14, 15-19 and 20-22. The first period includes as before the years before the creation of the single market, the second the early years of the single market before the introduction of the euro, then the euro before the financial crisis, then the years of the financial crisis, the recovery and finally the COVID-19 recession. The DiD equation is the following:

$$\delta_{dd} = \left(b_t^i - b_{t-1}^i\right) - \left(b_t^{NSM} - b_{t-1}^{NSM}\right) = \left(b_t^i - b_t^{NSM}\right) - \left(b_{t-1}^i - b_{t-1}^{NSM}\right) \qquad (3)$$

Here *i* denotes the single market, the eurozone, the non-euro single market countries and the northern and the southern part of the eurozone. The equation calculates the difference in the change of the FH coefficient b for any of these groups (treatment), on the one hand, and the countries outside the single market (control), on the other hand. This is equivalent to the difference between time periods of the between-group difference. Thus, we test whether the coefficient of savings in equation (1) decreased more in the eurozone – or the northern part of the euro zone, the southern part or the single-market countries that do not have the euro – than in the control group, which has the non-single-market countries.

The results in the bottom lines of the two tables show that the effect of the single market caused the largest fall in in the southern part of the euro zone and in the non-euro part of the single market. The introduction of the euro has, as expected, the biggest effect in the

eurozone, especially in the northern countries. Finally, the financial crisis starting in 2008 raised the value of b similarly in the eurozone and non-eurozone single market countries.

What is most noteworthy about the results in Table 1 and Table A2 is that the introduction of the euro lowered the FH coefficient in the single market and especially in the eurozone – a sign of increased capital mobility – and increased it by more in the years after the financial crisis – a sign of decreased capital mobility. The subsequent lowering of the coefficient during the COVID-19 recession is likely to be transitory. At the end of the sample period, before COVID-19, the FH coefficient is higher inside the European single market than outside it and higher in the eurozone than in the club of non-euro members of the single market.

By triggering the capital flows that set the stage for the financial crisis of 2008 and the subsequent euro crisis, the euro facilitated economic crisis and recessions in many member states, such as Ireland, Greece and Spain. This crisis highlighted the time inconsistency of eurozone fiscal rules and thus their inability to foster fiscal discipline. A reform of the Stability and Growth Pact in the 2011-2013 period contributed to the decline of eurozone deficits up to 2019 but their subsequent rise due to the fiscal measures implemented to tackle the pandemic provoked another significant reform of the fiscal framework in 2024 allowing for a more tailor-made fiscal adjustment. The crisis itself then appears to have raised the FH coefficient and set in motion changes that lowered capital mobility or, alternatively, made countries intertemporally solvent again. Frankel's(1992) theoretical framework presented in equation (2) allows us to understand these developments. The financial crisis after 2008 was a clear case of a rise in the 'country risk' reflected by the significant rise in default risks. There is also the expectation of a euro exit creating currency risk in some of the countries.

Table 1. Estimation of FH equation using panel data

OLS with FE							
	(All) GCF	(Single M.) GCF	(Non-SM) GCF	(SM, no euro) GCF	(eurozone) GCF	(euro, north) GCF	(euro, south) GCF
GDS	0.559***	0.568***	0.415***	0.321*	0.665***	0.589***	0.720**
	(7.88)	(6.64)	(4.29)	(2.22)	(6.08)	(4.12)	(3.84)
d9398	0.380	-1.042	0.390	-3.398	0.245	-3.431	7.444
	(0.19)	(-0.60)	(0.16)	(-1.20)	(0.08)	(-1.46)	(2.21)
d9907	8.145***	9.994**	3.108	4.675	14.216***	9.036**	8.270
	(3.45)	(2.58)	(1.44)	(0.76)	(4.06)	(3.09)	(1.12)
d814	2.341	0.436	5.119*	-3.410	1.880	-4.120	2.443
	(1.41)	(0.20)	(1.82)	(-1.28)	(0.75)	(-0.45)	(0.59)
d1519	-0.297	-5.390*	6.986*	-2.050	-7.495	-3.866	-5.102
	(-0.10)	(-1.96)	(2.12)	(-0.97)	(-1.80)	(-0.34)	(-0.86)
d2022	4.158*	3.953	4.883*	4.371	3.320	13.372**	3.279
	(1.84)	(1.34)	(1.89)	(1.02)	(1.09)	(3.08)	(0.55)
GDS xd9398	-0.085	-0.099	0.012	-0.046	-0.138	0.009	-0.455*
	(-1.03)	(-1.25)	(0.16)	(-0.36)	(-0.96)	(0.07)	(-3.03)
GDSxd9907	-0.410***	-0.527***	-0.178*	-0.350	-0.687***	-0.504***	-0.324
	(-3.91)	(-3.35)	(-1.86)	(-1.55)	(-4.94)	(-5.50)	(-0.91)
GDSxd814	-0.242***	-0.218**	-0.253**	-0.086	-0.252**	-0.015	-0.236
	(-3.58)	(-2.30)	(-2.32)	(-0.69)	(-2.74)	(-0.05)	(-1.35)
GDSxd1519	-0.136	0.036	-0.351**	-0.086	0.149	0.025	0.006
	(-1.25)	(0.33)	(-2.82)	(-0.86)	(0.78)	(0.06)	(0.02)
GDSxd2022	-0.289***	-0.305**	-0.262**	-0.293	-0.269**	-0.599***	-0.303
	(-3.25)	(-2.67)	(-2.67)	(-2.05)	(-2.41)	(-4.03)	(-1.18)
_cons	12.681***	12.456***	14.901***	19.217***	10.021***	11.625**	9.142
	(7.78)	(6.02)	(7.00)	(5.63)	(3.44)	(2.78)	(2.01)
Difference 60-92 and 93-98	-0.085	-0.099	0.012	-0.046	-0.138	0.009	-0.455
Difference 93-98 and 99-07	-0.325	-0.428	-0.19	-0.304	-0.549	-0.513	0.131
Difference 99-07 and 08-14	0.168	0.309	-0.075	0.264	0.435	0.489	0.088
Difference 08-14 and 15-19	0.106	0.254	-0.098	0	0.401	0.04	0.242
Difference 15-19 and 20-22	-0.153	-0.341	0.089	-0.207	-0.418	-0.624	-0.309
Dif 93-98/60-92		-0.111		-0.058	-0.15	-0.003	-0.467
Dif 99-07/93-98		-0.238		-0.114	-0.359	-0.323	0.321
Dif 08-14/99-07		0.384		0.339	0.51	0.564	0.163
Dif 15-19/08-14		0.352		0.098	0.499	0.138	0.34
Dif 20-22/15-19		-0.43		-0.296	-0.507	-0.713	-0.398
Number of Countries	36	17	12	5	11	7	4
Wald Test intercepts	3.91(0.01)	5.34(0.01)	1.92(0.18)	4.53(0.08)	35.64(0.00)	11.31(0.01)	23.53(0.01)
Wald Test slope	4.00(0.01)	4.89(0.00)	4.35(0.02)	2.10(0.24)	52.10(0.00)	6.61(0.02)	68.99(0.00)
N	1521	746	538	244	454	259	195
R^2	0.332	0.521	0.271	0.473	0.595	0.454	0.737

4. Goods markets

Even in a single market with a common currency, one would not expect prices to be equalized, because many goods and services are location specific and cannot be traded. Housing being an obvious example. Since houses cannot move, people have to move to arbitrage price difference. This is more generally true; goods markets are affected by both developments in labour and capital markets. Migration will increase the production of labour-intensive goods and services in the country receiving the immigrants and cause a reduction in the production of these goods and services in countries experiencing emigration.[21] In a similar vein, capital flows will increase the production of capital-intensive goods in the recipient country and reduce it in the country of origin. Thus, to take an example, the production of cars in many Eastern European countries has increased while in the West, immigrants provide labour for social services, construction and other labour intensive work. These developments are welfare improving although unskilled workers in the West may experience a slight worsening of their labour market prospects, see Dustmann et al. (2013).

4.1 Capital flows, sudden stops and prices: the role of exchange rates

There are also disruptive interactions between capital and goods markets. Portfolio investment flows affect aggregate demand and the real exchange rate under both the common currency and floating exchange rates. However, the mechanism of the capital inflows and the consequences of the sometimes eventual sudden stop depend on the currency arrangement. The recent financial crisis showed how such flows can have disruptive effects both in the eurozone as well as in countries outside the eurozone. In a nutshell, in a floating exchange rate regime, capital flows cause currency market volatility while in the eurozone they cause bond market volatility. In both cases, relative prices – the real exchange rate – increase during the capital inflow phase and fall during the outflow phase. The aftermath differs in that the floating currency can quickly increase the competitiveness of the economy through a sudden depreciation of the currency. In the eurozone, things are not that easy, and it can may take years of high unemployment and demand compression for a current account deficit to turn into a surplus.[22]

[21] This is the renowned Rybczynski Theorem in international trade.

[22] See, amongst others, Raza et al. (2018) and Lane and Milesi-Ferretti (2012). Both papers find no evidence of real exchange rates affecting the post-crisis current account dynamics in the eurozone but find evidence of domestic demand compression playing a bigger role in the current account adjustment.

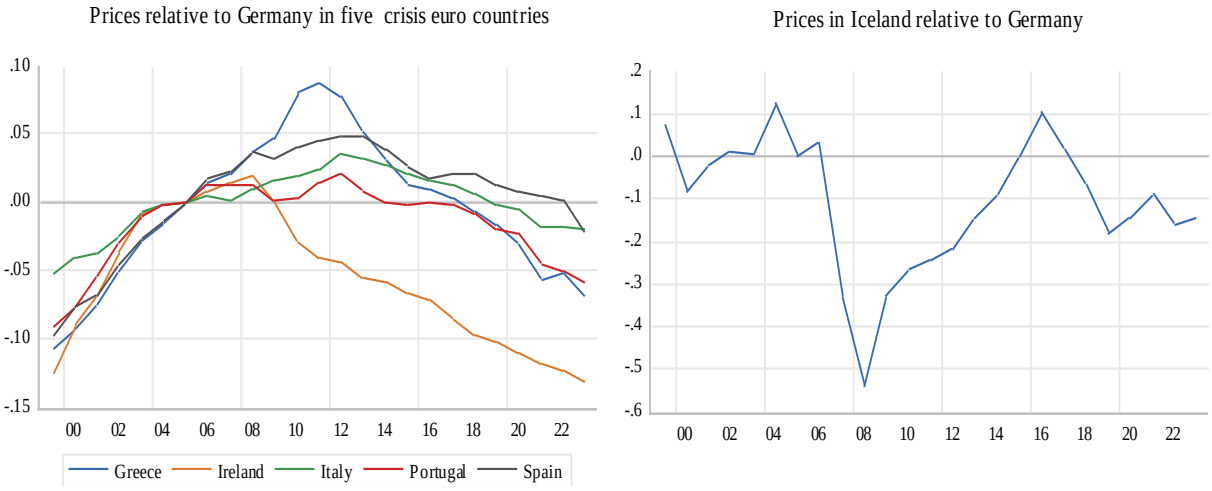
In a floating currency regime, as Iceland learned at a high cost, the capital inflow is driven by interest rate spreads and expectations of future currency appreciation. The inflow causes currency appreciation and a fall in the price of imports, and a domestic credit expansion with rising prices of stocks and houses. The appreciation does not have to occur instantaneously, as the textbooks teach, but can take many years. Both developments increase private consumption demand – through a wealth effect and changes in relative prices – and cause a current-account deficit. The net investment position worsens as a result. Booming domestic demand raises prices in goods markets, measured in a common currency, compared with prices in other countries. A sudden stop of the capital flows, triggered by the realization that the party cannot go on, will then make the currency tank, asset prices fall, and the financial system suffers a debt crisis when the credit creation comes a halt. The currency depreciation then comes to the rescue by making relative prices fall and helps with the (export-led) recovery but only after a period of debt restructuring.

In the euro area, the capital inflow can be driven by rising house prices and a construction boom, as in Spain during the 2000s, or by a prodigal government, as was the case in Greece. Additionally, the lack of synchronisation of economic cycles may imply a procyclical common monetary policy for some countries. The inflow makes domestic prices increase relative to other countries, but more gradually than in the floating exchange rate countries. The aftermath is usually more drawn out because the safety valve of a floating currency is missing. The stop of the capital inflow triggers domestic credit contraction, a fall in asset prices and rising unemployment until domestic demand has fallen enough to reduce the trade deficit, which can no longer be financed, and domestic supply has adjusted through a process of wage devaluation. In the longer run relative prices fall, competitiveness is restored.

To elucidate the effect of capital flows on relative prices, we show in Figure 4 the ratio of the CPI in several European countries divided by the CPI for Germany in the runup to and following the 2008 crisis in five eurozone countries and in Iceland, which has floating exchange rates. Note, in the left-hand panel, the rising real exchange rates in Greece, Ireland, Italy, Portugal and Spain before the crisis as these countries lost competitiveness due to a capital inflow and domestic credit creation. Ireland was badly hit in the fall of 2008 and its price level started to fall relative to prices in Germany in 2009. Relative prices started to fall in the other four countries when the eurozone crisis erupted in full force in 2010 and 2011. The right-hand panel has prices in Iceland measured in euros (calculated as the product of the CPI for Iceland and the exchange rate measured in the number of euros in one unit of the local currency (krónur, ISK)) divided by the CPI for Germany. Relative prices increased somewhat

before the crisis but then fell precipitously when the sudden stop of the capital inflow caused the currency to tank. The fall in prices in Iceland relative to Germany was more than 50% from the peak in 2006 to the low in 2008.

Figure 4. Capital flows and relative prices with and without the euro

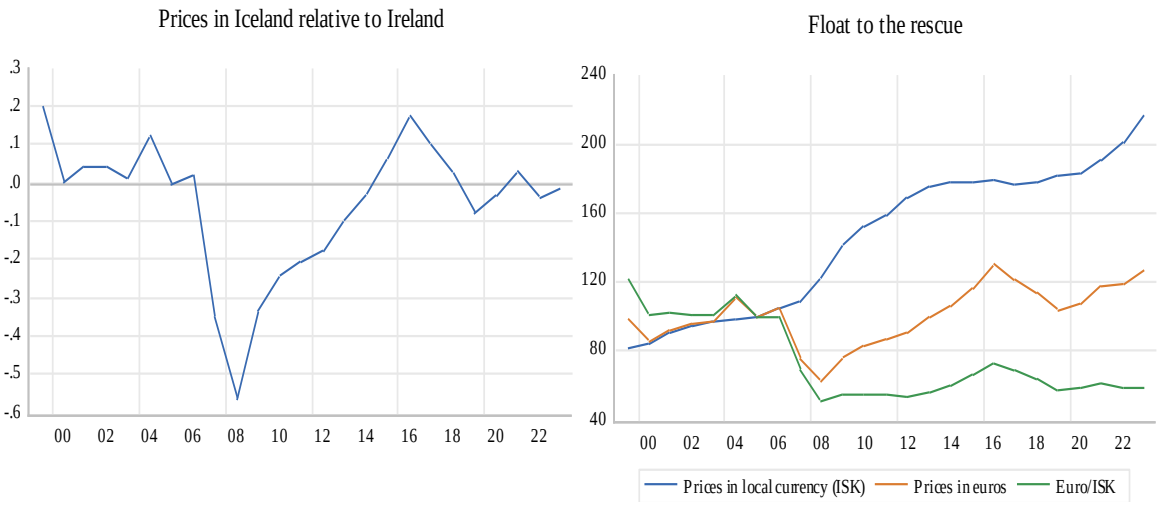


The two panels show the log-difference between prices in each country and Germany, which are made equal in year 2005.

Low prices then helped trigger a tourism boom in Iceland, which raised relative prices until its peak in 2016. The collapse of tourism during the COVID-19 pandemic made prices fall relative to those in Germany.

Figure 5 shows the evolution of prices in Iceland relative to prices in Ireland (euro price level in Iceland relative to prices in Ireland) (left-hand panel). Both countries' banking systems were hit in the autumn of 2008, Ireland's banking system was saved by the ECB while Iceland's collapsed in a spectacular fashion. Note the rapid fall in prices in Iceland in 2008, which restored competitiveness almost overnight. The right-hand panel of Figure 5 shows that the fall in relative prices in Iceland in 2008 was solely caused by the currency depreciation while the rise in the following years is caused by domestic inflation, much of which is caused by the gradual passthrough of lower exchange rates into prices.

Figure 5. Recovery in Iceland compared to Ireland



The left-hand panel shows the log-difference between prices in Iceland and Ireland, which are made equal in year 2005. The right-hand side panel shows indices that take value 100 in 2005.

5.2 An error-correction model of price adjustment

In order to elucidate these effects further, we estimated an error regression equation using a fixed effects estimator. As before, we use data from the countries that were consistently in the eurozone or outside the eurozone and in the single market. There are 10 eurozone counties (in addition to Germany, the numerar) and five single-market non-euro countries. We use price data from the beginning of the euro in 1999 until 2023. Our data are the Consumer Price Index (CPI) for each of the euro countries and converted into euros at current exchange rates for the non-euro countries. Denote the log of the CPI in country i by p_{it} and the log of the CPI for Germany by p_t. The error-correction equation can then be written as follows:

$$Dp_{it} = a_i + \beta_1 * Dp_t + \beta_2 * p_{t-1} + \beta_3 * p_{it-1} + e_{it} \quad (4)$$

The price level of country i is adjusting to the German price level, the short run adjustment is the coefficient of German inflation and if adjustment is instantaneous $\beta_1 = 1$. The long-run coefficient on German inflation is $-\beta_2/\beta_3$. Goods market integration would imply that $-\beta_2/\beta_3 = 1$, which implies $\beta_2 = -\beta_3$. Imposing these two restrictions we can re-estimate the equation as:

$$D(p_{it} - p_t) = \alpha_i + \gamma * (p_{t-1} - p_{it-1}) + \epsilon_{it} \quad (5)$$

The coefficient of the lagged dependent variable γ measures the speed of adjustment.

The results for equation (4) are shown in Table 2 and for equation (5) in Table 3. The countries are grouped into eurozone members, countries with floating exchange rates and the

intermediate fixed exchange rate case, which only includes Denmark.[23] We also show the average value of the estimated coefficients for the country groups for the sake of comparison. Finally, the last column has the estimated standard error of regression, which is a measure of the size of the country shocks.

The estimated coefficient β_1 of German inflation is close to, and not significantly different from, one for the eurozone countries and also for Denmark but far from one for the floating currency economies other than Norway. This implies greater inflation convergence within the eurozone than within the single market at large. Whereas there is faster short-run adjustment in the euro zone to inflation shocks, there is slower long-run adjustment to price level divergences. The speed of adjustment in the floating rate countries (0.169) is on average more than five times that in the eurozone (0.030). This fits the story told above about the financial crises in the eurozone and in Iceland.

The higher speed of adjustment in the floating countries comes at a price. The size of the economic shocks, measured by the standard errors of regression in Table 2, is more than four times as large (0.064 instead of 0.015) on average in the floating countries than in the eurozone. The standard error is by far the largest in Iceland, which was hit by the largest shock in 2008, but it is also higher than the eurozone average in the other four floating economies. One can judge the extent of divergence from having short and long run coefficients different from one, by comparing the standard errors in Tables 2 and 3.

Table A3 gives the residual correlations between the countries. These will have quite large standard errors, given the degrees of freedom of the equation. And, in general, they are not large and some of the large ones are difficult to explain, such as Italy and Finland of 0.61. Correlations between the euro countries tend to be positive, averaging 0.11, as do correlations between the floaters, averaging 0.28, but between euro and floaters there are mixtures of positive and negative averaging close to zero.

[23] We omit late entrants into the single market, such as the Eastern European countries, and late entrants into the eurozone, such as the Baltic economies.

Table 2. Price adjustment equation (4). Annual data 1999-2023, prices in euros.
Standard errors in parentheses.

	Eurozone					*Floating currencies*					
	a_i	Dp_t	p_{t-1}	$p_{i,t-1}$	*s.e.*		a_i	Dp_t	p_{t-1}	$p_{i,t-1}$	*s.e.*
Austria	-0.366	0.954	0.382	-0.301	0.004	Iceland	0.065	-1.140	0.371	-0.384	0.125
	(0.106)	(0.047)	(0.122)	(0.100)			(1.135)	(1.629)	(0.269)	(0.164)	
Belgium	0.315	1.013	-0.194	0.127	0.010	Norway	1.465	0.932	0.017	-0.334	0.044
	(0.449)	(0.134)	(0.462)	(0.366)			(0.506)	(0.584)	(0.142)	(0.173)	
Finland	0.058	0.721	0.154	-0.164	0.008	Sweden	1.005	0.406	0.156	-0.372	0.042
	(0.085)	(0.122)	(0.130)	(0.119)			(0.529)	(0.549)	(0.139)	(0.185)	
France	0.090	0.736	0.123	-0.142	0.005	Swiss	-1.558	0.275	0.707	-0.366	0.049
	(0.044)	(0.069)	(0.091)	(0.091)			(1.180)	(0.713)	(0.427)	(0.198)	
Greece	0.599	1.280	-0.137	0.009	0.011	UK	0.971	1.504	0.165	-0.380	0.059
	(0.115)	(0.157)	(0.063)	(0.047)			(0.761)	(0.774)	(0.133)	(0.177)	
Ireland	0.580	1.163	0.016	-0.142	0.009	**Average**	0.389	**0.395**	0.283	**-0.367**	0.064
	(0.081)	(0.117)	(0.040)	(0.040)							
Italy	0.240	1.105	-0.041	-0.011	0.005						
	(0.062)	(0.077)	(0.065)	(0.055)							
Netherlands	0.005	1.180	0.308	-0.310	0.010	*Fixed exchange rate*					
	(0.112)	(0.123)	(0.123)	(0.107)							
Portugal	0.348	1.048	0.001	-0.075	0.007	Denmark	0.248	0.912	0.016	-0.069	0.007
	(0.075)	(0.102)	(0.059)	(0.050)			(0.060)	(0.095)	(0.086)	(0.083)	
Spain	0.472	1.122	-0.116	0.015	0.006						
	(0.074)	(0.079)	(0.050)	(0.037)							
Average	0.234	**1.032**	0.050	**-0.100**	0.015						

Table 3. Price adjustment equation (5) Annual data 1999-2023, prices in euros relative to Germany. Standard errors in parentheses.

Eurozone				*Floating currencies*			
	a_i	$p_{i,t-1} - p_{t-1}$	*st.e.*		a_i	$p_{i,t-1}-p_{t-1}$	*st.e.*
Austria	0.003 (0.010)	0.026 (0.318)	0.004	Iceland	-0.040 (0.010)	-0.397 (0.053)	0.126
Belgium	0.005 (0.010)	-0.125 (0.278)	0.010	Norway	-0.010 (0.010)	-0.002 (0.120)	0.051
Finland	0.002 (0.012)	-0.110 (0.494)	0.010	Sweden	-0.013 (0.009)	-0.062 (0.128)	0.046
France	0.000 (0.011)	0.073 (0.680)	0.007	Switzerland	0.026 (0.015)	-0.162 (0.104)	0.049
Greece	0.001 (0.008)	-0.103 (0.148)	0.016	UK	-0.020 (0.010)	-0.220 (0.089)	0.058
Ireland	-0.004 (0.013)	-0.070 (0.172)	0.016	**Average**	-0.011	-0.169	0.066
Italy	0.001 (0.008)	-0.145 (0.328)	0.007				
Netherlands	0.003 (0.007)	0.477 (0.162)	0.022	*Fixed exchange rate*			
Portugal	-0.001 (0.009)	-0.168 (0.245)	0.011	Denmark	-0.001 (0.008)	0.004 (0.464)	0.010
Spain	0.004 (0.008)	-0.156 (0.184)	0.010				
Average	0.001	-0.030	0.023				

5. Concluding thoughts

From the establishment of the European Coal and Steel Community in 1951, the founding fathers of the European single market dreamed of a frictionless common market in goods and services, labour and capital, which would generate lower prices, increased trade and higher rates of economic growth. They also believed that economic integration would promote political integration and make war between European States less likely.

The experience so far is mixed. The countries belonging to the European Union have enjoyed almost eight decades of peace. Student exchanges and a common labour market have contributed to increased understanding and acceptance of national differences. A war between member states is unthinkable. The common labour market has given millions the opportunity to improve their lot, and the integration of goods and service markets has increased trade and welfare, as can be said about capital market integration.

But while integration has certainly increased welfare, it has also caused political and economic upheaval at times. Political parties that oppose migration have challenged the vision of the Founding Fathers of the European project and threaten the status quo. Capital flows caused a financial crisis in the first decade of the century in some of the single-market countries, some within and others outside the eurozone. While macroprudential supervision and regulation and fiscal rules set by the European Union can help stave off future financial crises, immigration is more difficult to address. This is because of the clear economic benefits and the subjective nature of the opposition coming from people who feel that their culture, their way of life, is threatened by people who have different habits and customs.

The EU has created a common market and a common currency but not the common state functions that would operate to promote adjustment within a country, in particular a common fiscal policy, which is quite limited. The Founding Fathers hoped that it would develop into a Federal United States of Europe. This was often treated as an ambition to be like the US. It is sometimes forgotten how slowly the US Federal State developed. It took over a century and a quarter for the Federal Reserve to be established. The main function of the Federal Government in the early years was to fight wars. Checks and balances, particularly to protect states' rights, were embodied in the Constitution and it took a Civil War to clarify the extent of States' right. It may be that it will require wars to strengthen a common fiscal policy and central authority in the European Union, even to make a European State. That is certainly not a distant prospect at the time of this writing.

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Table A1. Country groupings

	Non-single market	Single market	Euro	Euro-north	Euro-south
Australia	X				
Austria		X	X	X	
Belgium		X	X	X	
Canada	X				
Chile	X				
Colombia	X				
Costa Rica	X				
Czechia		X			
Denmark		X			
Estonia					
Finland		X	X	X	
France		X	X	X	
Germany		X	X	X	
Greece		X	X		X
Hungary					
Iceland		X			
Ireland		X	X	X	
Israel	X				
Italy		X	X		X
Japan	X				
Korea, Rep.	X				
Latvia					
Lithuania					
Mexico	X				
Netherlands		X	X	X	
New Zealand	X				
Norway		X			
Poland					
Portugal		X	X		X
Slovak Republic					
Slovenia					
Spain		X	X		X
Sweden		X			
Switzerland		X			
United Kingdom	X	X			
United States	X				

Table A2. Estimation of FH equation using panel data (IV)

IV with FE							
	(All) GCF	(Single M,) GCF	(Non-SM) GCF	(SM, no euro) GCF	(eurozone) GCF	(euro, north) GCF	(euro, south) GCF
GDS	0.593***	0.589***	0.450***	0.364***	0.662***	0.566***	0.761***
	(7.52)	(7.10)	(3.98)	(2.98)	(5.85)	(3.45)	(6.18)
d9398	1.146	-0.600	0.961	-2.617	0.157	-3.800**	8.152***
	(0.56)	(-0.37)	(0.38)	(-1.16)	(0.05)	(-2.00)	(5.12)
d9907	8.694***	10.439***	3.525	5.509	14.174***	8.685***	9.619**
	(3.56)	(2.73)	(1.59)	(1.00)	(4.17)	(3.01)	(2.09)
d814	2.981*	0.957	5.489*	-2.501	1.904	-4.091	3.664
	(1.66)	(0.43)	(1.93)	(-1.10)	(0.69)	(-0.48)	(1.28)
d1519	0.269	-4.942*	7.320**	-1.407	-7.635*	-4.865	-3.820
	(0.09)	(-1.86)	(2.21)	(-0.89)	(-1.94)	(-0.44)	(-0.92)
d2022	4.730**	4.431	5.256**	5.220	3.195	12.419**	4.542
	(1.97)	(1.44)	(1.96)	(1.22)	(1.07)	(2.48)	(1.13)
gds9398	-0.116	-0.114	-0.016	-0.071	-0.130	0.031	-0.481***
	(-1.39)	(-1.56)	(-0.19)	(-0.69)	(-0.98)	(0.31)	(-7.25)
gds9907	-0.433***	-0.541***	-0.198**	-0.379*	-0.680***	-0.483***	-0.380*
	(-4.04)	(-3.52)	(-2.01)	(-1.91)	(-5.37)	(-5.17)	(-1.72)
gds814	-0.270***	-0.236**	-0.271**	-0.117	-0.249**	-0.010	-0.290**
	(-3.67)	(-2.49)	(-2.45)	(-1.10)	(-2.50)	(-0.03)	(-2.38)
gds1519	-0.161	0.021	-0.368***	-0.108	0.159	0.071	-0.049
	(-1.44)	(0.19)	(-2.93)	(-1.42)	(0.89)	(0.17)	(-0.26)
gds2022	-0.315***	-0.322***	-0.281***	-0.324**	-0.260**	-0.557***	-0.357**
	(-3.29)	(-2.70)	(-2.73)	(-2.28)	(-2.36)	(-3.10)	(-2.01)
_cons	9.686***	11.046***	12.071***	15.485***	11.063***	9.581**	8.442***
	(5.45)	(6.08)	(4.86)	(6.29)	(3.89)	(2.12)	(2.89)
Difference 60-92 and 93-98	-0.116	-0.114	-0.016	-0.071	-0.13	0.031	-0.481
Difference 93-98 and 99-07	-0.317	-0.427	-0.182	-0.308	-0.55	-0.514	0.101
Difference 99-07 and 08-14	0.163	0.305	-0.073	0.262	0.431	0.473	0.09
Difference 08-14 and 15-19	0.109	0.257	-0.097	0.009	0.408	0.081	0.241
Difference 15-19 and 20-22	-0.154	-0.343	0.087	-0.216	-0.419	-0.628	-0.308
Dif 93-98/60-92		-0.098		-0.055	-0.114	0.047	-0.465
Dif 99-07/93-98		-0.245		-0.126	-0.368	-0.332	0.283
Dif 08-14/99-07		0.378		0.335	0.504	0.546	0.163
Dif 15-19/08-14		0.354		0.106	0.505	0.178	0.338
Dif 20-22/15-19		-0.43		-0.303	-0.506	-0.715	-0.395
Number of Countries	36	17	12	5	11	7	4
Wald Test intercepts	15.71(0.00)	22.43(0.00)	8.43(0.08)	23.35(0.00)	142.1(0.00)	51.68(0.00)	113.2(0.00)
Wald Test slope	17.74(0.00)	20.05(0.00)	20.23(0.00)	11.47(0.02)	214.1(0.00)	32.10(0.00)	16.61(0.00)
N	1483	727	527	238	442	252	190
R^2	0.590	0.618	0.713	0.663	0.620	0.521	0.735

Table A3. Correlation of shocks measured by residuals from equation (4)

	Aut	Bel	Fin	Fra	Gre	Ire	Ita	Net	Por	Spa	Ice	Nor	Swe	Swi	UK	Den
Eurozone																
Austria		-0.11	0.15	0.41	-0.01	0.10	0.35	-0.15	0.60	0.09	0.18	-0.27	0.13	0.17	-0.02	-0.03
Belgium	-0.11		0.33	-0.12	0.32	-0.25	0.02	0.38	0.13	0.58	-0.04	0.47	0.29	0.35	-0.26	0.69
Finland	0.15	0.33		0.23	-0.03	-0.27	0.61	0.35	0.03	0.00	-0.04	0.34	0.27	0.36	-0.36	0.63
France	0.41	-0.12	0.23		0.32	0.02	0.57	-0.45	0.37	0.22	-0.27	0.01	0.07	0.00	-0.21	0.09
Greece	-0.01	0.32	-0.03	0.32		-0.49	0.32	-0.03	0.22	0.18	-0.09	0.10	-0.07	0.23	-0.38	0.52
Ireland	0.10	-0.25	-0.27	0.02	-0.49		-0.15	-0.13	0.09	-0.21	-0.16	-0.61	-0.39	-0.37	0.19	-0.40
Italy	0.35	0.02	0.61	0.57	0.32	-0.15		0.08	0.46	-0.05	0.09	0.01	0.05	0.33	-0.26	0.54
Netherlands	-0.15	0.38	0.35	-0.45	-0.03	-0.13	0.08		-0.14	0.14	0.25	0.10	0.04	0.18	0.04	0.46
Portugal	0.60	0.13	0.03	0.37	0.22	0.09	0.46	-0.14		0.06	0.16	0.00	0.31	0.42	0.19	0.14
Spain	0.09	0.58	0.00	0.22	0.18	-0.21	-0.05	0.14	0.06		-0.12	0.45	0.35	-0.09	-0.25	0.23
Average	0.16	0.14	0.16	0.17	0.09	-0.14	0.25	0.01	0.20	0.11	0.00	0.06	0.10	0.16	-0.13	0.29
	0.11										**0.08**					
Floating																
Iceland	0.18	-0.04	-0.04	-0.27	-0.09	-0.16	0.09	0.25	0.16	-0.12		0.04	0.10	0.24	0.33	-0.07
Norway	-0.27	0.47	0.34	0.01	0.10	-0.61	0.01	0.10	0.00	0.45	0.04		0.78	0.28	0.06	0.32
Sweden	0.13	0.29	0.27	0.07	-0.07	-0.39	0.05	0.04	0.31	0.35	0.10	0.78		0.40	0.27	0.20
Switzerland	0.17	0.35	0.36	0.00	0.23	-0.37	0.33	0.18	0.42	-0.09	0.24	0.28	0.40		0.26	0.55
UK	-0.02	-0.26	-0.36	-0.21	-0.38	0.19	-0.26	0.04	0.19	-0.25	0.33	0.06	0.27	0.26		-0.27
Average	**0.04**	**0.16**	**0.11**	**-0.08**	**-0.04**	**-0.27**	**0.04**	**0.12**	**0.22**	**0.07**	**0.18**	**0.29**	**0.39**	**0.30**	**0.23**	**0.14**
	0.04										**0.28**					
Fixed																
Denmark	-0.03	0.69	0.63	0.09	0.52	-0.40	0.54	0.46	0.14	0.23	-0.07	0.32	0.20	0.55	-0.27	