March 20, 2013

On the Persistence of Trade Imbalances:
Evidence from Europe*

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Abstract

Does exchange rate variability affect the speed of external adjustment? We study bilateral trade balances for a sample of 18 European countries over the period from 1948 through 2008. We find that, with the introduction of the euro, trade imbalances among euro area members widened considerably, even after allowing for permanent asymmetries in trade competitiveness within pairs of countries or in the overall trade competitiveness of individual countries. Intra-euro area imbalances also seem to have become more persistent with the introduction of the euro. Greater persistence is partially linked to economic and regulatory inflexibilities, such as fiscal restrictions and labor market rigidities.

I. Introduction

The association between exchange rate variability and the speed of current account adjustment is still a matter of much debate. In a now-classic article, Friedman (1953) famously claimed that flexible exchange rates allow the prompt and continuous change of relative prices and thereby facilitate rapid external adjustment. Empirical studies, in contrast, often find no robust relationship between the flexibility of the nominal exchange rate and the rate of current account reversion. In fact, Chinn and Wei (2013) even argue that Friedman's hypothesis is largely a matter of faith.

The determinants of current account positions and its dynamics are typically assessed in one of two ways. Most studies focus on a country's aggregate external balance, often measured as a fraction of overall economic activity (such as gross domestic product, or GDP). These papers typically examine large panel data sets to characterize the variation of the current account and current account adjustment across countries and over time. Examples include, among others, Chinn and Prasad (2003) and Freund (2005). Another set of papers analyzes the evolution of a single country's external position by trading partner. Examining patterns in bilateral trade, time-series techniques are applied to estimate structural supply and demand equations for exports and imports. Mann and Plück (2007) provide a recent application for the United States.

Both empirical approaches, however, are not without difficulties. The analysis of country aggregates has to deal with the problem that many determinants of a country's external position are bilateral in nature. For instance, our key variable of interest, exchange rate flexibility, is a (predominantly) pairwise feature whose effect may not be identified properly at the aggregate country level. Country-specific analyses, in contrast, may suffer from small sample size. More important, the empirical findings are often viewed as outcomes of a case study whose results cannot be easily generalized.

In this chapter, we extend the previous work in this area along two lines. First, we analyze imbalances in bilateral trade relationships. While there is no economic reason to assume that a bilateral trade relationship should necessarily be balanced, for many countries, the difference between the value of shipments to and from a particular partner has risen sizably in recent years. More notably, large bilateral imbalances appear to increasingly dominate some countries' overall trade balance, thereby raising considerable interest among

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policy-makers and a wider public. A prominent example is the trade deficit between the United States and China, which now accounts for almost half the US total trade deficit.

Second, following Berger and Nitsch (2010, 2011, 2013), we examine the formation of the European Economic and Monetary Union (EMU) as an experiment to study the effects of a fixed exchange rate regime on trade imbalances. With the adoption of a common currency, eleven European countries irrevocably fixed their bilateral exchange rates on January 1, 1999. In our analysis, we analyze the patterns of trade between a sample of eighteen European countries (some of which adopted the euro as their common currency in recent years) over the period from 1948 through 2008.

Previewing our main results, we find that trade imbalances—measured as the fraction of deficits and surpluses in total bilateral trade—have indeed widened considerably between euro-area member countries after the introduction of the euro. Moreover, since we control for various sets of country-specific and pairwise fixed effects, our analysis indicates that the larger imbalances are not (only) the result of enduring asymmetries in trade competitiveness between a given pair of countries or the consequence of changes in the institutional framework, financing conditions, or trends in the competitiveness of specific countries against all others. In addition, we establish that intra–euro area imbalances have become more persistent with the introduction of the euro. Interestingly, greater persistence is partially linked to economic and regulatory inflexibilities, such as fiscal restrictions and labor market rigidities.

The remainder of the chapter is organized as follows. Section 2 describes the empirical methodology and the data. The heart of the text is section 3, which presents the empirical results; we first examine the association between the exchange rate regime and trade imbalances and then analyze the persistence in trade patterns. Our findings are summarized in a brief concluding section, which also provides some policy conclusions.

II. Methodology and Data

Our variable of interest is the bilateral trade balance between a reporter country r and a partner country p, defined as the difference between r's exports to p and r's imports from p in a given year t. To account for differences in the importance of a trade relationship both across

partners and over time, we normalize the trade surplus or deficit by the total value of bilateral trade:[1]

(1) $\text{TradeBalance}_{rpt} = (\text{Exports}_{rpt} - \text{Imports}_{rpt}) / (\text{Exports}_{rpt} + \text{Imports}_{rpt})$.

Initially, we are interested in the effect of EMU or euro-area membership on bilateral trade imbalances; see also Berger and Nitsch (2010, 2011, 2013). To that end, we estimate variants of the regression as follows:

(2) $|\text{TradeBalance}_{rpt}| =$
$\alpha + \beta\, \text{EMU}_{rpt}\, \{+ \Sigma_t\, \phi_t\, T_t\}\, \{+ \Sigma_{rp}\, \phi_{rp}\, RP_{rp}\}\, \{+ \Sigma_{rt}\, \phi_{rt}\, R_{rt}\}\, \{+ \Sigma_{pt}\, \phi_{pt}\, P_{pt}\} + \varepsilon_{rpt}$,

where the regressand is the absolute value of the normalized trade balance; EMU is a dummy variable that takes the value of 1 if both trade partners are members of the euro area at time t and zero otherwise; and ε is the disturbance term. We also include various combinations of fixed effects. In our baseline specification, we use common time fixed effects {T} to control for joint variations in trade imbalances over time. We also allow pairwise imbalances to deviate consistently from the sample average by adding pair-specific fixed effects {RP}. Finally, we replace the common time effects by country time-fixed effects for both reporter {R} and partner {P} countries to capture any dynamic country-specific features that could affect the countries' overall trade position, including changes in the institutional environment, trends in country-specific competitiveness, or changes in the ease with which trade imbalances can be financed.[2] Given the comprehensiveness of the set of fixed effects, this constitutes a fairly strong test of the hypothesis that euro-area membership will influence the level of trade imbalances.

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[1] Given our interest in the symmetry of trade relations, normalizing by total trade is the natural choice (rather than, for instance, normalizing by country size). Larger magnitudes of the variable of interest indicate greater imbalances in bilateral trade.

[2] Examples for changing institutional arrangements captured by time fixed effects include the country-specific effects of the "Single Market" initiative and pre-EMU exchange rate arrangements. Arguably, the introduction of the euro has eased the financing of trade deficits through tighter financial integration, and for some countries, through the decline of real interest rates. Time fixed effects will also capture any systematic decline in (real) exchange rate volatility.

Our main focus, however, is on the persistence of trade imbalances. In particular, we aim to identify country-specific features that affect the speed of adjustment of bilateral trade imbalances; these features may potentially include the exchange rate regime, such as EMU membership. Our regressions take the following general form:

(3) $|\text{TradeBalance}_{rpt}| = \alpha + \beta\ |\text{TradeBalance}_{rpt\text{-}1}| + \gamma\ Z_{rpt} + \delta\ Z_{rpt} \times |\text{TradeBalance}_{rpt\text{-}1}|$

$\{+ \Sigma_t\ \phi_t\ T_t\}\ \{+ \Sigma_{rp}\ \phi_{rp}\ RP_{rp}\}\ \{+ \Sigma_{rt}\ \phi_{rt}\ R_{rt}\}\ \{+ \Sigma_{pt}\ \phi_{pt}\ P_{pt}\} + \varepsilon_{rpt}$,

where Z is the variable of interest, such as a dummy variable for joint membership in the euro area. For variables other than the exchange rate regime, measures are typically entered as the pairwise average of values of the reporter and partner country.

In line with previous work on the effects of EMU on trade (Berger and Nitsch, 2008), our analysis focuses on a homogeneous set of eighteen European countries. The approach has the advantage of including countries that either share the institutional framework of the European Union or are closely associated with it. The sample comprises the fifteen countries that were members of the European Union at the time of the introduction of the euro (eleven of which adopted the currency from the beginning, followed by Greece in 2001), plus Iceland, Norway, and Switzerland. We analyze the period from 1948 to 2008.

Our key source of data is the *Direction of Trade Statistics* from the International Monetary Fund (IMF), from which we obtained nominal values of bilateral exports and imports on an annual basis. Because country *r*'s trade balance with *p* is typically not identical to *p*'s inversely signed trade balance with *r* (e.g., because of different statistical valuation methods for exports and imports), we analyze the full sample of bilateral imbalances.[3] Our trade data set is augmented with macroeconomic variables from the IMF's *International Financial Statistics* and the World Bank's *World Development Indicators*. Institutional variables are taken from the Organisation of Economic Cooperation and Development (OECD). Variables and sources are described in detail in the appendix to this chapter.

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[3] Restricting the sample to only one observation per country pair requires a decision on which observation to analyze and which to ignore. In our sensitivity analysis, we experimented with a number of approaches and found most results to be reasonably robust. For example, including only one observation per country pair while dropping any observations where pairwise balances differ by more than 10 percentage points between the two reporting countries delivers results quite similar to those tabulated below.

III. Empirical Results

Figure 1 graphs the evolution of absolute trade imbalances in our sample over time. Two observations stand out. First, the sample average trade imbalance consistently exceeds the median imbalance, indicating that the distribution could be dominated by a few disproportionately large imbalances between country pairs. Indeed, some bilateral trade relationships are characterized by one-directional trade flows and, thus, high imbalances, especially for small countries such as Iceland, Ireland, and Greece.[4] Second, median and mean imbalances display the same U-shaped pattern over time. There were relatively large bilateral trade imbalances in the Bretton Woods era (after the end of World War II until the early 1970s), followed by a period of moderate imbalances in the 1970s and 1980s and a renewed increase in imbalances since the mid-1990s. Taken at face value, this pattern is consistent with the hypothesis that a fixed exchange rate regime is associated with larger trade imbalances.

To illustrate this issue in more detail, Figure 2 shows the trade balances of various groups of countries over the same period. Specifically, we distinguish between trade relationships for which exchange rates were fixed with the introduction of the euro (intra-EMU trade) and trade pairs for which nominal exchange rates remained flexible (i.e., trade between EMU countries and non-members as well as trade between nonmembers). Interestingly, the U-shaped pattern applies most strongly to trade between EMU member countries, while trade between nonmembers displays no clear tendency over time. Trade imbalances between EMU member countries and non-members show a similar but less pronounced U-shape. A possible explanation is that the external value of the euro, while flexible for the euro area as a whole, cannot adjust to individual (and possibly opposing) member country needs.

Regression analysis confirms the association between the exchange rate regime and trade imbalances. Table 1 presents the benchmark estimation results. We begin with the most parsimonious specification of equation (2), a regression of the absolute value of bilateral trade imbalances on an EMU membership dummy and a comprehensive set of year fixed effects. As shown in the first column of the table, the estimated β coefficient on the EMU variable is

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[4] The introduction of fixed country-pair effects will limit the possible effect of outliers on our econometric results below.

positive, and with a t-statistic of 2.1, significantly different from zero at the 5 percent level; the point estimate of about 0.018 implies that trade imbalances between euro-area member countries average about 2 percentage points larger than for the rest of the sample. In the next column, we add a comprehensive set of pairwise fixed effects to our specification, so the EMU coefficient now captures only the time variation in the trade imbalance for EMU member countries after the adoption of the euro. The estimated coefficient not only remains positive and significant, but almost doubles in magnitude, reaching 0.033. This suggests that euro-area member countries have experienced an increase in their bilateral trade imbalances with other euro-area members by an average of more than 3 percentage points since the adoption of the common currency, which appears large compared to a sample mean of about 0.3. Controlling instead for time-variant country-specific features in the reporter and partner country leaves the estimation result basically unchanged. As shown in column 3, the estimated effect of euro-area membership on trade imbalances remains positive, statistically highly significant, and economically sizable.

The final three columns of Table 1 further generalize these results. The regressions add a dummy variable for the presence of a fixed (or unchanged) exchange rate between two countries other than euro area membership, along with the p-value of a t-test for similarity of the estimated coefficients. While the estimates of the EMU effect on trade imbalances are unaffected by this extension, the coefficients on the variable for other fixed exchange rates vary strongly across specifications. The estimated coefficient is positive and significant when only common time fixed effects are included, possibly reflecting some large imbalances in the immediate post–World War II period. After controlling for pairwise fixed effects, however, the coefficient falls in magnitude and becomes statistically indistinguishable from zero; it even changes sign (but remains insignificant) for the specification with country time fixed effects. This finding seems to be generally in line with observations that the effect of currency union membership on trade differs from the effect of fixed exchange rates on trade; see, for instance, Rose (2000).

Our main interest, however, is in the persistence of trade account imbalances—that is, the speed with which imbalances revert to equilibrium after a shock. Again, we begin our analysis with some graphical evidence. Figure 3 shows the AR(1) coefficient from a simple autoregression of the trade balance, estimated over rolling five-year windows. While there is a general trend towards greater persistence over the sample period, the speed of adjustment

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appears to become faster (and the autoregressive coefficients decrease in magnitude) during episodes of flexible exchange rates. More important, there are again notable differences in the adjustment patterns across groups of countries. As shown in Figure 4, trade imbalances among EMU member countries have become highly persistent since the late 1980s.

To provide accompanying estimation results, we follow Chinn and Wei (2013) and apply two regression approaches to determine the effect of exchange rate invariability on trade. First, we stratify the sample by exchange rate regime and estimate separate regressions by regime. Second, we interact the lagged dependent variable with the variable of interest (which initially is membership in the euro area).

A first set of regression results is reported in Table 2. The table contains information on separate regressions for different groups of countries under EMU, with increasing degrees of exchange rate flexibility when moving from left to right, as well as a regression for the EMU member countries before the introduction of the euro. Moreover, each row in the table tabulates the results from a different estimation specification so that, in total, coefficient estimates from twelve separate regressions are reported.

We begin with the most parsimonious specification of an autoregression of order 1, allowing for year-specific intercepts only.[5] For this specification, the degree of persistence for trade between countries that use the euro as their national currency is 0.962, as shown in the first column of the table. More important, persistence appears to decline gradually for trade between country pairs with more flexible exchange rate regimes; the point estimates fall to 0.939 for pairwise trade involving currencies other than the euro. In contrast, there is no evidence of an increase in trade persistence among EMU member countries after the adoption of the euro. If anything, the degree of persistence has been even slightly higher in the decade before the introduction of the common currency, possibly reflecting already-low exchange rate variability.

Reassuringly, the key findings turn out to be generally robust across various panel estimators. The differences in the speed of trade account adjustment between groups of country pairs become even more pronounced for more demanding specifications with country-specific and pairwise fixed effects. In intra-European trade after the introduction of

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[5] The inclusion of higher-order autoregressive terms provides no further insights.

the euro, trade imbalances between countries that still use their own national currency seem to be the least persistent.

To further explore differences in trade persistence between pairs of countries that operate under different exchange rate regimes, we also present results from a more comprehensive estimation approach. Table 3 reports estimates for the full sample when the lagged dependent variable is interacted with a fixed exchange rate dummy variable. To economize on space, only results for the most demanding regression specification are reported, which includes comprehensive sets of time-varying exporter and importer fixed effects to take account of any factor that is specific to a particular country in a given year, as well as a comprehensive set of dyadic-specific fixed effects to absorb any time-invariant characteristics that are common to a pair of countries.

Again, we find strong evidence of persistence; the autoregressive coefficient is about 0.68 and highly statistically significant. More important, the degree of persistence is much higher for EMU countries. When the lagged dependent variable is interacted with EMU membership, the estimated coefficient is positive, statistically highly significant, and economically large. Taken at face value, the degree of persistence in intra–euro area imbalances is about 25 percent higher than elsewhere, implying an autoregressive coefficient of about 0.83 for EMU members. Indeed, with this extension, the coefficient on the noninteracted EMU dummy becomes significantly negative, suggesting that the disproportionately large bilateral trade imbalances under EMU are linked to a greater persistence of these imbalances between euro-area member countries.[6] An interesting fact is that this result does not extend to other episodes of fixed exchange rates, as shown in column 2 of table 3. In line with Chinn and Wei (2013), a fixed exchange rate does not increase persistence automatically, a finding that we further explore below. Finally, the remainder of the table reports analogous estimation results for regressions in which the absolute value of the trade imbalance is replaced by the trade surplus and deficit as dependent variable.

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[6] Higher persistence means that trade balance shocks will linger longer and can accumulate, among other possible effects. In a regression with only a lagged endogenous variable and the EMU dummy, the latter is rendered insignificant (not reported).

Next, we examine the effect of other inflexibilities on the persistence in bilateral trade patterns. We begin with two measures that roughly describe the economic environment for any pair of countries: average economic growth and aggregate fiscal position. Berger and Nitsch (2010) find that countries with relatively strong growth, a relatively low volatility of the national business cycle, and relatively higher fiscal deficits exhibit systematically lower trade surpluses than others. We examine the effect of these factors on trade persistence in the simplest possible way.

As before, we begin by estimating variants of equation (3) for samples stratified by exchange rate regime. Table 4 presents the results. In the upper part of the table, we analyze the effect of economic growth on the degree of trade persistence. Not surprisingly, the autoregressive parameter is again positive, economically large, and statistically significant, providing strong evidence of persistence in pairwise trade imbalances. Similarly, the positive coefficient on the pairwise average of GDP growth indicates that fast-growing country pairs tend to exhibit relatively large imbalances, although the coefficient is not always significantly different from zero. The key variable of interest, however, is the interaction term. Under EMU, the estimated coefficient on this variable takes a negative and statistically significant value, implying that country pairs with anemic growth tend to experience more persistent trade imbalances. No similar pattern is observed for country pairs operating under different exchange rate regimes, including the episode of EMU countries before the adoption of the euro. As a result, economic conditions appear to matter strongly for the speed of trade account adjustment under a fixed exchange rate.

The lower part of table 4 presents analogous results for the effect of the average fiscal position of a country pair on bilateral trade persistence. While aggregate fiscal policies have, at best, only a moderate effect on the level of pairwise trade imbalances, trade surpluses and deficits become relatively more persistent for country pairs in the euro area with large budget deficits. While the estimated coefficient on the interaction term is consistently negative across samples, under EMU, the point estimate is different from zero at a conventional level of statistical significance. In sum, the results strongly indicate that some of the greater persistence of trade imbalances for euro-area member countries can be linked to general economic conditions.

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Our findings are broadly confirmed when the full sample is analyzed. Table 5 contains the results. Again, we tabulate only the results for the specification with full sets of exporter, importer, and dyadic fixed effects. The main difference between these results and our default model in table 3, however, is that the key variable of interest is now the coefficient on the triple interaction term. The coefficient captures the extent to which persistence in the euro area is affected by economic variables. While the results on GDP growth are inconsistent across specifications, the coefficient on the pairwise budgetary position is significantly negative, indicating that trade imbalances have become significantly more persistent for EMU member countries with large fiscal deficits after the introduction of the euro.

In another perturbation, we replace economic measures with institutional variables. More specifically, we examine the effect that rigidities of labor and product markets have on trade persistence. Berger and Nitsch (2010, 2011) find that external imbalances are affected by measures representing the regulation of adjustment, especially for country pairs that use the same currency. Figure 5 provides some graphical illustration for the pairwise differences in employment protection and product market regulation.

Table 6 is an analogue to table 4 for these institutional measures. Apart from the autoregressive parameters (which are always economically and statistically significant), few estimated coefficients differ from zero. Most notably, however, there is a strong positive effect of employment protection on the degree of persistence of trade imbalances for EMU member countries, an effect that is not observed for other exchange rate regimes.

Similar findings are obtained when we analyze the full sample and report the results in table 7. The key finding of these regressions is that higher levels of employment protection tend to be associated with greater persistence of trade imbalances among euro-area countries. Based on the results from the fully specified model in column 3, the autoregressive coefficient increases by about 0.09 for each unit increase in the pairwise average of the OECD employment regulation measure (that ranges from 1 to 6). In summary, our results indicate that after adoption of the euro, euro-area member countries with more rigid labor market institutions exhibited statistically and economically significantly lower rates of reversion in their trade account imbalances. For instance, a reduction of employment protection levels from the sample mean of 2.4 to the sample low of 0.8 would reduce persistence by about 0.15,

all other things being equal. This difference is equivalent to the deviation of the degree of persistence among EMU countries from the sample average.

IV. Conclusions

In this chapter, we explored evidence from the introduction of the euro to identify the effect of (irrevocably) fixed nominal exchange rates on the magnitude and persistence of trade imbalances. Specifically, we examined the evolution of bilateral trade imbalances between euro-area member countries compared to pairwise balances for countries with (in principle) flexible exchange rates. Although bilateral trade relationships need not necessarily be balanced, the emergence of large and persistent trade imbalances between a pair of countries may reflect underlying policy tensions or rigidities, most notably the absence of nominal exchange rate flexibility.

We provided consistent evidence that imbalances in trade among euro-area member countries have indeed both widened markedly and become more persistent after the introduction of the common currency. Fixed nominal exchange rates appear to lengthen the impact of shocks on external accounts.

In addition, we examined the effects of inflexibilities other than exchange rate invariability. For instance, the lack of an adjustable nominal exchange rate supposedly poses a particular problem for pairs of countries that also operate a single and unrestricted market for goods and services, such as the euro area. In this case, the permanently fixed nominal exchange rate forces real exchange rate adjustment through relative price levels alone, which can be difficult in the presence of rigidities in national goods and labor markets.

Our results strongly confirmed that economic conditions, as well as policy and market institutions, affect the speed of external adjustment, particularly when the nominal exchange rate is fixed. Trade imbalances tend to be less persistent for country pairs with relatively high economic growth rates and prudent fiscal policies. Also, country pairs with higher average levels of employment protection tend to display long-lasting trade imbalances.

In line with our previous findings in Berger and Nitsch (2010, 2011, 2013), our results imply both bad and good news for policymakers. The bad news is that irrevocably fixed nominal exchange rates come at the cost of larger and more permanent trade imbalances, just

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as Friedman (1953) claimed more than half a century ago. The good news is that these imbalances are not completely unavoidable. With a fixed exchange rate, the more flexible the national labor and product markets are, trade imbalances are all the smaller and their adjustment to shocks all the faster.

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Figure 1: Bilateral Trade Imbalances over Time
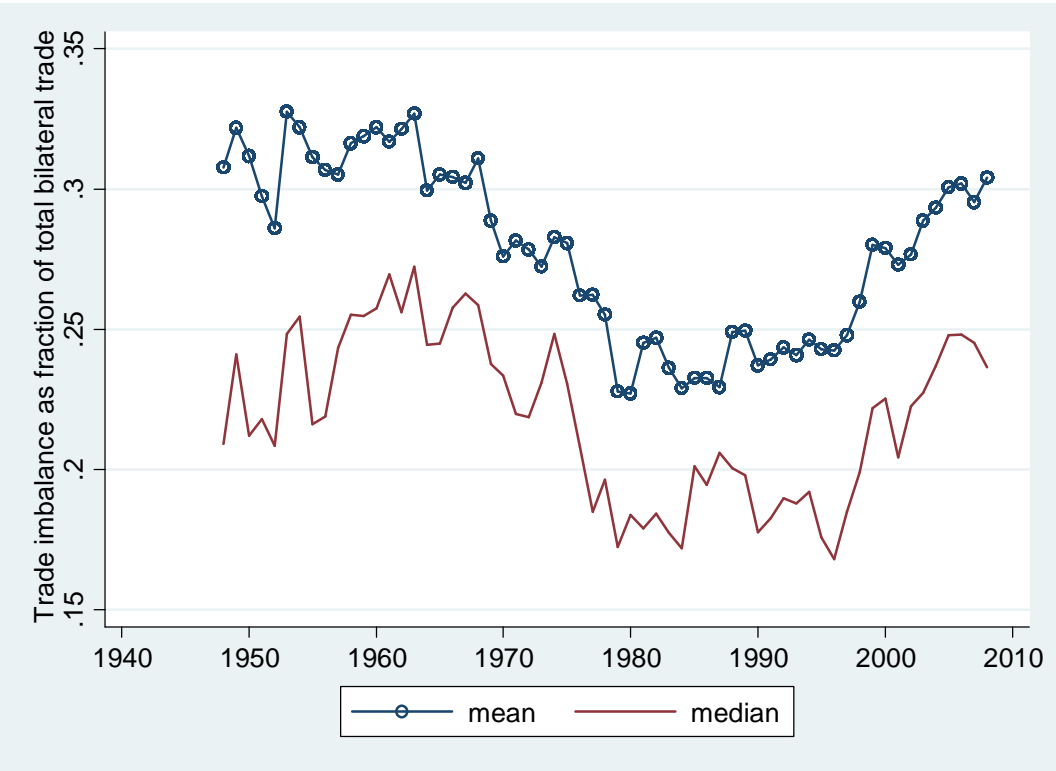
Notes: The figure graphs the absolute difference between a country's exports and imports with a partner as a fraction of total bilateral trade (exports plus imports) for a sample of 18 European countries. Data are taken from the IMF's Direction of Trade Statistics.

Figure 2: Bilateral Trade Imbalances by Group of Country Pairs
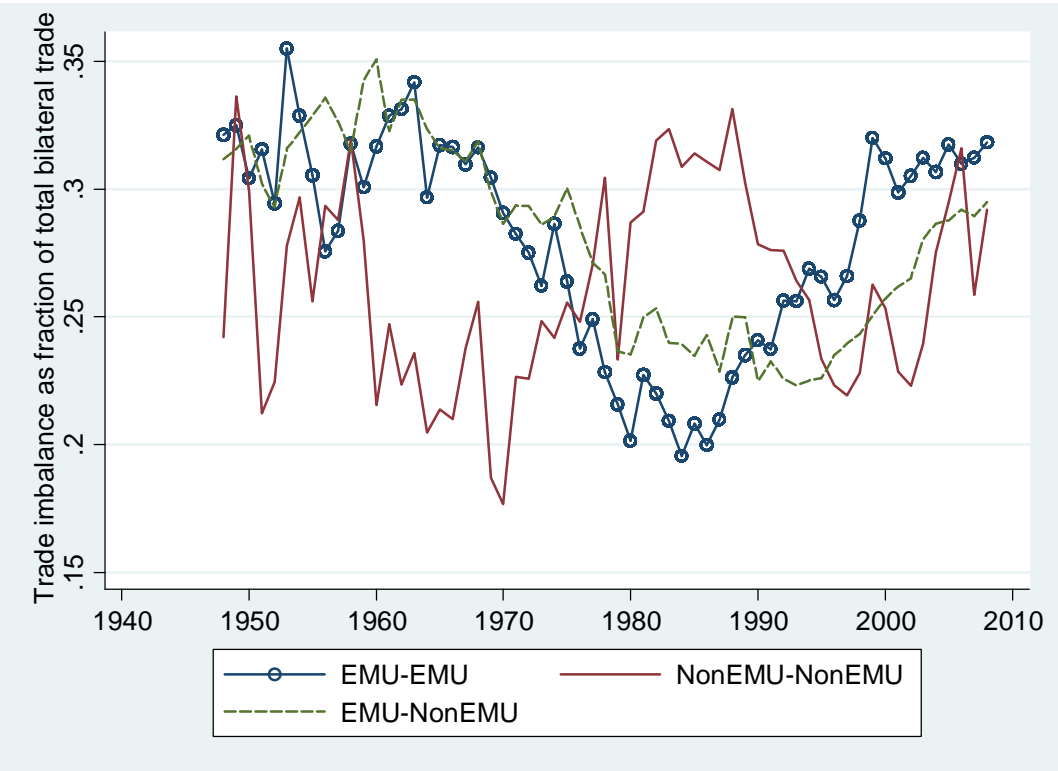
Notes: The figure graphs the average absolute difference between a country's exports and imports with a partner as a fraction of total bilateral trade (exports plus imports) for various groups of country pairs. Data are taken from the IMF's Direction of Trade Statistics.

Figure 3: Persistence of Bilateral Trade Imbalances over Time

Notes: The figure graphs the estimated AR(1) coefficients for the absolute difference between a country's exports and imports with a partner as a fraction of total bilateral trade (exports plus imports) over rolling 5-year windows. Data are taken from the IMF's Direction of Trade Statistics.

Figure 4: Persistence of Bilateral Trade Imbalances by Group of Country Pairs

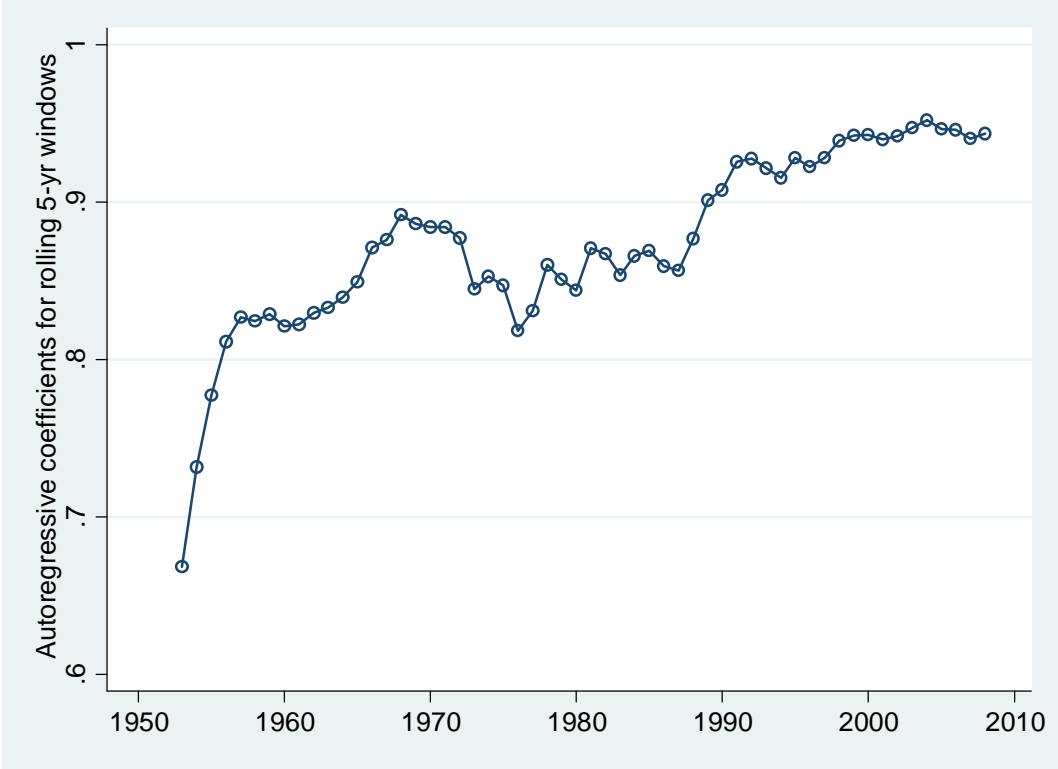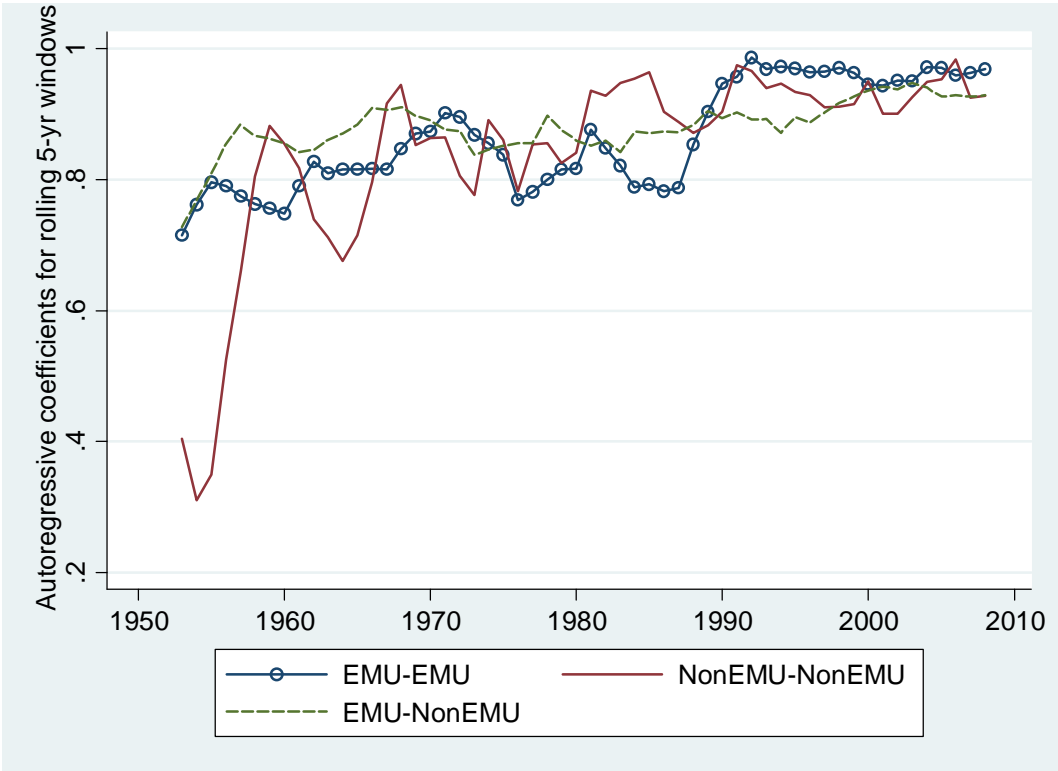Notes: The figures graph the estimated AR(1) coefficients for the absolute difference between a country's exports and imports with a partner as a fraction of total bilateral trade (exports plus imports) over rolling 5-year windows for various groups of country pairs. Data are taken from the IMF's Direction of Trade Statistics.

Figure 5: Trade Imbalances and Regulation

Employment protection
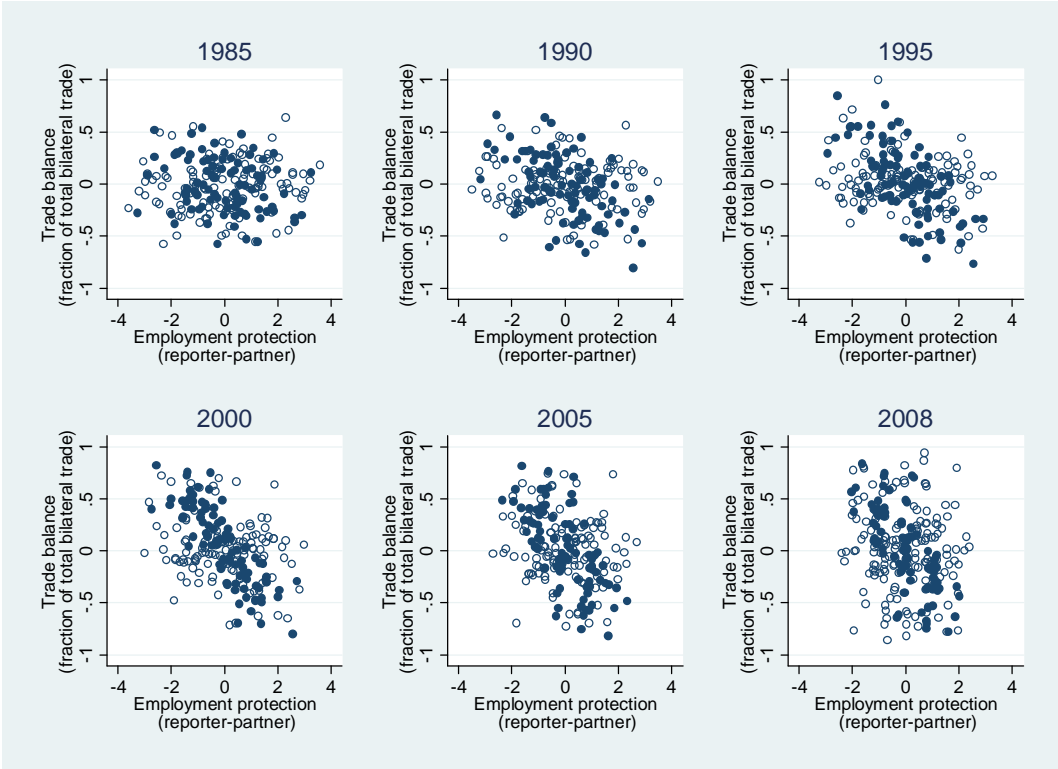
Product market regulation

Notes: Filled circles mark country pairs where both partners are/become EMU members.

Table 1: Trade Imbalances under Fixed Exchange Rate Regimes

EMU	0.018* (0.009)	0.033** (0.007)	0.035** (0.015)	0.020* (0.009)	0.032** (0.007)	0.035* (0.016)
Other fixed exchange rate				0.050** (0.007)	0.013** (0.005)	-0.001 (0.007)
Common time fixed effects?	Yes	Yes	No	Yes	Yes	No
Pairwise fixed effects?	No	Yes	Yes	No	Yes	Yes
Country time fixed effects?	No	No	Yes	No	No	Yes
Number of observations	16,491	16,491	16,491	15,965	15,965	15,965
Adj. R^2	0.02	0.53	0.63	0.02	0.53	0.64
P-value: EMU=Other fixed				0.008	0.028	0.034

Notes: OLS regression. Dependent variable is the absolute trade imbalance as a fraction of total bilateral trade. Robust standard errors are reported in parentheses. **, * and # denote significant at the 1%, 5% and 10% level, respectively.

Table 2: Persistence of Trade Imbalances by Group of Country Pairs

Sample	EMU	Outside EMU	No EMU country	EMU
Period	**1999-2008**	**1999-2008**	**1999-2008**	**1989-1998**
	Time fixed effects			
Lagged trade imbalance	0.962 (0.008)	0.939 (0.011)	0.936 (0.028)	0.971 (0.011)
Adj. R^2	0.92	0.85	0.82	0.89
	Time and pairwise fixed effects			
Lagged trade imbalance	0.583 (0.038)	0.436 (0.041)	0.358 (0.102)	0.602 (0.041)
Adj. R^2	0.93	0.88	0.87	0.91
	Pairwise and time-varying country fixed effects			
Lagged trade imbalance	0.578 (0.042)	0.440 (0.042)	0.368 (0.105)	0.604 (0.041)
Adj. R^2	0.93	0.88	0.86	0.91
Number of observations	1,060	1,660	300	1,100

Notes: OLS regression. Dependent variable is the absolute trade imbalance as a fraction of total bilateral trade. Robust standard errors are reported in parentheses. All coefficients are significant at the 1% level.

Table 3: Persistence of Trade Imbalances by Exchange Rate Regime

	Imbalance		Surplus/Deficit	
Lagged trade imbalance	0.675** (0.009)	0.677** (0.010)	0.734** (0.013)	0.735** (0.013)
Lagged trade imbalance × EMU	0.159** (0.018)	0.171** (0.019)	0.076** (0.017)	0.077** (0.017)
EMU	-0.040** (0.010)	-0.044** (0.010)		
Lagged trade imbalance × Other fixed exch. rate		-0.020 (0.016)		-0.017 (0.014)
Other fixed exch. rate		0.012# (0.006)		
Number of observations	16,194	15,932	16,194	15,932
Adj. R^2	0.81	0.81	0.89	0.89

Notes: OLS regression. Dependent variable is listed on the top of each column. Robust standard errors are reported in parentheses. ** and # denote significant at the 1% and 10% level, respectively. Country specific time and country-pair fixed effects are included but not reported.

Table 4: Economic Environment and Persistence by Group of Country Pairs

Sample	EMU	Outside EMU	No EMU country	EMU
Period	**1999-2008**	**1999-2008**	**1999-2008**	**1989-1998**
Lagged trade imbalance	1.002** (0.016)	0.938** (0.022)	0.865** (0.046)	0.980** (0.019)
Lagged trade imbalance × Average real GDP growth	-0.016* (0.007)	-0.004 (0.008)	0.015 (0.013)	-0.005 (0.006)
Average real GDP growth	0.008# (0.004)	0.010** (0.003)	0.023# (0.012)	0.003 (0.003)
Number of observations	1,060	1,660	300	1,080
Adj. R^2	0.92	0.86	0.83	0.89

Sample	EMU	Outside EMU	No EMU country	EMU
Period	**1999-2008**	**1999-2008**	**1999-2008**	**1989-1998**
Lagged trade imbalance	0.914** (0.016)	0.948** (0.010)	0.985** (0.030)	0.961 (0.027)
Lagged trade imbalance × Average budget balance (% GDP)	-0.022** (0.006)	-0.009# (0.005)	-0.015 (0.013)	-0.001 (0.005)
Average budget balance (% GDP)	0.003 (0.002)	0.004* (0.002)	0.004 (0.004)	-0.002 (0.002)
Number of observations	864	1,536	300	900
Adj. R^2	0.91	0.86	0.82	0.90

Notes: OLS regression. Dependent variable is the absolute trade imbalance as a fraction of total bilateral trade. Robust standard errors are reported in parentheses. **, * and # denote significant at the 1%, 5% and 10% level, respectively. Common time fixed effects are always included, but not reported.

Table 5: Economic Environment and Persistence of Trade Imbalances

Lagged trade imbalance	0.755** (0.012)	0.749** (0.012)	0.740** (0.013)	0.717** (0.013)	0.712** (0.013)	0.710** (0.014)
Lagged trade imbalance × Average real GDP growth	-0.003 (0.003)	-0.004 (0.003)	-0.002 (0.003)			
Average real GDP growth	0.003* (0.001)	0.002* (0.001)	0.002* (0.001)			
Lagged trade imbalance × Average real GDP growth × EMU		0.015** (0.002)	-0.006 (0.004)			
Lagged trade imbalance × Average budget balance (% GDP)				0.002 (0.003)	0.003 (0.003)	0.002 (0.003)
Average budget balance (% GDP)				0.003** (0.001)	0.003** (0.001)	0.003** (0.001)
Lagged trade imbalance × Average budget balance (% GDP) × EMU					-0.016** (0.003)	-0.014** (0.004)
Lagged trade imbalance × EMU			0.112** (0.018)			0.026 (0.019)
EMU			-0.012* (0.006)			-0.011 (0.007)
Number of observations	12,292	12,292	12,292	7,406	7,406	7,406
Adj. R^2	0.83	0.83	0.81	0.85	0.85	0.85

Notes: OLS regression. Dependent variable is the absolute trade imbalance as a fraction of total bilateral trade. Robust standard errors are reported in parentheses. Year-specific reporter and partner fixed effects and time-invariant pairwise fixed effects are always included, but not reported.

Table 6: Regulatory Environment and Persistence by Group of Country Pairs

Sample	EMU	Outside EMU	No EMU country	EMU
Period	**1999-2008**	**1999-2008**	**1999-2008**	**1989-1998**
Lagged trade imbalance	0.796** (0.073)	1.000** (0.011)	1.842** (0.463)	0.930** (0.062)
Lagged trade imbalance × Average employment protection	0.034* (0.015)	-0.014 (0.010)	-0.271# (0.143)	0.007 (0.010)
Average employment protection	-0.006 (0.005)	0.006# (0.004)	0.035# (0.021)	-0.003 (0.004)
Number of observations	864	1,266	210	900
Adj. R²	0.91	0.86	0.81	0.90

Sample	EMU	Outside EMU	No EMU country	EMU
Period	**1999-2008**	**1999-2008**	**1999-2008**	**1989-1998**
Lagged trade imbalance	1.083** (0.117)	0.944** (0.111)	0.599* (0.283)	0.755** (0.011)
Lagged trade imbalance × Average product market regulation	-0.043 (0.034)	0.012 (0.042)	0.165 (0.116)	0.041 (0.055)
Average product market regulation	0.031# (0.018)	0.011 (0.026)	-0.058# (0.021)	-0.006 (0.022)
Number of observations	180	300	60	90
Adj. R²	0.92	0.88	0.91	0.90

Notes: OLS regression. Dependent variable is the absolute trade imbalance as a fraction of total bilateral trade. Robust standard errors are reported in parentheses. **, * and # denote significant at the 1%, 5% and 10% level, respectively. Common time fixed effects are always included, but not reported.

Table 7: Regulatory Environment and Persistence of Trade Imbalances

Lagged trade imbalance	0.756** (0.046)	0.746** (0.046)	0.761** (0.046)	0.643** (0.100)	0.658** (0.103)	0.606** (0.114)
Lagged trade imbalance × Average employment protection	-0.029 (0.018)	-0.027 (0.017)	-0.034# (0.018)			
Average employment protection	0.100** (0.017)	0.100** (0.013)	0.054** (0.013)			
Lagged trade imbalance × Average employment protection × EMU		0.012# (0.007)	0.088** (0.024)			
Lagged trade imbalance × Average product market regulation				0.000 (0.057)	-0.004 (0.057)	0.020 (0.061)
Average product market regulation				-0.127 (0.144)	0.227** (0.082)	0.319* (0.125)
Lagged trade imbalance × Average product market regulation × EMU					-0.020 (0.028)	-0.115 (0.101)
Lagged trade imbalance × EMU			-0.171** (0.060)			0.199 (0.180)
EMU			-0.021# (0.011)			-0.028 (0.031)
Number of observations	5,059	5,059	5,059	720	720	720
Adj. R²	0.90	0.90	0.91	0.94	0.94	0.95

Notes: OLS regression. Dependent variable is the absolute trade imbalance as a fraction of total bilateral trade. Robust standard errors are reported in parentheses. Year-specific reporter and partner fixed effects and time-invariant pairwise fixed effects are always included, but not reported.

Appendix: Data Description

Variable	Description	Source	Period
Trade balance	(Exports-Imports)/ (Exports+Imports)	IMF Direction of Trade Statistics	1948-2008
EMU	Dummy for common membership in euro area (time-variant)		1948-2008
Other fixed exchange rate	Dummy for exchange rate volatility < 0.1 in a given year		1948-2008
Real GDP growth	Real GDP growth	IMF International Financial Statistics	1948-2008
Real GDP growth volatility	Standard deviation of real GDP growth over period of 4 years before and after a given year	IMF International Financial Statistics	1948-2008
Budget balance (% GDP)	General government balance/GDP	IMF International Financial Statistics	1960-2008
Employment protection	Strictness of employment protection	OECD	1985-2008
Regular employment	Sub-indicator for dismissal of employees on regular contracts	OECD	1985-2008
Temporary employment	Sub-indicator for strictness of regulation on temporary contracts	OECD	1985-2008
Collective dismissal	Sub-indicator for additional regulation of collective dismissal	OECD	1998-2008
Product market regulation	Product market regulation	OECD	1998, 2003, 2008
Administrative regulation	Sub-indicator for administrative regulation	OECD	1998, 2003, 2008
Domestic economic regulation	Sub-indicator for domestic economic regulation	OECD	1998, 2003, 2008
State control	Sub-indicator for state control	OECD	1998, 2003, 2008
Barriers to entrepreneurship	Sub-indicator for barriers to entrepreneurship	OECD	1998, 2003, 2008
Barriers to trade & investment	Sub-indicator for barriers to trade and investment	OECD	1998, 2003, 2008