

IMF Working Paper

Euro Area Export Performance and Competitiveness

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Strategy, Policy and Review Department

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June 2011

Abstract

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Concerns about export growth within the euro area peripheral countries due to a lack of competitiveness within the euro area are a key policy issue. Our analysis suggests that: (i) Long-term price elasticities for intra-euro area exports are at least double those for extra-euro area exports, so traditional real effective exchange rate indexes may overstate the effectiveness of euro depreciation in restoring exports growth in the euro area periphery and; (ii) There are surprisingly wide divergences across alternative relative price measures and even when relative price data suggest a steady loss in intra- (and extra-) euro area competitiveness, the pace of deterioration depends on the measure of relative prices used.

JEL Classification Numbers: E31, E60, F14, F31, F32

Keywords: Exports, Competitiveness, Trade equations, Euro area

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¹ We would like to thank seminar participants at the IMF for comments and Emmanuel Hife for excellent research assistance.

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I. INTRODUCTION

1. Concerns about export growth within the euro area peripheral countries due to a lack of competitiveness within the euro area are a key policy issue.² The narrative about the lack of competitiveness generally goes as follows: the fall in borrowing costs on entry into the euro area led to unsustainable booms in borrowing and domestic demand in these countries, fueling inflation and raising relative prices within the currency union. Restoring competitiveness through domestic cost compression within the euro area will be difficult given disinflationary pressures from the recession, and will further exacerbate adverse debt dynamics by limiting nominal GDP growth over coming years.

2. This note explores these issues by: (1) *examining a range of indicators of intra- and extra-euro area competitiveness*, to see what the raw data tell us about trends in competitiveness over the boom; and (2) *estimating intra- and extra-euro area export equations* to assess the price sensitivity of intra- and extra-euro area trade flows.

3. Our analysis finds that long-term price elasticities for intra-euro area exports appear to be at least double those for extra-euro area exports. This suggests that traditional real effective exchange rate indexes may provide a misleading picture of the effectiveness of euro depreciation in restoring exports growth in the euro area periphery. In addition, while relative price data for some countries in the periphery suggest a steady loss in intra- (and extra-) euro area competitiveness since the inception of the euro, the pace of deterioration depends on the measure of relative prices used.

4. The rest of the paper is organized as follows. In Section II we describe data sources and the construction of variables used in the analysis. In Section III we provide descriptive evidence of developments in competitiveness since the mid 1990s using different real effective exchange rate (REER) indicators for the euro area. In Section IV we evaluate the responsiveness of both intra and extra euro area export volumes to changes in competitiveness using panel data and conclude in Section V with a summary and a discussion of policy implications.

II. THE DATA

5. We construct two datasets: a quarterly set of competitiveness indicators and an annual panel dataset to estimate export demand equations. The primary data sources are the IMF Information Notice System, IFS, WEO, and Direction of Trade Statistics.

6. First, the quarterly data of REERs used in the descriptive analysis covers the period 1995-2009. In addition to the usual consumer price index (CPI)- and unit labor cost in manufacturing (ULC)-based REERs, we constructed (for those countries where data are available) REERs based on wholesale/producer price indices (WPI) and export unit values (XUV). The REERs are calculated using the REER Facility provided by the IMF Statistics department. The facility defaults to CPI-based REERs using the Information Notice System data for nominal exchange rates, partner country weights, and CPIs. For the methodology of calculating REERs see Bayoumi, Lee, and Jayanthi (1999) and for the INS Zanella and

² Such issues are particularly important for Greece, Ireland, Italy, Portugal, and Spain.

Desruelle (1997). In calculating other types of REERs, unit labor cost data, export unit values data, and wholesale price index data were substituted for CPI data, respectively. For example, in calculating unit labor cost-based REER, we substitute unit labor cost data for CPI data while keeping the same default partner weights and nominal exchange rates data. Data on ULC in manufacturing are based on OECD data. WPI/PPI data are mainly from the International Financial Statistics (IFS). Where WPI/PPI data are missing, the CPI is used as a proxy. XUV data are also mainly from IFS, with missing data complemented by export price index data from Eurostat.

7. Trading partners in the REER calculation are limited to those with a share of at least one percent in each country's trade. The weights change over time: we use four sets of weights each applied to the periods 1979-89, 1990-95, 1996-2004, and 2005-2009, respectively. For most countries the number of partners above the one percent threshold has increased over time. As a result the total number of trading partners included in the calculation varies across countries and over time, with the median number of partners at 20 in the latest set of weights.

8. We also calculate separate REERs for trade within the euro area and trade with countries outside the euro area. We arrive at the separate intra (extra) euro area REERs by setting trade weights for countries outside (inside) the euro area at zero in the REER facility.

9. Second, we construct an annual dataset for the panel regression analysis. Annual REER data are based on the sources and methods described above. Data on bilateral export values in manufacturing are taken from the Direction of Trade Statistics (DOTS) and deflated by export prices from IFS. Since we do not have information on export deflators on a bilateral basis, we use export deflators for total exports as a proxy. We construct a real foreign demand variable for each country by weighting real GDPs of trading partners using the trade weights described above. All volume variables are converted to constant 2000 euros. Our final sample consists of annual data for 11 euro area countries (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, and Spain) from 1980 to 2009.³

III. DESCRIPTIVE EVIDENCE

10. Figure 1 reports a range of overall real effective exchange rate (REER) indexes for the euro area and euro area countries. The CPI-, WPI- and ULC-based measures show that the REER for the euro area as a whole has gone through a full cycle over the past 15 years. Following a period of real depreciation in the second half of 1990s, these indices have been on an upward trend over the past decade. By 2009, the CPI- and ULC-based measures were very close to the levels observed in the mid-1990s. Even at the euro area level, however, real effective exchange rates based on export unit values have a different trend, appreciating steadily by some 35 percent from 1995 to 2010.

³ Owing to a lack of reliable data, for some measures (the WPI/PPI and XUV based REERs), the sample begins from 1985 for Portugal and Greece.

11. Discrepancies between various indicators are larger for individual countries, raising questions about the assessment of developments in external competitiveness based purely on REER based indicators.⁴ In particular, the four REER indicators for the peripheral countries give only partial support to the much-discussed view that external competitiveness deteriorated significantly since the adoption of the euro became likely enough that interest rates started to narrow. In Ireland, the CPI-based REER has appreciated by about 20 percent since 1995, while the WPI- and ULC-based REERs have depreciated by about 20-30 percent over this time period.⁵ Portugal shows similar divergences. While Italy's competitiveness does appear to have eroded, the size of this effect is, frankly, anyone's guess—while the CPI- and WPI-based measures show only modest appreciation since 1995, the ULC- and XUV-based indicators have appreciated by about 50 and 110 percent, respectively.⁶ The data for Greece and Spain show a more consistent story, involving steady appreciation of some 10-40 percent on all four measures.

12. Distinguishing intra- and extra-euro area real effective exchange rates further underlines the uncertainties about the relative price movements within the euro area (Figure 2). The uncertainty about changes in intra-euro area relative prices seen in the peripheral countries corresponds to similar uncertainty regarding the competitiveness gains in Germany, with different measures suggesting anything from a marginal gain to one of almost 20 percent. Despite recently-expressed concerns about its competitiveness, France also seems to have depreciated within the euro area.

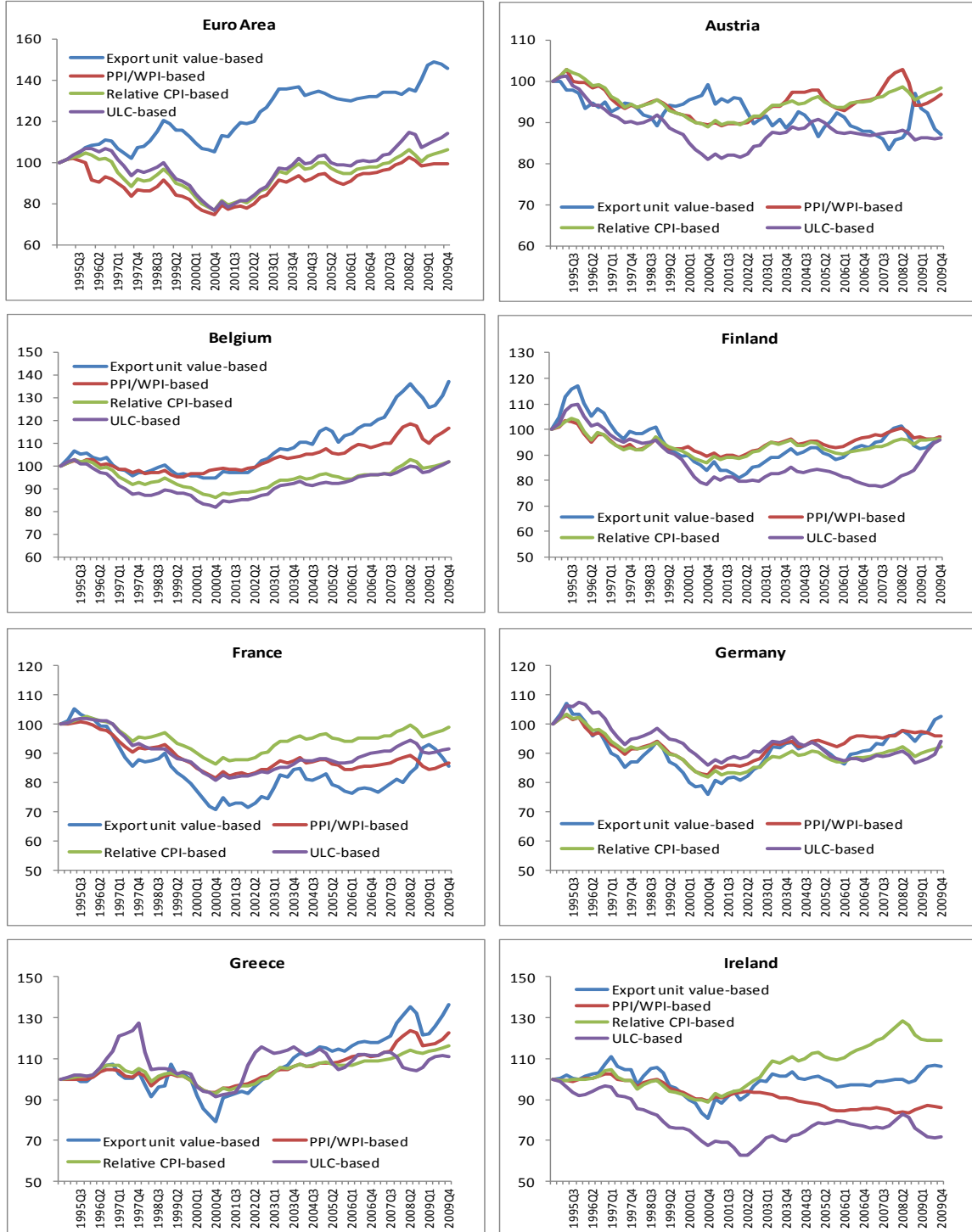
13. Each of the measures of relative prices considered has advantages and shortcomings as an indicator of external competitiveness. To illustrate this point (without being comprehensive): the CPI has the advantage of including traded services, but is affected by its focus on consumer products, the impact of taxes/subsidies, and the large share of non-traded goods/services in the index. The wholesale price index is less affected by taxes and subsidies and covers goods in various stages of the production process, but does not provide any information on services and also includes non-traded goods. The ULC-based REER has similar shortcomings, and has the additional disadvantage of reflecting only one cost component, omitting other input costs and profit margins. Other questions can be raised

⁴ See European Central Bank (2005) for a more comprehensive analysis of competitiveness and export performance. For an analysis of non-price external competitiveness for some euro area countries, see Bennett et al. (2008) and for the euro area Di Mauro and Forster (2008).

⁵ Cerra and Soikkeli (2002) confirm significant competitiveness gains in Irish manufacturing in the late 1990s based on standard ULC-based measures, but note that these gains were limited to a few manufacturing sectors.

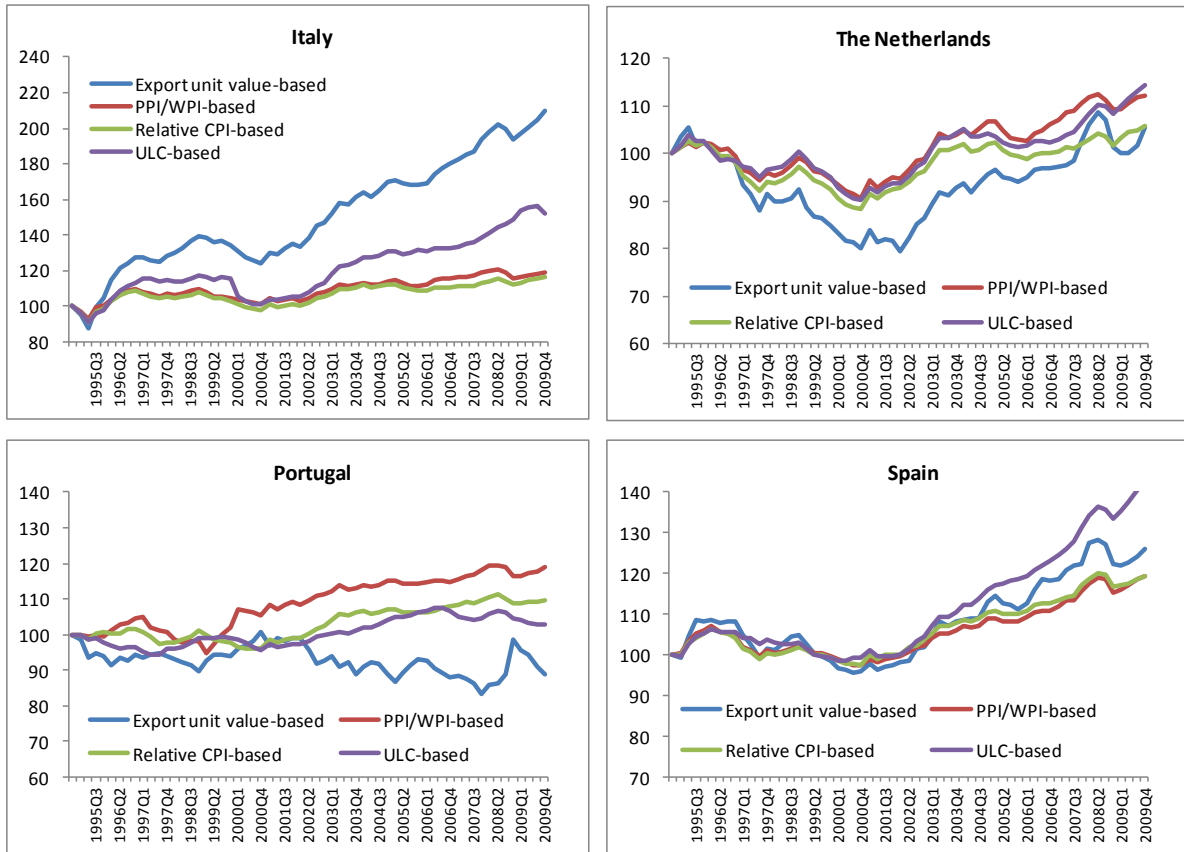
⁶ The considerable increase in Italian export prices is also discussed in European Central Bank (2005).

Figure 1. Real Effective Exchange Rates in Euro Area Countries, 1995 to 2009
Index 1995 = 100



Sources: IFS; EER facility; OECD.Stat; EuroStat.

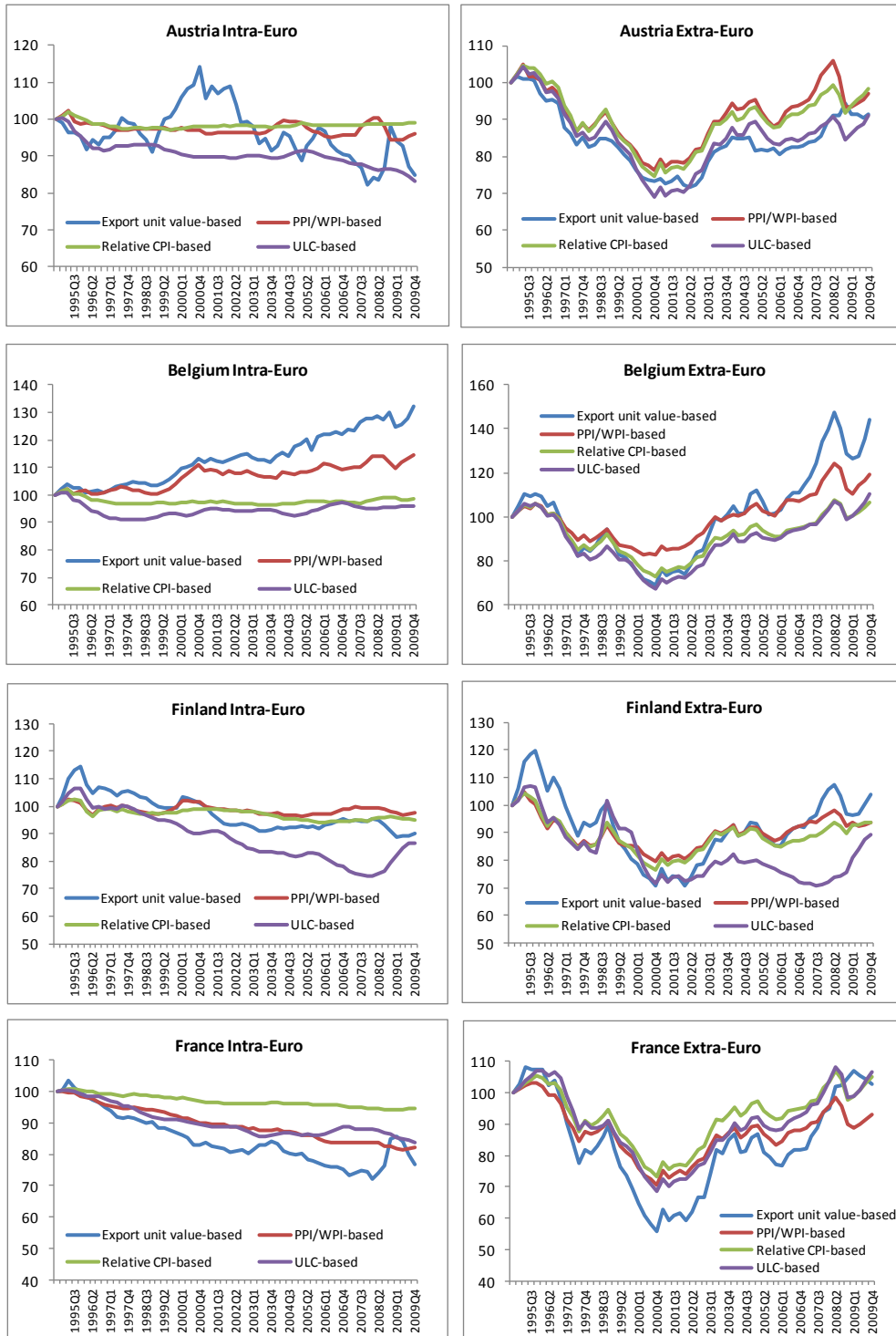
Figure 1, continued



Sources: IFS; EER facility; OECD.Stat; EuroStat.

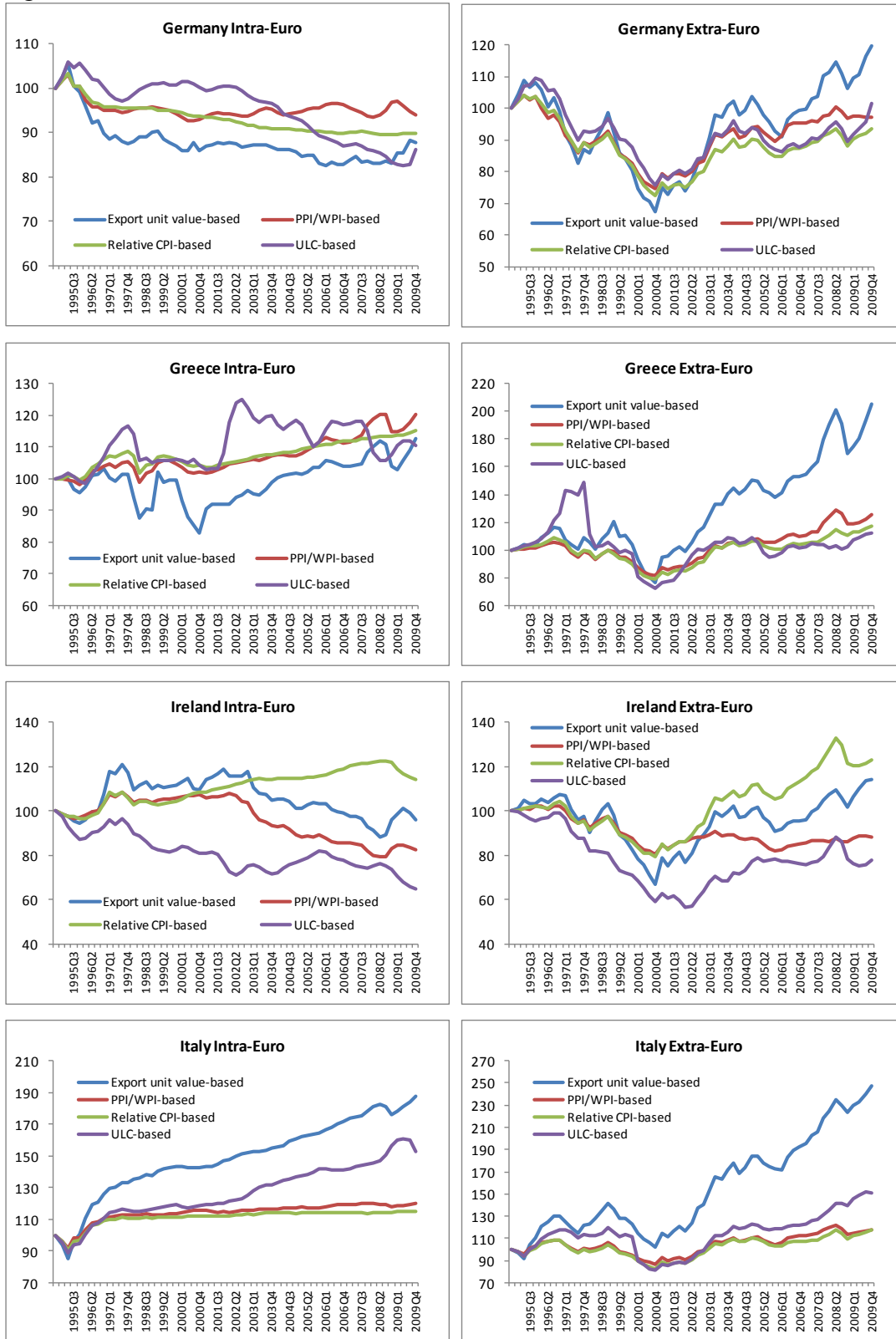
**Figure 2. Real Effective Exchange Rates in Euro Area Countries:
Intra/Extra-Euro Area, 1995 to 2009**

Index 1995 = 100



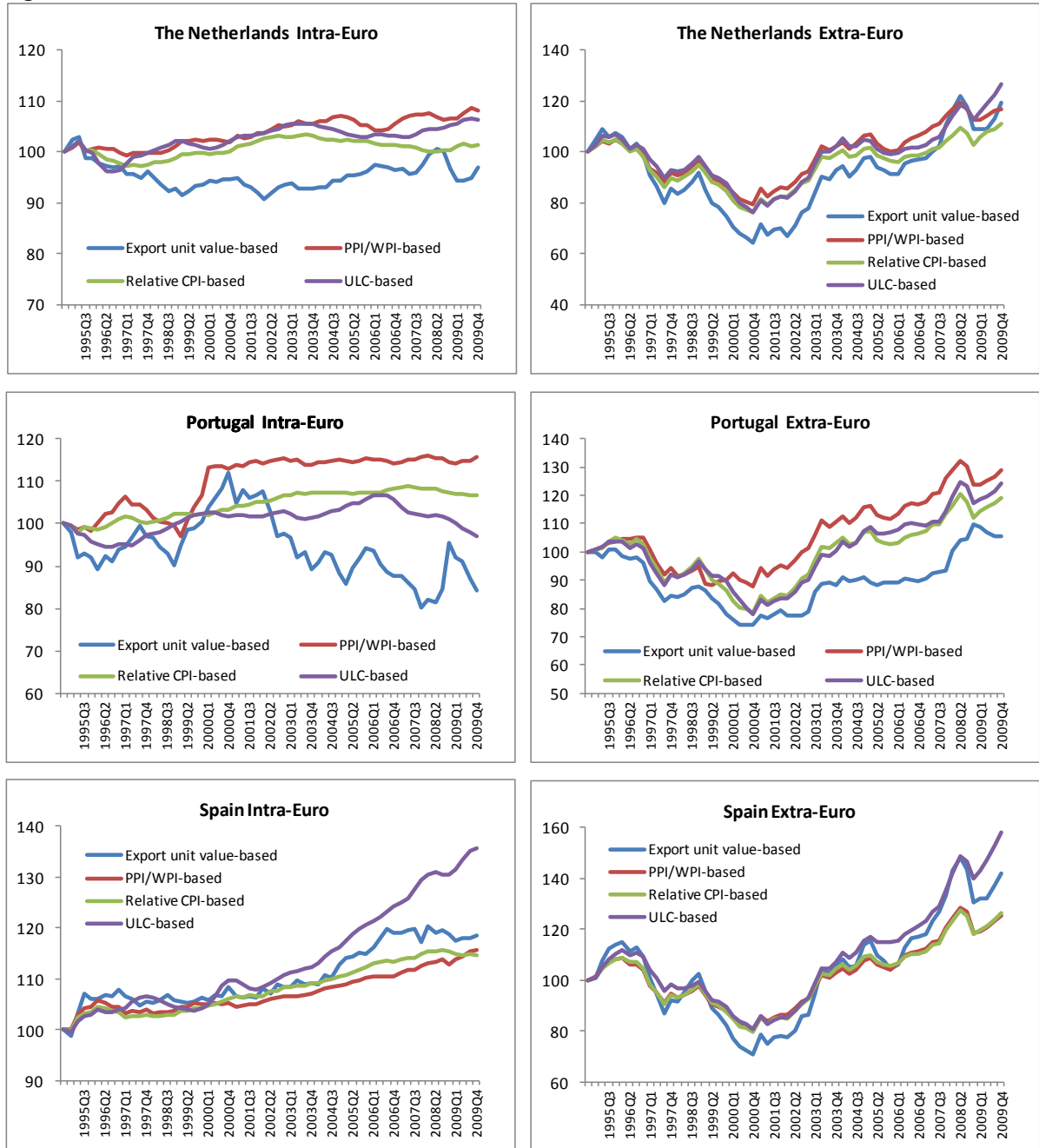
Sources: IFS; EER facility; OECD.Stat; EuroStat.

Figure 2 continued



Sources: IFS; EER facility; OECD.Stat; EuroStat.

Figure 2 concluded.



Sources: IFS; EER facility; OECD.Stat; EuroStat.

about the quality and usefulness of customs data underlying export unit values. For instance, export unit value based REERs are also particularly sensitive to changes in the composition of exports (for a discussion see Silver, 2007).

14. Economic catch-up is also likely to have different effects on different REER measures. For instance, the Balassa-Samuelson effect is usually reflected in an appreciation of the CPI-based REER, but not to the same extent in the other REER measures. Likewise, the effects of improvements in product quality are not necessarily equivalent across measures. For instance, if shifts to high-quality products are more pronounced in export sectors than in the sheltered sectors of the economy, price increases related to quality improvements are more likely to be reflected in export unit prices than the other measures.

IV. ESTIMATED EXPORT EQUATIONS

15. Estimated export equations provide insights on the reliability of different competitiveness measures and on differences in behavior between extra- and intra-euro area trade.⁷ In order to explore the impact of REERs on trade flows we look at the relationship between the four different REER indicators and volumes of exports in euro area countries. We focus on manufacturing exports to illustrate the potential for improvements in competitiveness to provide a positive contribution to growth during the recovery period. Given the clear trends in competitiveness over the sample, we estimate cointegrating vectors using country fixed effect regressions and the following specification of exports (exp_{it}) on foreign demand (fd_{it}) and the ($reer_{it}$) REER (all regressions also include an EMU dummy variable that equals 1 from 1999, and 0 otherwise and country fixed effects):⁸

$$exp_{it} = \theta_0 + \theta_{1t}fd_{it} + \theta_{2t}reer_{it} + \theta_{2t}EMU + \mu_i + \epsilon_{it}$$

16. The results for total export volumes suggest that the WPI-, XUV-, and ULC-based REERs are better indicators of price competitiveness than the CPI-based measures (Table 1). While the estimated elasticity of exports with respect to foreign activity is estimated at around 1.7 to 1.9 and is highly significant in all of the specifications, the coefficient on the real effective exchange rate varies widely. The elasticities for ULC- and XUV-based measures are statistically significant and range from 0.5 to 0.6. The elasticity for the WPI-based REER is similar in size, but statistically insignificant. The CPI-REER coefficient is miniscule, incorrectly signed and also statistically insignificant.

17. The next experiment distinguishes between intra- and extra-euro area exports to see if the underlying elasticities are larger for members of a forming or finished currency union. A currency union, and the preceding exchange rate arrangements (including the European

⁷ The literature on estimating export demand equations is large (Goldstein and Khan (1985) provide a comprehensive discussion and an early survey, with more recent applications in Bayoumi, 1999 and Chinn, 2005).

⁸ The panel regression approach that we take implies that the elasticities of foreign demand and REERs are common across the sample of euro area countries. While differences in trade structures could lead to differences in elasticities across countries, the low number of annual observations makes it difficult to arrive at reliable elasticities for a large sample of euro area countries using a country-by-country approach. Allard et al (2005) use quarterly data to estimate trade equations for France, Germany, Italy, and Spain.

exchange rate mechanism), lowers uncertainty about the permanence of changes in competitiveness by lowering uncertainty about the future path of the exchange rate. This, in turn, could make trade more sensitive to changes in REERs. At the same time other factors could result in different price elasticities. For example, if the goods traded within the euro area tend to be more similar to each other they could be more substitutable, raising the impact of price differentials.

18. The results for the whole sample period (1980-2009) do indeed suggest that intra-euro area exports are more sensitive to changes in competitiveness than extra-euro area exports. The estimated coefficients show similar patterns to those found for the aggregate trade data, with elasticities on activity relatively consistently measured at around 1.4-1.5 for intra-euro area trade and 1.6-1.8 for trade outside of the union. Estimated REER elasticities show considerably more variation. For the WPI-based measure, competitiveness within the union dominates, with the (highly significant) estimated intra-euro area elasticity of -1.3 compared to the statistically insignificant equivalent for extra-union trade. For the ULC-based REER the estimated intra-euro area elasticity is more than three times the extra-union elasticity (-1.0 versus -0.3) and highly significant. A ratio of two-and-a-half is found with the XUV-based REER. Finally, the incorrect sign for the CPI-based measure in the aggregate data seems to be driven by the intra-euro area results. This may well reflect the fact that relative prices of non-traded goods such as services (to say nothing of indirect taxes)—which are more important in the CPI than the other price measures—can vary more than those of traded goods within a currency union.

19. We have done a comprehensive robustness exercise to assess sensitivity of our results to country outliers. Specifically, we repeated the regressions in Table 1 several times, excluding one country at a time from the sample. While the statistical significance of the negative coefficients for REERs is lower in some cases, this exercise confirms that our results are robust to excluding countries from the sample. For example, 43 percent of the REER regression coefficients for model 1 are negative (compared to 50 percent in Table 1) and statistically significant. For intra euro area exports this ratio goes up to 64 percent (compared to 75 percent in Table 1). The CPI-based REER is the only variable for which the sign of the coefficient changes when the sample changes, but these coefficients are never statistically significant.⁹

⁹ Detailed results are available upon request.

Table 1. Export Equations

	(1) ULC	(2) CPI	(3) WPI	(4) XUV
Model 1: Total Export Volume:				
Foreign demand	1.782*** (0.173)	1.685*** (0.197)	1.715*** (0.197)	1.927*** (0.177)
REER	-0.549* (0.286)	0.008 (0.468)	-0.565 (0.406)	-0.605*** (0.189)
R-squared	0.882	0.866	0.874	0.909
Model 2: Extra Euro Area Export Volume:				
Extra-EA Foreign Demand	1.685*** (0.212)	1.626*** (0.195)	1.578*** (0.197)	1.857*** (0.193)
Extra-EA REER	-0.267 (0.202)	-0.173 (0.187)	-0.101 (0.248)	-0.304** (0.120)
R-squared	0.876	0.870	0.866	0.898
Model 3: Intra Euro Area Export Volume:				
Intra-EA Foreign Demand	1.402*** (0.108)	1.439*** (0.126)	1.357*** (0.125)	1.511*** (0.103)
Intra-EA REER	-0.967** (0.378)	0.385 (0.850)	-1.297** (0.520)	-0.727* (0.368)
R-squared	0.817	0.778	0.802	0.819
<i>N</i>	330	330	325	320
Number of countries	11	11	11	11

Note: Robust standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All models also include a dummy variable that equals 1 for the EMU period, 0 otherwise.

20. Experiments suggest that, if anything, the differences in sensitivity to relative prices for intra- and extra-euro area exports have increased since the inception of EMU. In order to examine if the price elasticities have changed pre- and post-EMU, Table 2 reports the ULC-, WPI- and XUV-based regressions augmented to include an interaction term between the relative price term and an EMU dummy variable. The launch of the euro in January 1999 was preceded by a gradual process of further integration aimed at reducing exchange rate variability and achieving monetary stability, including the ERM arrangement. The EMU dummy is therefore only indicative of the impact of increased integration on price elasticities and may also capture other structural changes taking place around the same time period.

21. The interaction coefficients are statistically insignificant for aggregate area trade, suggesting no change in overall behavior. The estimated movement in intra-euro area price elasticities after EMU is also insignificant, but suggests that the elasticities increased in absolute terms. By contrast, the coefficients on extra-euro area trade suggest that these elasticities may have fallen after 1998.

Table 2. Export Equations with Interactions

	(1)	Total	(3)	(4)	Extra-EA	(6)	(7)	Intra-EA	(9)
	ULC	WPI	XUV	ULC	WPI	XUV	ULC	WPI	XUV
Foreign Demand	1.804*** (0.171)	1.705*** (0.202)	1.937*** (0.163)						
Extra-EA Foreign Demand				1.697*** (0.207)	1.609*** (0.195)	1.863*** (0.190)			
Intra-EA Foreign Demand							1.409*** (0.102)	1.357*** (0.126)	1.535*** (0.0940)
REER	-0.457 (0.321)	-0.660 (0.433)	-0.562** (0.226)						
EMU*REER	-0.588 (0.474)	0.357 (0.548)	-0.387 (0.358)						
Extra EA REER				-0.376 (0.235)	-0.531* (0.245)	-0.287* (0.130)			
EMU* Extra EA REER				0.413* (0.218)	0.903*** (0.204)	-0.198 (0.197)			
Intra EA REER							-0.853* (0.439)	-1.262** (0.565)	-0.625 (0.432)
EMU* Intra EA REER							-0.632 (0.970)	-0.145 (1.055)	-0.709 (0.588)
<i>N</i>	330	325	320	330	325	320	330	325	320
R-squared	0.884	0.874	0.913	0.880	0.873	0.899	0.818	0.802	0.830
Number of countries	11	11	11	11	11	11	11	11	11

Note: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. All models also include a dummy variable that equals 1 for the EMU period, 0 otherwise.

V. CONCLUSIONS

22. This paper has examined the link between exports and trends in competitiveness across euro-area countries. The first examine how well competitiveness is measured and on the role of intra-union developments. There is surprisingly large variation across our four measures of extra- and (in particular) intra-euro area relative prices—based on wholesale prices, consumer prices, unit labor costs, and export unit values. For some countries, such as France and Ireland, the picture becomes clearer if one ignores the CPI price series that generate unconventional results in panel regressions on exports. But even ignoring the CPI series implies significant uncertainty in most other cases, including countries such as Germany and Spain.

23. The results from export equations suggest that intra-euro area trade is several times more sensitive to changes in relative prices than extra-euro area trade. Indeed, these differences appear to have increased since the inception of EMU. The difference in elasticities is potentially important as it is much more difficult to adjust relative prices to restore competitiveness within a currency union. This result highlights the need for structural reforms to increase domestic wage and cost flexibility in euro area countries. This is consistent with Berger and Nitsch (2010) who find that EMU has led to larger and more persistent trade imbalances, which they in turn relate to rigidities in product and labor markets. In addition, the results suggest that more country-specific analysis of euro-area trade flows will be needed to understand differences in elasticities between intra- and extra-euro area trade and to gauge developments in price elasticities since the adoption of the euro.

24. The more general lesson from this exercise is that care needs to be taken when using standard measures of real effective exchange rates. Such calculations continue to use the Armington assumption, namely that all goods are equally substitutable. This paper has focused on one example where this is unlikely to be true, namely intra- and extra-euro area trade. However, many other cases spring to mind, such as exporters of high value added versus low value added goods, or exporters of capital versus consumer goods. These dimensions, and the interaction of product specialization and direction of trade, could be explored in future analysis.

REFERENCES

- Allard, C., Catalan, M., Evereart, L and Sgherri, S. (2005): “Explaining Differences in External Sectors Performance among Large Euro Area Countries”. IMF Country Report 05/401.
- Bayoumi, T., Lee, J. and Jayanthi, S. (1999): “New Rates from New Weights”, IMF Working Paper 05/99
- Bayoumi, T. (1999): “Estimating Trade Equations from Aggregate Bilateral Data”, IMF Working Paper 99/74
- Bennett, H., Escolano, J., Fabrizio, S, Gutierrez, E. Ivaschenko, I, Lissovolok, B., Moreno-Badia, M., Schule, W., Tokarick, S., Xiao, Y. and Zarnic, Z. (2008): “Competitiveness in the Southern Euro Area: France, Greece, Italy, Portugal and Spain”, IMF working paper 08/112.
- Berger, H. and Nitsch, V. (2010): “The Euros Effect on Trade Imbalances”, IMF working paper 10/226
- Chinn, M. (2005): “A Primer on Real Effective Exchange Rates: Determinants, Overvaluation, Trade Flows and Competitive Devaluations”, NBER working paper 11521.
- Cerra, V. and Soikkeli, J. (2002): “How Competitive is Irish Manufacturing?”, IMF working paper 02/106
- Di Mauro, F and Forster, K (2008): “Globalization and the Competitiveness of the Euro Area”, ECB occasional paper 97.
- European Central Bank (2005): “Competitiveness and the Export Performance of the Euro Area”, ECB occasional paper 30.
- Goldstein, M. and Khan, M. (1985): “Income and Price Effects in Foreign Trade”, Handbook of International Economics, volume II.
- Silver, M. (2007): “Do Unit value Export, Import and Terms of Trade Indices Represent or Misrepresent Price Indices”, IMF working paper 07/121.
- Zanello, A. and Desruelle, D. (1997): “A Primer on the IMF’s Information Notice System”, IMF working paper 97/71.