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Switching Monies:
The Effect of the Euro on Trade between Belgium and Luxembourg*

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Abstract
The trade effect of the euro is typically identified by comparing trade between countries that have adopted the euro with the level of trade between countries using separate currencies. In this paper, I examine the effect of the euro on trade between Belgium and Luxembourg. Since the two countries had already formed a monetary union in 1921, they were effectively switching monies when the euro was introduced. This experience provides an alternative benchmark to examine the trade effect of the euro.

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1. Introduction

On January 1, 1999, eleven European countries abandoned their national currencies and adopted a new common currency, the euro. For many economists, this episode provides an almost perfect 'natural experiment' to identify the effect of common currencies on trade. Previously, Rose (2000) had argued that countries sharing a common currency trade about three times more with each other than countries with separate currencies. This evidence, however, was mostly based on a sample of small and often highly dependent territories (that were using the currency of a dominant neighbour or former colonizer) and thus may not be applicable to a broader set of countries. Glick and Rose (2002) have examined changes in currency union status and argue that trade has doubled after currency union entry. Because of the lack of data, however, these estimation results are largely derived from currency union exits, arguing that there is symmetry between exits and entries--an assumption that may be problematic because currency union dissolutions were often accompanied by other measures of political and economic disintegration.

In view of these (data-related) difficulties, European Economic and Monetary Union (EMU) is likely to provide useful insights for the trade effects of monetary integration. The member countries of EMU are large, industrialized, and independent nations. Moreover, the euro was introduced by free and unforced decision. As a result, evidence from EMU appears to be largely unaffected by problems that may have biased previous results. Consequently, a large and still growing number of studies have examined the trade effects of the euro. These studies find on average a moderate but statistically significant increase in trade among EMU member countries after the introduction of the euro, thereby providing (mild) support for the hypothesis that monetary integration benefits trade; the literature is excellently surveyed in Baldwin (2006).

While empirical evidence from EMU may avoid some of the problems of earlier work on currency unions and trade, it raises a number of other issues. Berger and Nitsch (2008), for instance, argue that changes in trade patterns may be driven by long-run shifts in bilateral trade intensities; they find that the observed increase in trade after the adoption of the euro is basically a continuation of a long-run trend towards closer trade integration among EMU member countries since the end of World War II. Another (though partly related) issue is the choice of the relevant benchmark level of trade. Typically, trade within a currency union is related to trade between countries using separate currencies, holding constant for (all) other determinants of trade; variables borrowed from the gravity model take account for time-variant determinants of trade, while a set of country-pair specific fixed effects controls for

time-invariant differences in bilateral trade intensity. In practice, however, it is unclear whether this approach fully (and correctly) captures all differences in bilateral trade other than the currency regime, as emphasized, for instance, in Persson (2001).

In this short paper, I apply a different approach to identify the trade effect of the euro. In particular, I use a new and previously unexplored data set that allows focusing exclusively on the evolution of trade among current EMU member countries. More specifically, when EMU was established, two EMU member countries, Belgium and Luxembourg, were already in a monetary union for almost 80 years. For these two countries, the introduction of the euro was effectively just a switch from one common currency to another: previously, the Belgian franc and Luxembourgian franc were legal tender in both countries and exchanged at par; now, the two countries use the euro--a currency that is shared with a larger number of partner countries. Based on this set-up, the trade effect of the euro is identified by examining the evolution of Luxembourg's trade with other EMU member countries, using its bilateral trade with Belgium as benchmark.

2. Methodology and Data

In standard data sets of international trade, trade between Belgium and Luxembourg is rarely covered, mainly because of the economic union between the two countries. The IMF's Direction of Trade Statistics, for instance, reports bilateral trade only since the beginning of EMU in 1999. Still, pre-EMU data on trade between Belgium and Luxembourg are readily available; the statistical office of Luxembourg provides annual data on Luxembourg's exports and imports by country (including Belgium) since 1993.[1] The data are reported in current euro for a subset of 32 countries (covering on average about 97% of Luxembourg's trade).[2]

Figure 1 illustrates Luxembourg's trade with various groups of countries. In addition to bilateral trade with Belgium and trade with the remaining (nine) founding members of EMU, the graphs also portray Luxembourg's trade with (the three) European Union countries that did not participate in EMU (non-EMU) as well as trade with countries outside the European Union (non-EU).[3] To aid comparison, trade values are normalized by trade in 1999, when EMU was established. Thus, the graphs show that the largest percentage increase in

[1] In 1993, the European Single Market was established, implying a major revision in the statistical methods to collect trade data.
[2] The data are available online at http://www.statistiques.public.lu/fr/economie/index.html.
[3] It should be noted that there have been changes in the composition of country groups over the sample period. Greece became a member of EMU in 2001; the European Union was enlarged from 15 to 25 member countries in 2004. For ease of exposition, I ignore these two changes in composition.

trade after the introduction of the euro has been in Luxembourg's exports to non-EU countries where trade has more than doubled (in nominal terms). Also, for some country groups there have been wide fluctuations in trade. Turning to the countries of interest, Luxembourg's trade with EMU member states has moved more or less in line with its bilateral trade with Belgium. For both old and new currency union partners, trade has gradually increased over time, with bilateral trade with new partners expanding slightly faster than trade with Belgium. More importantly, trade with EMU member countries has also increased faster already before the introduction of the euro. These (continuous) differences in trend growth may bias estimates of the effect of common currencies on trade upwards, as recently emphasized in Berger and Nitsch (2008).

In order to correctly identify the trade effects of the euro, I apply a differences-in-differences specification; that is, I estimate equations of the form:

$$(1) \qquad \text{Trade growth}_{it} = \alpha + \beta\ \text{EMU member}_i + \gamma\ \text{EMU member}_i \times \text{EMU period}_t + \delta_t + \varepsilon_{it}$$

where *Trade growth*$_{it}$ is the growth rate of Luxembourg's trade with country *i* in year *t*, *EMU member* is a (time-invariant) dummy variable that takes the value of one when country *i* is (or has become) a member country of EMU (other than Belgium), *EMU period* is a dummy variable that takes the value of one for years when the euro has been in existence (i.e., from 1999 onwards), and δ_t is a comprehensive set of time dummies. The main coefficient of interest is γ which measures the effect of the euro on trade growth with new currency union partner countries.

In contrast to a standard gravity model of trade (in levels), the differences-in-differences specification has various advantageous features. Using growth rates (instead of levels) as dependent variable takes account of any partner-specific deviation from the sample mean of bilateral trade; in differenced form, all time-invariant factors that affect the level of bilateral trade (e.g., geographic distance) simply cancel out. In addition, the *EMU member* dummy controls for any systematic difference in trade growth between countries which have adopted the euro (the treatment group) and a set of other countries (which are used as comparison group). Finally, the model can be easily extended by adding other regression controls (such as, for instance, the partner country's GDP growth). In sum, however, I consider the differences-in-differences specification (based on trade growth) a particularly strong test for the trade effects of the euro.

3. Results

Table 1 presents the benchmark estimation results. My default specification is the differences-in-differences model for Luxembourg's exports to EMU partner countries, using the existing currency union partner, Belgium, as control. The specification is estimated with ordinary least squares, year fixed effects, and standard errors robust to clustering by countries. The results are tabulated at the extreme left of Table 1.

The top row contains the estimate of β; this coefficient captures the difference in mean trade growth between the treatment and control groups over the sample period. As shown, the estimate of β is positive, economically large and statistically significant, indicating that Luxembourg's export growth to new currency union partner countries has consistently exceeded the increase in shipments to its old partner, Belgium, in both the pre- and post-treatment periods. The key coefficient of interest, however, is γ which captures the extent to which the difference in means has changed after the formation of EMU (i.e., the treatment effect of the euro on trade). The result is reported in the next row; the estimated γ coefficient is statistically indifferent from zero and actually turns out to be negative. This finding implies that the introduction of the euro had essentially no separately identifiable effect on the pattern of Luxembourg's exports between new and old currency union partners; above-average export growth to currency union entrants has simply continued after the introduction of the euro. Similar (though statistically slightly weaker) results are obtained for Luxembourg's imports from EMU member countries; estimates are tabulated in column 2. Overall, the results for Luxembourg's trade with EMU partners appear to confirm the findings in Berger and Nitsch (2008) that trade among EMU member countries has increased already before the introduction of the euro--a trend that has continued with basically identical speed after the formation of EMU.

Columns 3 and 4 report, for comparison, analogous estimation results for a country sample that is frequently used to identify the trade effects of the euro. Aiming to analyze the pattern of trade among a homogeneous group of countries, a standard estimation approach is to compare trade among countries that have adopted the euro with trade that involves member countries of the European Union that stayed out of EMU; see, for instance, Micco, Stein, and Ordoñez (2003). The results are striking. In contrast to the findings above for the pattern of Luxembourg's trade with existing and new currency union partners, there is no statistically observable difference in Luxembourg's trade with currency union joiners and non-joiners. The estimated β coefficient is close to zero and statistically insignificant. At the same time, the estimate of γ has sizably increased in magnitude and, for some specifications, gains in

significance. Without taking the precise estimates too literally, the results suggest that, if anything, trade growth has accelerated after the adoption of the euro. In summary, the contradictory findings on the trade effects of a change in currency union status illustrate that the choice of the control group may have a measurable effect on estimates of the effect of common currencies on trade.

I have performed extensive sensitivity checks. For completeness, I have examined the full (reported) country sample; results are tabulated in the final two columns in Table 1. Not surprisingly, estimation results are even weaker for a trade effect of the euro when a larger sample of countries is examined since Luxembourg's trade with some Eastern European and Asian economies has strongly increased over the sample period. I have also experimented with adding various control variables. These extensions include controlling for GDP growth, adding other gravity variables, and adding a comprehensive set of country-specific fixed effects. The key findings are robust to these perturbations. In Table 2, for instance, I control for differences in GDP growth across trading partners. Again, the estimation results differ significantly across country samples. While there is a continuous increase in trade intensity with new currency union partners relative to trade with Belgium over the full sample period, trade with EMU partners appears to have only increased in the post-treatment period in larger samples that also cover non-EMU countries.

4. Summary

In this short note, I examine a new data set to identify the trade effects of the euro. In contrast to previous work, I use the evolution of trade between members of an existing monetary union, Belgium and Luxembourg were in a monetary union since 1921, as benchmark to which I compare trade between Luxembourg and other EMU entrants. Interestingly, the estimation results differ strongly from findings obtained from a standard set-up where trade between non-joiners is used as control group. This result suggests that features of the estimation design, including the choice of the reference group, may have measurable effects on estimates of a common currency on trade.

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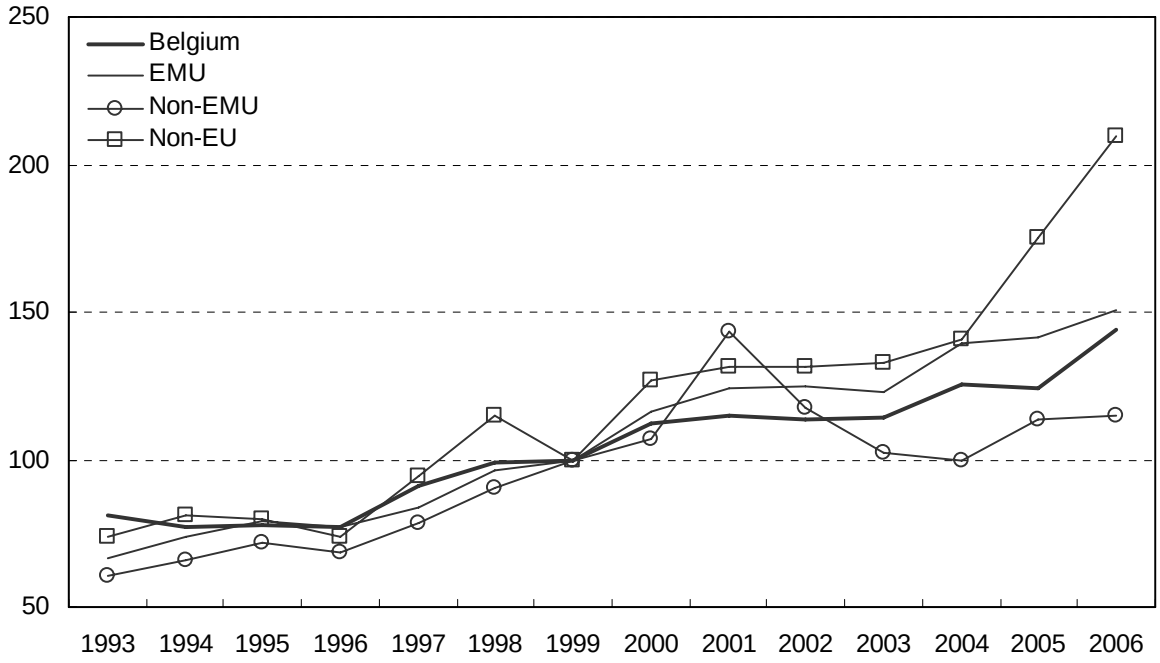
Figure 1: The Evolution of Luxembourg's Trade with Selected Partners

a) Exports



b) Imports

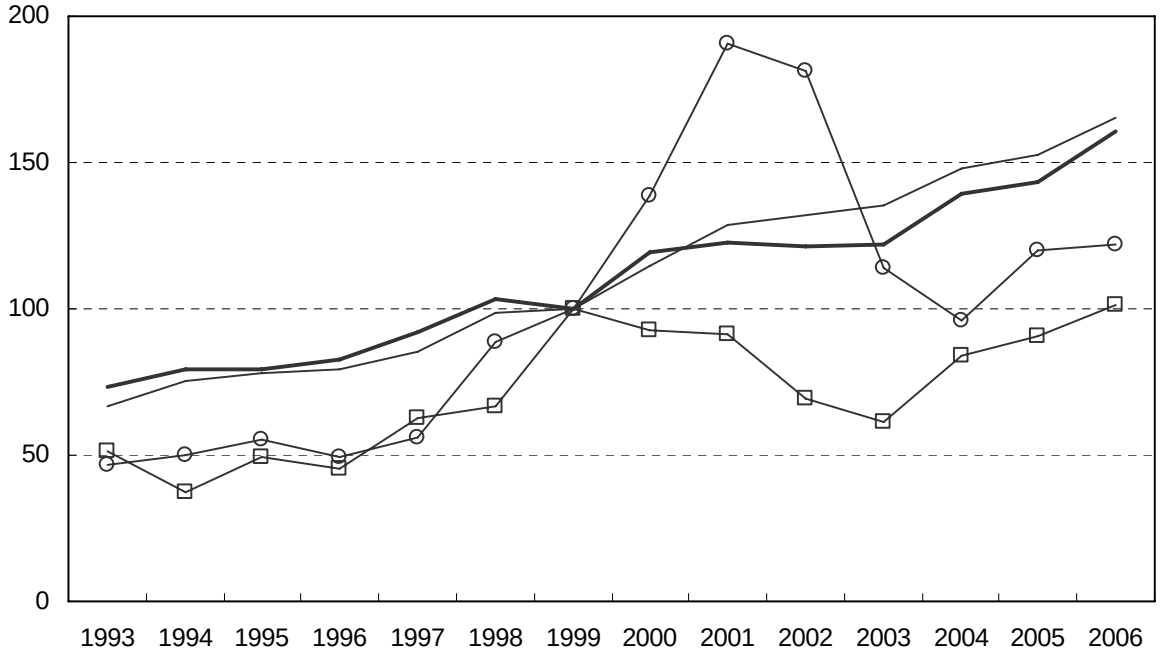


Table 1: Benchmark Results

Sample	**EMU11**	**EMU11**	**EU15**	**EU15**	**World**	**World**
Dependent variable	**Exports**	**Imports**	**Exports**	**Imports**	**Exports**	**Imports**
EMU member	5.60 (1.60)	3.87 (3.74)	-0.18 (2.78)	-0.32 (3.27)	-3.06 (3.92)	-6.83 (4.47)
EMU member × EMU period	-1.62 (2.83)	0.47 (4.43)	2.86 (4.52)	3.43 (5.40)	0.42 (4.59)	3.30 (6.53)
# observations	143	143	182	182	416	416
Adj. R^2	0.17	0.26	0.16	0.22	0.08	0.09

Notes: OLS with year effects. Standard errors robust to clustering by countries in parentheses.

Table 2: Robustness

Sample	**EMU11**	**EU15**	**World**
Dependent variable	**Trade**	**Trade**	**Trade**
EMU member	3.82 (2.18)	-1.14 (1.93)	-6.42 (3.45)
EMU member × EMU period	0.63 (1.99)	4.13 (2.99)	4.25 (4.49)
GDP growth	0.07 (0.22)	0.06 (0.16)	0.49 (0.10)
# observations	143	182	400
Adj. R^2	0.23	0.22	0.13

Notes: OLS with year effects. Standard errors robust to clustering by countries in parentheses.