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Bi- and *Uni*lateral trade effects of joining the Euro☆

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HIGHLIGHTS

- We re-assess the bilateral Euro effect including intra-national trade flows.
- This leads to larger, positive, and statistically significant bilateral EMU effects.
- We also identify unilateral country-specific Euro effects.
- The unilateral effects are positive, sizable and statistically significant, too.

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ABSTRACT

We propose a simple theoretically consistent adjustment for structural gravity estimations of the EMU impact on international trade. Our methods result in two contributions to the related literature. First, we show that proper control for *intra*-national trade flows leads to larger, positive, and statistically significant bilateral EMU effects. The intuition is that joining the EMU promotes trade among member countries at the expense of trade diversion from domestic sales. Second, the introduction of intra-national trade flows enables us to identify *Uni*lateral effects of joining the Euro between members and non-member countries. The unilateral effects are also positive, sizable and statistically significant.

1. Introduction

Motivated by the seminal work of Rose (2000), a large and vibrant body of literature has studied the impact of EMU membership on international trade.[1] While the debate on whether the Euro adoption indeed promotes international trade is still ongoing, scholars who work in this area seem to agree on two common practices. First, all existing studies estimate the Euro effects with a version of the empirical gravity equation. Second, in order to identify the EMU effect, all studies rely on data that only include international trade flows. We contribute to this literature by re-evaluating the EMU effect while adhering more closely to the structural gravity theory of international trade. Specifically, we argue that the impact of the EMU should be identified not only from data on international trade flows but also in the presence of *intra-national* trade flows, as suggested by all micro foundations of the gravity model of trade.[2]

This simple adjustment enables us to make two contributions to the existing EMU literature. First, we re-assess the standard, bilateral Euro effect including intra-national trade flows. The value-added of a theoretically motivated specification with intra-national trade flows is that it enables us to capture the possibility that joining the EMU may promote international trade among Euro

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[1] See for example, Micco et al. (2003); Baldwin and Taglioni (2007); Santos Silva and Tenreyro (2010); Olivero and Yotov (2012); Glick and Rose (2016); Larch et al. (2017); Mika and Zymek (2018).

[2] We refer the reader to Eaton and Kortum (2002); Anderson and van Wincoop (2003) as the two most prominent theoretical foundations of the structural gravity model. Costinot and Rodríguez-Clare (2014), Head and Mayer (2014); Yotov et al. (2016) offer reviews of alternative theoretical foundations of the structural gravity model.

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countries by diverting trade away from domestic sales. Such a possibility cannot be accounted for in studies that only employ international trade.[3]

Second, the inclusion of intra-national trade flows enables us to identify unilateral country-specific Euro effects on trade between EMU members and non-member countries. Right at the start of the discussion on the Euro trade effect, the question arose whether a potential trade enhancing bilateral Euro effect comes at the expense of trade diversion away from trade between Euro countries and non-EMU members. Micco et al. (2003) ask whether the Euro adoption acts as "reciprocal preferential liberalization or greater openness" towards all countries. They "[…] find no evidence that EMU has diverted trade of member countries away from non-members. In fact, EMU countries seem to have increased their trade with non-EMU countries, as well as with fellow EMU members".[4] Baldwin (2006) shares their view on the lack of evidence for trade diversion: "It suggests that the euro has acted more like a unilateral trade liberalization than a preferential trade liberalization". The unilateral effect is estimated by the introduction of a second Euro indicator variable, which is equal to one if either the exporter or the importer is an EMU member. The major problem with this approach (also taken e.g. by Gil-Pareja et al., 2008) is that such a variable would be perfectly multicollinear with a set of exporter-time and importer-time fixed effects.[5] Therefore, all such estimates are based on gravity specifications that do not account properly for the multilateral resistance terms and therefore face an omitted variable bias, (cf. Anderson and van Wincoop, 2003). We show in Section 2 how the inclusion of intra-national trade flows can be used to estimate a unilateral EMU membership and at the same time uphold the theory-consistency of structural gravity estimation. Section 3 describes the dataset used, Section 4 presents our main findings and offers a series of robustness experiments. Section 5 concludes.

2. Econometric specification and identification strategy

To set up our econometric model, we expand Bergstrand et al. (2015)'s version of a structural gravity specification by introducing two additional terms that capture the bilateral and the unilateral EMU effects:

$$X_{ij,t} = \exp\left[\beta_{EMU}\left(EMU_{ij,t} \times INTER_{ij}\right) + \beta_{EMU_{i\veebar j}}\left(EMU_{i\veebar j,t} \times INTER_{ij}\right)\right] \times \exp\left[\beta_{RTA}\left(RTA_{ij,t} \times INTER_{ij}\right) + \boldsymbol{\beta}_{INTER,t}\boldsymbol{INTER}_{ij,t} + \pi_{i,t} + \chi_{j,t} + \mu_{ij}\right] \times \epsilon_{ij,t}. \quad (1)$$

The two variables of central interest to our analysis are $EMU_{ij,t} \times INTER_{ij}$ and $EMU_{i\veebar j,t} \times INTER_{ij}$. The first variable, $EMU_{ij,t} \times INTER_{ij}$, corresponds to the bilateral indicator covariate for EMU membership, which is used standardly in the related literature. In order to emphasize the novelty of our methods and our first main contribution, $EMU_{ij,t} \times INTER_{ij}$ is constructed as an interaction between two indicator variables: $EMU_{ij,t}$ is a dummy variable that is equal to one if countries i and j are both in the EMU at time t, and zero otherwise; and $INTER_{ij}$ is a dummy variable that takes a value of one for international trade flows, and zero otherwise. Thus, by construction, $EMU_{ij,t} \times INTER_{ij}$ takes a value of one for international trade between EMU members, and it is equal to zero otherwise. Importantly, the reference group that is used for identification of the estimate on β_{EMU} includes intra-national trade. Therefore, as compared to existing EMU estimates that are obtained only in the presence of international trade flows, our estimate of β_{EMU} will capture possible EMU diversion effects away from domestic sales.

The second key variable designed to capture EMU effects in specification (1) is $EMU_{i\veebar j,t} \times INTER_{ij}$. This variable is also constructed as an interaction between two indicator variables. As previously defined, $INTER_{ij}$ is a dummy variable that takes a value of one for international trade flows, and zero otherwise. In addition, $EMU_{i\veebar j,t}$ is a dummy variable that will capture the unilateral EMU effects on trade between members and non-member countries. We use the symbol for exclusive disjunction $\veebar$ to define $EMU_{i\veebar j,t}$ as an indicator that takes a value of one if either the importer or the exporter (but not both at the same time!) are EMU members. Thus, by construction, the estimates of both of the key EMU variables in our setting ($EMU_{ij,t} \times INTER_{ij}$ and $EMU_{i\veebar j,t} \times INTER_{ij}$) can be interpreted independently from each other. Importantly, we note that the estimate on $EMU_{i\veebar j,t} \times INTER_{ij}$ cannot be identified with data on international trade flows only. The reason is that this variable will be perfectly collinear with the set of exporter-time and importer-time fixed effects, $\pi_{i,t}$ and $\chi_{j,t}$, which are described below. Note that, while the inclusion of intra-national trade flows allows the identification of country-specific effects, it is not possible to disentangle the importer- vs. exporter-specific effects due to a lack of separate variation, i.e., whenever a country has the Euro as an importer it also has it as an exporter. For a formal discussion of the collinearity issues that prevent identification of directional (i.e., exporter vs. importer) effects of country-specific variables in structural gravity regressions, we refer the reader to Beverelli et al. (2018).

The rest of the variables in (1) are the covariates from Bergstrand et al. (2015). $RTA_{ij,t} \times INTER_{ij}$ is an interaction between $INTER_{ij}$, and a dummy variable, $RTA_{ij,t}$, which is equal to one if countries i and j are both members of a regional trade agreement at time t, and zero otherwise. $\boldsymbol{INTER}_{ij,t}$ is a vector of dummy variables, which are equal to one for all international trade flows, and zero for all intra-national trade flows for each year t. As described in Bergstrand et al. (2015), these variables capture general globalization trends. Finally, $\pi_{i,t}$, $\chi_{j,t}$, and μ_{ij} denote three distinct sets of fixed effects. $\pi_{i,t}$ and $\chi_{j,t}$ are exporter-time and importer-time fixed effects, respectively, which are standardly used in the gravity literature to account for the multilateral resistance terms of Anderson and van Wincoop (2003) as well as for any other country-specific characteristics on the exporter and on the importer side. Finally, μ_{ij} is a set of pair fixed effects, which will control for all time-invariant bilateral trade costs.

Following the latest developments in the related literature, we estimate specification (1) with the Poisson Pseudo Maximum Likelihood (PPML) estimator to account for heteroskedasticity,

[3] Several existing studies demonstrate the importance of proper account for intra-national trade flows in structural gravity settings. Yotov (2012) uses a sample with domestic sales to resolve the distance puzzle in international trade. Dai et al. (2014) and Bergstrand et al. (2015) use intra-national trade flows to re-evaluate the impact of regional trade agreements and the effects of globalization in gravity estimations. We complement these studies by showing that similar methods are important for studying the impact of EMU membership.

[4] Concerning the channel for a unilateral effect, they provide the following reasoning: "[T]he monetary union may also provide its member countries with a vehicle to hedge exchange rate risk in their trade transactions with non-member countries". In a comment to the article, Jean-Marie Viaene adds: "[T]he emergence of the euro as a reserve currency qualifies it as a prime currency of invoice for trade with non-member countries. For the euro zone, this is an additional element of stability as these trade flows are not subject to exchange rate changes and volatility".

[5] To see the multicollinearity problem, note that by adopting a given currency, a country changes its respective currency against *all* trading partners. For example, if Germany adopts the Euro, it does this not only against the other Euro members, but also against all other countries in the world. Thus, by construction, the Euro adoption is a country-specific effect, which will be absorbed by/multicollinear with the exporter-time and the importer-time fixed effects in panel gravity estimations. For a formal discussion of the collinearity issues with country-specific variables in structural gravity regressions, we refer the reader to Heid et al. (2017); Beverelli et al. (2018), who identify the effects of non-discriminatory trade policies and country-specific institutions, respectively.