

Aleksander Aristovnik¹, Matevz Meze²

THE IMPACT OF THE EURO ON TRADE: THE CASE OF SLOVENIA BEFORE ENTERING THE EMU

The main aim of the paper is to present the key findings of the recent research concerning the introduction of the euro and its influence on the trade within the EU members. Last empirical studies show that trade within the EMU has increased on average up to 15% due to the adoption of the euro and there was also a surge in trade flows with the EU non-members. Trade benefits of the entry of new members into the EMU will probably not be the same as the benefits of the first members of the EMU. This hypothesis has been tested on the case of Slovenia. Based on econometric analysis, the consequences of the euro's introduction in 1999 on Slovenia's trade within the Eurozone have been revealed. A short-term negative effect on Slovenia's imports from the Eurozone was observed in the first 3 months after the euro's introduction (a 6.6% drop in imports) as well as a positive effect on Slovenia's exports to the Eurozone in the last two quarters prior to the euro's introduction. In the third quarter of 1998, exports were 5.6% higher than the average of the studied period, whereas in the last quarter they were 10.6% higher. Otherwise, no durable positive euro effects on Slovenia's trade were observed as in the years following the euro's introduction (up until Slovenia joined the EU) imports and exports were more or less constant.

Keywords: international trade; Economic and Monetary Union (EMU); econometric analysis; Slovenia.

JEL: F13, F17, F30.

Олександр Арістовнік, Матевж Мезе

ВПЛИВ ВАЛЮТИ ЄВРО НА ТОРГІВЛЮ: ЗА ДАНИМИ СЛОВЕНІЇ ДО ВСТУПУ В ЄВС

У статті представлено результати дослідження впливу валюти євро на торгівлю членів ЄВС. Останні дослідження з цього питання стверджують, що торгівля всередині ЄВС у середньому зросла на 15% після введення євро і, крім того, євро значно збільшив обсяги торгівлі з третіми країнами, поза ЄС. Торговельні переваги від вступу до ЄВС для нових членів при цьому будуть значні меншими за переваги старих членів Союзу. Дану гіпотезу доведено на прикладі Словенії. За допомогою економетричного аналізу вивчено наслідки введення євро у 1999 р. на словенську торгівлю у межах Єврозони. Спостерігається короткотривалий негативний ефект на словенський імпорт з Єврозони протягом 3 місяців після введення євро (падіння на 6,6%), і в той же час спостерігається позитивний ефект на експорт зі Словенії до Єврозони протягом двох кварталів до введення євро. У третьому кварталі 1998 р. експорт був на 5,6% вище середнього значення за досліджуваний період, а в останньому кварталі даного року він був вище середнього взагалі на 10,6%. Інших тривалих позитивних ефектів від впровадження євро для Словенії не спостерігалось до часу вступу країни у ЄС.

Ключові слова: міжнародна торгівля; Економічний та валютний союз; економетричний аналіз; Словенія.

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Александр Аристовник, Матевж Мезе

ВЛИЯНИЕ ВАЛЮТЫ ЕВРО НА ТОРГОВЛЮ: ПО ДАННЫМ СЛОВЕНИИ ДО ВСТУПЛЕНИЯ В ЭВС

В статье представлены результаты исследования влияния валюты евро на торговлю членов ЕС. Последние исследования по вопросу утверждают, что торговля внутри ЭВС в среднем выросла на 15% после введения евро и, кроме того, евро значительно увеличи-

¹ University of Ljubljana, Slovenia.

² University of Ljubljana, Slovenia.

чил объемы торговли с третьими странами, вне ЕС. Торговые преимущества при вступлении новых членов в ЭВС при этом будут значительно меньше преимуществ для старых членов Союза. Данная гипотеза доказана на примере Словении. При помощи эконометрического анализа изучены последствия введения евро в 1999 г. на словенскую торговлю в рамках Еврозоны. Наблюдается краткосрочный негативный эффект на словенский импорт из Еврозоны в течение 3 месяцев после введения евро (падение на 6,6%) и в то же время позитивный эффект на экспорт из Словении в Еврозону в течение двух кварталов до введения евро. В третьем квартале 1998 г. экспорт был на 5,6% выше среднего значения за исследуемый период, а в последнем квартале данного года он был выше среднего на 10,6%. Других длительных позитивных эффектов от введения евро не наблюдается вплоть до времени вступления Словении в ЕС.

Ключевые слова: международная торговля; Экономический и валютный союз (ЭВС); эконометрический анализ; Словения.

Introduction. At the beginning of 2007 Slovenia entered the Eurozone and thus joined the 12 countries (Austria, Belgium, Finland, France, Greece, Ireland, Italy, Luxembourg, Germany, the Netherlands, Portugal and Spain) where the new common euro currency was already in use. 5 other EU member states (Cyprus, Malta, Slovakia, Estonia and Latvia) joined the Eurozone after Slovenia, whereas some have yet to follow in its footsteps (Lithuania in 2015). For each of these countries the abolition of their domestic currency and the adoption of another official currency is a huge historic decision and therefore the key question is what benefits can outweigh the costs they expect from using the common currency (Obadic et al., 2014). The principal cost, which is also a concern of these countries, is the loss of their monetary and exchange rate policies which facilitate the adaptation to economic conditions (Verbic, 2009; Verbic and Spruk, 2014). The euro's introduction is also a burning issue for Great Britain and Denmark as they can either enter the Eurozone, or stay out of it.

The most frequently quoted benefit of introducing a common currency is an increase in trade between the countries forming the single currency area as a consequence of lower transaction costs and the elimination of the risk arising from exchange rate fluctuations. In the past few years, the bulk of empirical research on the Eurozone has focused on the analysis of consequences of the common currency, i.e. the euro, for trade. Previously, the consequences could only be inferred from older studies of the effect of eliminated exchange rate volatility on trade and those studies assessing the effects of other, non-European monetary unions on trade. The paper provides insights into the topical issue of how common currency, i.e. the euro, affects international trade. Did the euro's introduction boost the volume of trade between the countries of the Eurozone? Did the Eurozone countries, upon the introduction of the euro, divert their trade away from the currency union non-members or third countries where the euro currency is not used? How big is the effect of the euro on trade and why is this so? Was there after 1999, when the euro was introduced, any observable change in Slovenia's imports from and exports to the Eurozone? The following paper strives to answer these questions by drawing conclusions on the available literature and the study of the common currency effect on trade.

The paper is organized as follows. The first part briefly presents the key studies in the research field, developed over the last decade, thus progressively answering the

above questions. The second part is dedicated to an econometric analysis in which some observations about the consequences of the euro's introduction for trade are empirically applied to the case of Slovenia, which at the time was not a member of the currency union, and its trade with the Eurozone. The paper concludes with the key findings.

The empirical literature overview. There are many consequences of a currency union. Emerson et al. (1992) thoroughly (statically and dynamically) discuss various potential benefits and costs brought about by the monetary integration effect for the following basic economic goals: microeconomic efficiency (in terms of resource allocation and economic growth), macroeconomic stability (in terms of inflation, product and employment) as well as proportionality in terms of effects distribution between countries and regions. Moreover, general benefits and costs of participating in a currency union are extensively dealt with in the literature dedicated to the theory of an optimal monetary area which is practically the only theory discussing the issue of currency unions (Mongelli, 2002). Table 1 schematically summarizes the characteristics and key findings of the main studies addressing the euro's effect on trade. For each study the estimated size of the euro's effect on intra-EMU trade, the dependent variable, the used sample and its main characteristics are presented.

Empirical analysis of the effect from the EMU formation on Slovenia's trade.

Below follows a robust analysis of the time series of Slovenia's exports and imports to and from the EMU members. Using the OLS method and quarterly data for the 1996:1–2006:4 period, the model of Slovenia's goods exports and imports with the Eurozone was assessed. The variables are in logarithm form and therefore the regression coefficients represent constant elasticities.

With its small, open economy, Slovenia cannot influence the terms of its international trade. Imports are considered as import demand by Slovenian entities and exports are considered as export supply by Slovenian producers. In the available literature two main factors affecting imports are delineated, namely domestic economic activity and relative prices, whereas exports are influenced by foreign economic activity and relative prices (in export equations one can also find domestic activity which increases the supply of goods intended for export). Relative prices are presented as the ratio between the export (import) price index and domestic price index (or by applying the domestic exchange rate). Generally, the export and import function can be formulated as follows:

$$EXP = f(Y(f), p(exp)/p(d)); \text{ anticipated effect } [+ , +]; \quad (1)$$

$$IMP = f(Y(d), p(imp)/p(d)); \text{ anticipated effect } [+ , -]. \quad (2)$$

where $EXP(IMP)$ is real goods exports (imports); $Y(d)$ the income of domestic country; $Y(f)$ the income of foreign region; $p(exp)$ export prices; $p(imp)$ the prices of imported products; $p(d)$ the domestic prices of imperfect substitutes. We expect economic activity to positively affect trade in both cases. Theoretically, growth in export prices, relative to domestic prices, should increase export supply, whereas relative growth in import prices (foreign goods become relatively more expensive) should reduce import demand. Similar can be expected for the real effective exchange rate (appreciation positively affects imports and negatively exports).

Table 1. Overview of the main studies of the euro's effect on trade

Study	Estimated effects	Dependent variable	Sample
Micco et al. (2003)	4–16%	Real bilateral trade (Exp+Imp)	22 industrialized countries (EU-15), 1992–2002
Bun & Klaassen (2002)	4–38%	Real bilateral export	EU-15, Canada Japan, USA, 1965–2001
de Nardis & Vicarelli (2003)	6%	Real export	EMU countries + 19 other countries, 1980–2000
Flam & Nordstrom (2006a)	15%	Real export	20 OECD countries, 1989–2002
Flam & Nordstrom (2006b)	20–26%	Real export	20 OECD countries, 1995–2005
Faruqee (2004)	7–14%	Bilateral trade (Exp+Imp)	22 industrialized countries, 1992–2002
de Souza (2002)	18.5% (insignificant)	Bilateral trade	EU15, 1980–2001
Berger & Nitsch (2005)	15% (1992–2003); 50% (1948–03); No effect (with a trend control)	Bilateral trade	22 industrialized countries, 1948–2003
De Sousa & Lochard (2004)	4–7%	Bilateral trade	22 OECD countries, 1982–2002
Mancini & Pauwels (2006)	Significant break in trade 1999:1	Import in current prices	EU15, 1980:1–2004:4
Bun & Klaassen (2006)	18% (1992–2002); 51% (1967–02); 3% (with a trend control)	Bilateral trade	19 industrialized countries, 1967–2002
de Nardis et al. (2007a)	4–5%	Real bilateral export	23 OECD countries, 1988–2003
de Nardis et al. (2007b)	Effects on sectors (ISIC rev. 3) med 4–16%.	Real bilateral export	23 OECD countries (EU-13), 1988–2004
Belke & Spies (2008)	7%	Real bilateral import	OECD and CEE countries, 1992–2004
Brouwer et al. (2008)	1–13%	Real bilateral export	29 EU and OECD countries, 1980–2005
Cieslik et al. (2012)	2–13%	Real bilateral export	CEE countries, 1992–2010

First, Slovenia's quantitative (real) goods exports to the EMU-12 were estimated. The model has a double-logarithm form and conforms to the basic assumptions of the OLS method (multicollinearity, autocorrelation and homoscedasticity). The estimated export function:

$$\ln(EXP_t) = b_1 + b_2 \ln(IMEZ_t) + b_3 \ln(CFSL)_{t-1} + b_4 \ln(XP)_{t-2} + D98q_3 + D98q_4. \quad (3)$$

The applied explanatory variables of the export function are as follows: the import index of the 12 members of the Eurozone (*IMEZ*, 1996:1 = 100) as an indicator of foreign demand, gross fixed capital formation by Slovenian producers which increase export supply (*CFSL*, in mln EUR, prices in 1996:1), relative export prices

(*XP*, the export price index relative to the consumer price index, 1996:1 = 100) and dummy variables for the third and fourth quarters of 1998 (the pre-euro period).

In the search for a statistically optimal import model, the double-logarithm function was assessed by using different explanatory variables (and their lags) for domestic economic activity and for relative prices. The best variables proved to be domestic consumption (*DC*) and the real effective exchange rate (*REERT*) of Slovenian tolar vs. the EMU-12 (deflator: nominal labor costs by unit in manufacturing). The model takes a differential form (first differences of the logarithm) and conforms to the basic assumptions of the OLS method (multicollinearity, autocorrelation and homoscedasticity). The estimated import function would be:

$$\Delta \ln(IM_t) = \beta_1 \Delta \ln(DC_t) + \beta_2 \Delta \ln(REERT_t) + \beta_3 D99q1 + \beta_4 D04q1 + u_t. \quad (4)$$

The applied variables are as follows: dependent variable of Slovenia's real imports from the EMU-12 in mln EUR (sign *IM*, fixed euro exchange rate (*FEER*), fixed prices 1996:1, deseasoned), explanatory variables of the total domestic consumption (*DC*, fixed prices, reference year: 1995, in mln EUR (*FEER* before 2007), deseasoned and adjusted to the number of working days) as well as the real effective exchange rate vs. the rest of the EMU-13 (*REERT*, 1999 = 100, deflator: nominal labor costs per unit in manufacturing). *D99q1* is a dummy time variable the value of which in the first quarter of 1999 equals 1 and which overlaps with the time the euro currency was introduced in Europe. *D04q1* is a dummy variable for the first quarter of 2004 and overlaps with the period immediately before Slovenia joined the EU.

Empirical results. The estimated export function is as follows:

$$\ln(EXP_t) = -1.23 + 0.84 \ln(IMEZ_t) + 0.28 \ln(CFSL)_{t-1} + 0.42 \ln(XP)_{t-2} + 0.055 D98q3 + 0.10 D98q4. \quad (5)$$

se: (0.564) (0.019) (0.047) (0.092) (0.022) (0.022)

t: (-2.176) (42.327) (6.112) (4.536) (2.432) (4.456)

p: (0.036) (0.000) (0.000) (0.001) (0.020) (0.001)

n = 42 (1996:3–2006:4) R² = 0.981 d = 1.87

The signs of the coefficients correspond to what was expected and are statistically significant. Based on the sample data we estimate that the included explanatory variables very well explain the movements in the (logarithm of) exports since no less than 98% of the variance of the dependent variable is explained (without dummy variables, the percentage is 96.9). Growth of 1% in import demand of the Eurozone (*IMEZ*) increases Slovenia's exports on average by 0.84%, with everything else being equal. Growth of 1% in Slovenian gross fixed capital formation, with a 3-month lag on average, increases exports by 0.3% (*ceteris paribus*), whereas 1% growth in relative export prices increases exports after 6 months by 0.42%. Dummy variables for the last two quarters of 1998 were statistically significant, thus indicating this was potentially a consequence of the euro's expected introduction on 1 January 1999. Namely, in the third quarter of 1998 exports were 5.6% higher than the average of the studied period, whereas in the last quarter they were 10.6% higher.

The results show that only a short-term positive effect on Slovenian exports can be observed in the period immediately preceding the euro's introduction. The size of the effect complies with the estimates made in the discussed studies, showing that on

average the euro increased the EMU non-members' exports to the Eurozone by 7–13%. The estimated import function is as follows:

$$\Delta \ln(IMP_t) = 1.367 \Delta \ln(DC_t) + 0.687 \Delta \ln(REERT_t) - 0.0638 D99q1 + 0.1064 D04q1. \quad (6)$$

se: (0.144) (0.409) (0.025) (0.025)

t: (9.457) (1.681) (-2.509) (4.244)

p: (0.000) (0.101) (0.016) (0.001)

$n = 43$ (1996:2–2006:4) $R^2 = 0.76$ $d = 1.71$

The signs of the coefficients of domestic consumption and the exchange rate correspond to the expectations and are statistically significant (at 10%, the exchange rate is borderline significant). Based on the sample data we estimate that the included explanatory variables very well explain the movements in imports as no less than 76% of the variance of the dependent variable is explained (without dummy variables, the percentage is 60.4). If domestic consumption increases by 1%, the real volume of Slovenian imports from the EMU rises on average by 1.37%, with all other things being equal. A 1% exchange rate appreciation increases imports by 0.7% on average (*ceteris paribus*).

The basic finding we were searching for is hidden in the dummy variable of the euro's introduction (*D99q1*). It turns out that, in the first quarter of 1999, Slovenia's imports from the Eurozone recorded a one-off 6.6% drop ($\exp(0.0638) - 1$), whereas the envisaged entry to the EU increased exports in the short term by 11.2% and this cannot be explained by economic activity or exchange rate fluctuations. The considerable volatility of imports is clearly seen until the beginning of 2000, particularly in 1999. We presume that the surge in imports in the second quarter and the plunge in the third quarter of 1999 were due to the introduction of value-added tax in Slovenia on 1 July 1999 (the beginning of the third quarter); however, this movement is well explained by the model applied (domestic consumption and exchange rate).

Conclusions. The finding that the euro should also increase trade with the EMU non-members (non-members' exports to the EMU) was verified for the case of Slovenia which was still not a member at that time. Employing econometric analysis, we looked for the consequences of the euro's introduction in 1999 on Slovenia's trade with the Eurozone. A short-term negative effect on Slovenia's imports from the Eurozone was observed in the first 3 months after the euro's introduction (6.6% drop in imports) as well as a positive effect on Slovenia's exports to the Eurozone in the last two quarters prior to the euro's introduction. In the third quarter of 1998, exports were 5.6% higher than the average of the studied period, whereas in the last quarter they were 10.6% higher. Otherwise, no durable positive euro effects on Slovenian trade were observed as in the years following the euro's introduction (up until Slovenia joined the EU) imports and exports were more or less constant. If the reason for all of the above is the euro's introduction and/or formation of the EMU, then Slovenia (and probably other prospective EMU members) can primarily expect from the euro's introduction a surge in imports from the Eurozone and only a minimum rise in exports.

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