Exchange Rate and
Trade: J-curve in European Union

Dan Lupu[1], Mircea Asandului[2]

Abstract: The EU economy is experiencing a severe recession amid the global crisis, and although in other regions began to appear mild signs of recovery, in EU countries are recorded a continuously worsening. In many European states, the economic contraction is a consequence of the decrease in net exports component of GDP. The aim of the article is to analyze the situation in which the EU chooses to devalue its currency to increase exports. We found that, the depreciation of the Euro, has no influence on exports and that in EU, it is not expressed a J-curve effects.

Keywords: euro-dollar parity; devaluation; international trade

JEL Classification: F10; F11; F31

1 Introduction

The exchange rate is a factor influencing the economy, used by some states to correct certain imbalances produced as a result of the financial crisis, which "hit" in many countries previously considered to be infallible. The negative effects of the financial crisis are found in lower freight volumes involved in international trade as a result of changes in prices and sluggish demand.

Depreciated course helps, theoretically, on short term the exports - segment which supported the economy in crisis, enhancing competitiveness through price. In 2012, the exports stagnated and where this situation will continue or whether exports will return to negative territory, the economic growth in the EU this year is called into question, combined with a fragile recovery in consumption. A depreciation of the euro increases export competitiveness in terms of price, but the actual development of exports is mainly influenced by the evolution of external demand - which risks of loss / slowdown are still higher.

[1] Assistant Professor, PhD, Alexandru Ioan Cuza University of Iasi, Faculty of Economics and Business Administration, Romania, Address: 22 Carol II Str, Iasi, Romania, Tel.: +40232201450, Fax: +40232201070, Corresponding author: danlupu20052000@yahoo.com

[2] Assistant Professor, PhD, Alexandru Ioan Cuza University of Iasi, Faculty of Economics and Business Administration, Romania, Address: 22 Carol II Str, Iasi, Romania, Tel.: +40232201450, Fax: +40232201070, E-mail: asmircea@yahoo.com.

To improve the current account of the balance of payments (trade) may be used to a slight devaluation of the national currency. However, the effect on the current account is not immediately successful. Devaluation would increase initially at time t0 the deficit because the imports and exports need time to adapt to the new relative prices. The devaluation would make imports more expensive and exports more efficient, so that after the adjustment period, which can last up to 2 years, the current account of the balance of payments will improve.

The purpose of this article is to explore whether the exchange rate depreciation improves bilateral trade between the European Union and the world. The data used in this study are monthly data covering the period 1999 (the year of onset of the euro) and 2013. To achieve the objective, we do a stationarity test using Augmented Dickey-Fuller method, then a Johansen cointegration test and in the end we use an OLS regression model.

2. Literature Review

The theory of "J-curve" has inspired many of the economic policies adopted in the 50s-70s, and even 80s. According to this theory, in a first phase, the devaluation will lead to a deterioration of the trade balance as exports under way and expressed in national currency get a smaller gain, while imports will be paid in foreign currency. Subsequently, it will increase the substitution of imports by domestic production, allowing recovery of the account balance (Auboin&Ruta, 2012; Bahmani-Oskooee&Mohsen, 2004; Detken, 2002; Meade, 1988; Rosensweig, 1988).

This phenomenon is characterized by a period in which the ongoing contracts, denominated in a particular currency, dominates the determinants of current account items. Over time, the new contracts, concluded after the exchange rate depreciation, begin to prevail, and the effects of devaluation or depreciation are visible. It is obvious that the existence of J curve depends on the extent to which trade is conducted under existing contracts (as opposed to purchases on spot markets), the extent to which there is a symmetrical use of the national currency and the exchange and the delays in signing contracts in their execution.

For devaluation to serve indeed to export recovery, it requires that companies have strong will and also the ability to conquer new markets. In the absence of these elements, it will not take advantage of the opportunity that is offered, and the balance long-awaited recovery will not happen entering into the vicious circle of depreciation. In these cases, there is a sequence of segments in the negative slope of the curve J. The initial trade balance does not improve, but there is an increasing negative value. These phenomena occur only if the structure of exports and imports of the country is such manner that makes price fluctuations to influence trade flows

only to a very small extent. In this case, the question is of quality international specialization (Bin, 2006; Gupta&Uma, 1999; Halicioglu, 2008; Onafowora, 2003; Šimáková, 2013).

Some economists believe that the volatility of exchange rate only produce negative effects, irrespective of the direction in which it occurs. The appreciation or depreciation effects are not sufficiently robust to be generalized in all countries. In addition, the companies record additional charges for protecting against currency risk, thereby reducing revenues partners involved in international trade. The existence of financial market instruments allows, in some degree, to achieve protection against exchange risks by paying a premium in accordance with contract value. Unfortunately, these tools are not widely used, many operators prefer not to protect against currency risk (Bahmani-Oskooee&Mohsen, 1985; Brada, 1992; Hsing, 2005; Rose, 1989; Tian, 2013).

Despite numerous studies on the J curve, few focus on the EU as an entity, many of them looking at only one European country.

Bahmani-Oskooee and Kutan (2009) made an extensive study in some European countries, especially those in Eastern Europe. Using monthly data from the period January 1990 to June 2005 and applying cointegration conditional method, the authors found empirical support for the J-curve only in Bulgaria, Croatia and Russia. For other countries, they found that are not characteristics of existence for J-curve.

Hsing (2009) examines the J curve for other EU countries: Croatia, Czech Republic, Hungary, Poland, Slovakia, Slovenia and the bilateral relationship with the U.S. The author concludes that the J-curve is not empirically confirmed for any of these six countries.

3. Empirical Results

The year 1999 marked a radical change in the economies of Europe, which have undergone economical and financial restructuring for the transition to the single currency. After this year, the European countries, once with the change of regime exchange rate, started a reform process aimed at full economic integration. One of the important components of European macroeconomic strategies was the exchange rate policy, the rate regime being free.
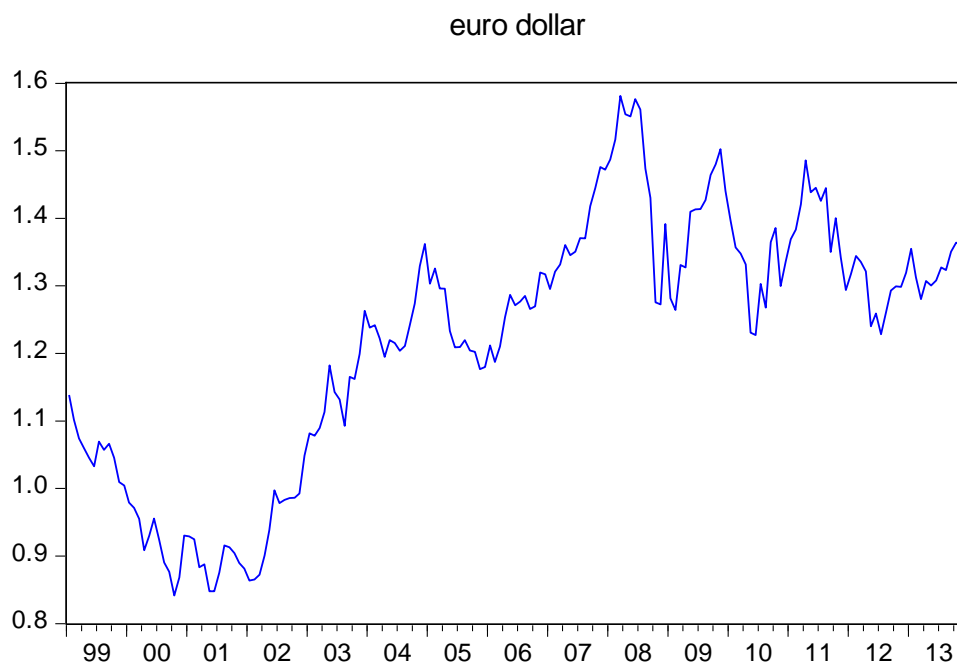
euro dollar

Figure 1. Exchange rate of euro-dollar January 1999-December 2013

Source: Own calculations according EUROSTAT data

The euro came into use starting on January 1, 1999. Basically, the euro has replaced the national currencies to move in all EMU countries and can be changed with any convertible currency. From this moment, the EU had to open borders to international capital through the liberalization of capital account.

The impact of a greater flexibility of the exchange rate implies a number of advantages and disadvantages. The EU has a number of advantages as a result of discouraging speculative inflows, more balanced distribution between operators gains and losses from foreign currency transactions, limiting the cost of central bank intervention, using an exchange mechanism compatible with inflation targeting. The major disadvantage derives from the decreasing predictability of euro and difficulties that arise when policymakers want to help the economy by lowering the exchange rate.

It should be noted that from the first moment of adopting the euro, the trade balance recorded deficits, the largest being in 2007-2008 on the expansion of imports and decreasing exports. During the same period, the euro began to depreciate sharply in relation with dollar. The evolution of EU imports and exports in the last five years was as follows:
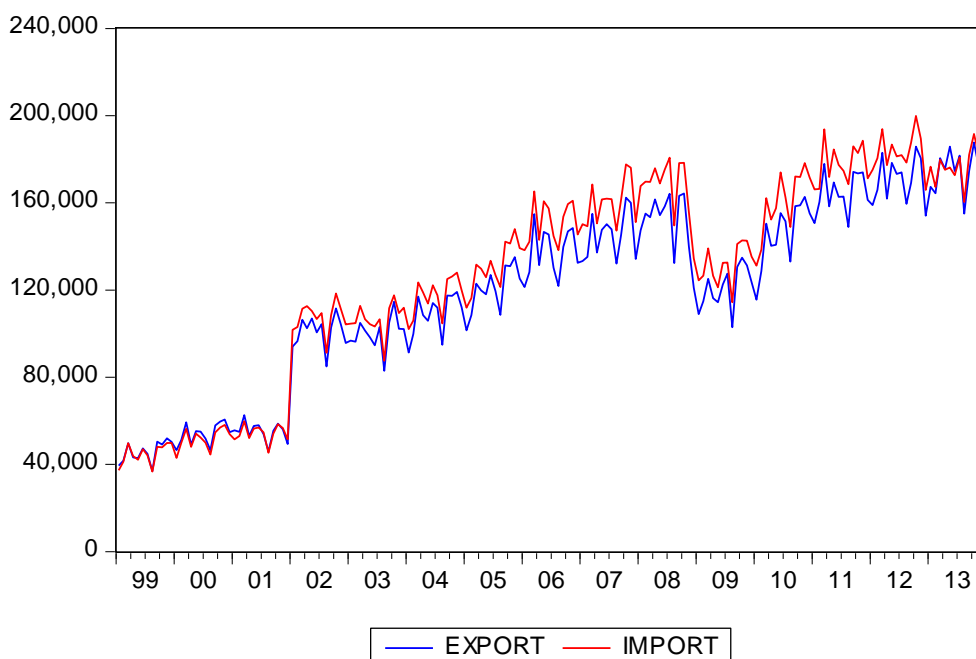
Figure 2. The evolution in EU trade balance 1999-2013

Source: Own calculations according EUROSTAT data

In the recent years, the EU trade balance was characterized by an increase in imports and a decline in exports. This deterioration was made largely on the fact that international trade partners of the EU bloc states were hit hard by the financial crisis, austerity and debt crisis.

4. Econometric Analysis

To determine the impact of the euro exchange rate on EU exports will be analyzed the regression between variable exports (dependent) and variable exchange rate (independent). The exports are variable outcome (is called exogenous or independent) and the exchange rate is the factor dependent or exogenous. The exports can be influenced by other factors, which are synthesized and represented into the final relationship as residual factors. Testing the relationship between the two variables mentioned is done for the period January 1999 - December 2013. The exports are expressed in monthly (million) and the exchange rate is given by the average monthly exchange rate of the euro against the dollar. Data are collected on the EUROSTAT website.

d(exports) = c + d(exchange rate euro_dolar)

To determine the stationarity of the two series, exports and exchange rate of euro_dollar, we used the Augmented Dickey-Fuller method. The results are presented below:

Table 1. The stationarity Test results for exports and exchange rate of euro_dollar series

Null Hypothesis: D(EXPORTURI) has a unit root			Null Hypothesis: D(USD_EURO) has a unit root		
Augmented Dickey-Fuller test statistic	t-Statistic	Prob.*	Augmented Dickey-Fuller test statistic	t-Statistic	Prob.*
	- 5.741015	0.0000		- 11.82872	0.0000
Test critical values:	1% level	- 3.473672	Test critical values:	1% level	- 3.472813
	5% level	- 2.880463		5% level	- 2.880088
	10% level	- 2.576939		10% level	- 2.576739

Source: Own calculations according EUROSTAT data, using EViews7

As we can see, the two series are nonstationary but then become stationary by applying first differences of the original series.

In order to achieve the long-term relationship between the two variables, exports and exchange rate euro_dollar, they must be cointegrated. Below we present the Granger causality test results for the two previous series, d (exports) and d (euro_dollar).

Table 2. Test results for Granger causality between exports and euro_dollar series Granger Causality Tests pairwise

Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
D(USD_EURO) does not Granger Cause D(EXPORTS)	154	0.64654	0.5253
D(EXPORTS) does not Granger Cause D(USD_EURO)		1.33681	0.2658

Source: Own calculations according EUROSTAT data, using EViews7

As we can see from the statistics associated to Granger test, the two sets influence each other.

Their integration in econometric analysis program, according to the model described, leads to the following results:

141

Table 3. Results of regression analysis of monthly average exchange rate EUR / USD and monthly value of exports for the period 1999-2013

Dependent Variable: D(exports)
Method: Least Squares
Sample (adjusted): 1 156
Included observations: 156 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.005060	0.002261	2.237397	0.0267
D(USD_EURO)	-0.050243	0.072531	-0.692714	0.0395
R-squared	0.300106	Mean dependent var		0.004990
Adjusted R-squared	0.200367	S.D. dependent var		0.028170
S.E. of regression	0.028218	Akaike info criterion		-4.285010
Sum squared resid	0.122619	Schwarz criterion		-4.245909
Log likelihood	336.2308	F-statistic		0.479852
Durbin-Watson stat	1.443559	Prob(F-statistic)		0.489532

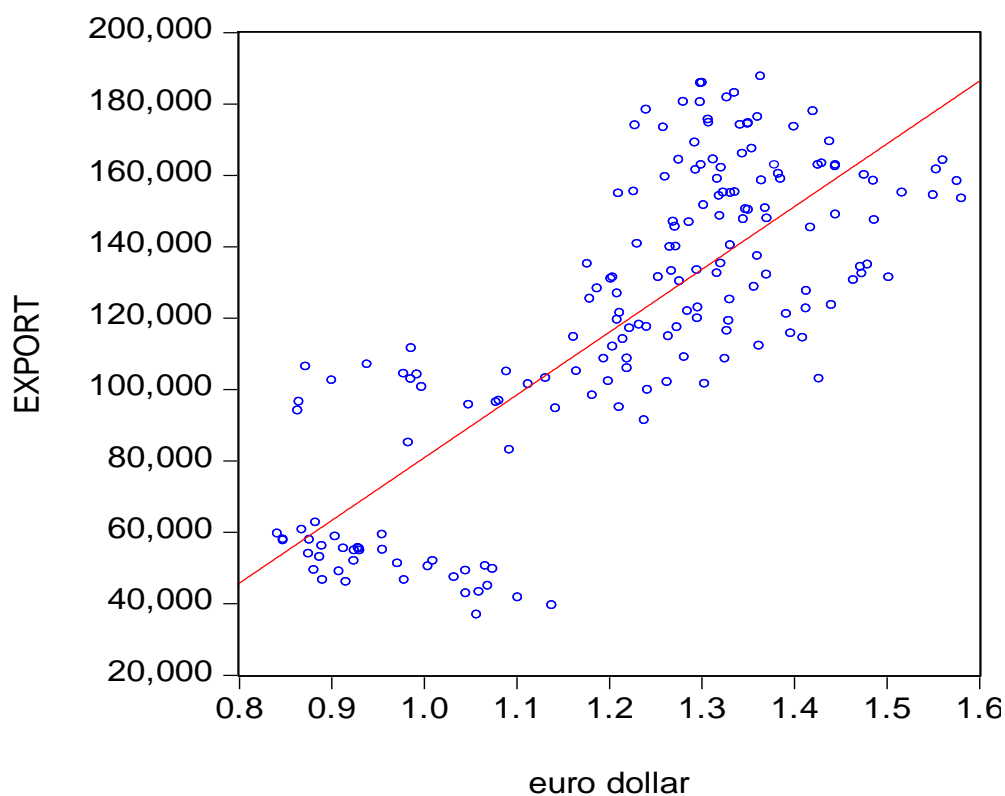*Source: Own calculations according EUROSTAT data, using EViews7*

The obtained relations shows a direct link between the exchange rate of the euro against the dollar and exports of EU bloc, the relationship between the two variables is given by the following formula: *exports*=0.005060-0.050243*exchange rate*

The above relationship can be interpreted as follows: the increasing of exchange rate with one euro (currency depreciation), the exports increase by an average of 357,583,300 Euros.

However, the growth of exports is not sustainable in the long term without measures to increase competitiveness. The exchange rate depreciation can also manifest destabilizing macroeconomic effects, while the EU economy is characterized by a high degree of indebtness.

R-squared measures the accuracy with which the variable result is explained by the evolution of the variable factor, namely the measure of progress is the dependent variable explained by the independent variable. The value obtained show that 30% depreciation of the euro has implications for increasing the volume of exports, but their evolution is explained by other factors. Amid the financial crisis, the demand and international trade decreased, and currency exchange ratio was not a sufficient stimulus to influence international trade.

The link, significant weak, between the exchange rate and exports is reflected by the graphical representation of data points coordinates X (average trimestrial rates of exchange between the euro and dollar) and Y (exports expressed in million Euros) and line regression equation obtained from the econometric analysis results above. It is noted that the cloud of points with the highest density corresponds to a low rate of euro / dollar and the volume of exports.

Figure 3. The relationship between the exchange rate of the euro-dollar against EU exports
Source: Own calculations according EUROSTAT data

The positioning of points in the above chart shows that currency depreciation does not correspond to a large volume of exports. The graphical representation allows us to see that the two variables is weak link statistically significant. However, we cannot remove the theory that a depreciation of the euro products can give price advantage to foreign products.

5. Conclusion

Given the outbreak of the international financial crisis, more and more states have raised the possibility of currency depreciation to boost exports. The free-floating currency regime and Central Bank intervention in the market and especially the speculators led to low volatility in euro. The analysis on the example of the EU shows that the depreciation of the euro has little influence on exports, not being able to completely eliminate the positive effects of devaluation on export volume growth without losing any observed adverse effects that could destabilize the European economy.

6. Acknowledgement

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