INTEGRATION OF THE EUROPEAN MONETARY MARKET. A GRAVITATIONAL MODEL VIA TARGET

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Abstract

The aim of this paper is to determine the degree of integration of the European monetary market by using a gravitational model and calculate statistical indicators based on a quantity approach instead of the traditional indicators based on the law of one price; we can thereby obtain a more complete overview of the microstructure of this market. The results obtained suggest that interbank liquidity is homogeneously established among EU member states, hence backing up the thesis that the current degree of interbank integration is high and enables the effective operation of European monetary policy. In a pioneering approach, TARGET transfers have been used in order to establish the research database; such a source of information is undoubtedly ideal for a study of this nature.

Key words: TARGET, gravitational model, financial integration, European monetary market

Classification JEL: F36, G15

Introduction

Over the past decade, the European financial scene has undergone deep changes that have been further accelerated by the adoption of the Euro as the common currency, hence contributing to the process of integration of European financial markets. The significance of studying the evolution of the process of financial integration stems from the positive effects that such integration may have on risk-spreading, the efficient selection of investment programmes and the promotion of economic growth, as indicated in papers by Crucini (1999), Beck *et al.* (2000 a & b), Tsuru (2000), Bekaert *et al.* (2001), Thiel (2001), London Economics (2002), and the Gyllenhammer Report (2002), to mention just a few recent examples. On the other hand, given that the common monetary policy operates through the financial system, this system must necessarily be as efficient as possible to guarantee its effective transmission. Hence, the degree of financial integration is important when determining the effectiveness of this transmission. Furthermore, financial integration affects the structure of the financial system, which in turn influences financial stability. We should not be surprised hence, that academics, regulatory bodies and central banks have expressed interest in the latest developments in the process towards financial integration after EMU; such interest has led to numerous works in this area, among which special mention should be made of Ayuso & Blanco (1999), Centeno & Mello (1999), Danthine *et al.* (2000), Santillan *et al.* (2000), Freixas & Holthausen (2001), von Thadden (2001), Cabral *et al.* (2002), Angeloni & Ehrmann (2003), Reszat (2003) and Baele *et al.* (2004).

As we can confirm, there is an abundance of literature dealing with the quantification of the financial integration of the various markets: monetary, public debt, retail, shares and company loans. Broadly speaking, studies have focused on the estimation of models and the calculation of indicators which may be of two kinds, according to the nature of the information they use: price-based and quantity based.

The models and indicators based on prices measure the divergences in prices or the profitability of assets based on their different nationalities and provide immediate proof of whether or not the law of one price is being met. This law must be respected in an integrated financial market. In order to compare the pricing of assets, they must have sufficiently similar characteristics. Since 1999, the adoption of the Euro has made it much easier to compare assets, as the risk derived from exchange rates has been eliminated.

The analysis of the pricing evolution of assets has the fundamental advantage that it is based on the law of one price, hence enabling a quick interpretation; it is quite true nonetheless that its construction involves a certain degree of complexity.

The integration process of the European monetary market has been object of intense study ever since the Euro was introduced (see, among others, European Central Bank, 2001 & 2002; International Securities Market Association, 2003). We can practically conclude that adherence to the law of one price was achieved almost immediately, in less than one month. Hence the differentials in monetary market interest rates between countries virtually disappeared and attained a similar footing to those in domestic markets.

(Santillán *et al.*, 2000; Favero *et al.*, 2000; Gaspar *et al.*, 2001, Hartmann *et al.*, 2001 and 2003; Adam *et al.*, 2002; Baele *et al.*, 2004).

The use of models and indicators based on the study of quantities is not as widespread as those based on prices. This is basically due to the difficulty of gaining access to quality databases. Generally speaking they are used with models which analyse price variations in order to bring up additional information about the microstructures of markets as is dealt with in Bindseil & Seitz (2001), Hartmann *et al.* (2001), Adam *et al.* (2002) and Cocco *et al.* (2003). Following from this, indicators based on flows and stocks can help us effectively verify if the nationality of the actors involved is a discriminating factor when it comes to negotiating in a particular market.

Indicators based on quantities involve everything from simple descriptive statistical analysis to others of greater mathematical complexity, as is set forth in this paper. The problem presented by these indicators is that in the analysis of stocks and flows of capital stock, there is no equivalent to the law of one price; therefore there is no single test that will enable us to establish the existence or not of financial integration in the different markets. This being so, we have to resort to a whole series of statistical indicators with the aim of obtaining a true image of the process of integration.

When stocks are analysed, the interpretation of the indicators is simpler since the composition of investors' portfolios can be theoretically compared with an efficient reference portfolio.

On the other hand, the existence of cross-border capital flows is not the necessary condition nor is it sufficient in itself to sustain financial integration. It is not necessary because the law of one price is respected even when there is

an absence of flows between countries; we only need to consider that the mere threat of foreign banks entering the domestic market of a country is sufficient reason in itself for price levelling between countries. Neither is it sufficient in itself since markets may not be integrated in spite of the existence of large cross-border capital flows, if such flows do not have the effect of levelling interest rates; an example would be the case of the market power of banks varying from one country to another. Nevertheless, it may be reasonable to assume, unless there is evidence to the contrary, the existence of a certain amount of symmetry between intense cross-border flows of capital and financial integration. In this sense, special mention should be made of studies by Galati & Tsatsaronis (2001), who analyse the cross-border activity of the interbank market and Manna (2004).

The aim of this paper is to analyse the degree of integration of the European interbank market by studying the flows of transferred capital between EU member states – using information obtained from TARGET databases and this constituting a pioneering approach in the use of this source. To follow this study approach, a gravitational model will be proposed, and two indicators will be calculated which will reveal how monetary flows between various countries behave. The aim of this approach is to obtain a fresh vision of the interbank market microstructure and to establish whether or not the degree of integration attained is allowing the correct application of monetary policy of the Eurosystem.

The paper is structured as follows: Following on from the introduction, the TARGET database is described; it is this database which will be used in the successive analyses. The gravitational model will then be specified and the

results obtained will be presented. Subsequently two indicators showing the degree of European monetary market concentration will be defined and calculated. Finally the main conclusions of the paper will be set forth.

1. Database

As we have pointed out, the purpose of this study is to investigate the degree of financial integration attained in the European monetary market since the creation of a single currency by applying models and statistical techniques which will analyse the monetary flows between EU member states. The database used is made of the total cross-border operations of EU states carried out through TARGET.

TARGET is the system for the transfer of interbank funds of the Eurosystem. It has been designed as a tool to meet the objectives of the Eurosystem in that it helps to define and develop the monetary policy of the Eurozone. It is also geared at promoting the correct operation of payment systems, thereby contributing to the integration and stability of the monetary market in the Eurozone. It came into operation on January 4, 1999, the first working day of that year.

TARGET an the acronym for “Trans-European Automated Real-time Gross settlement Express Transfer system”, i.e., a system for gross settlement operating in real time. It enables domestic and cross-border transfers to take place in member states of the European Economic Area (EEA).

The system processes transfers completed in Euros. TARGET is particularly directed at the settlement of large payments, such as those concerned with

money market transactions or the foreign exchange; it cheaply transfers payments in real time while guaranteeing a high level of security.

Nonetheless, it is not limited to these uses as it enables both interbank transfers and as transfers on behalf of clients of finance companies to take place. In addition, there is no minimum transfer quantity. In any case, of all transfers that take place in the international scene, 95% of the volume transferred concerns interbank operations.

We need to bear in mind that the use of TARGET is not obligatory, neither in interbank payments nor in commercial payments. However, with the aim of limiting the systematic risk inherent in the net settlement systems for large payments, all systems of this genre which operate in Euros must carry out their settlements by way of TARGET (ECB, 2003). Payments directly concerned with monetary policy of the Eurosystem must also settle through TARGET.

Furthermore, there are currently many settlement systems which have opted to make their settlements through TARGET[1].

As has been previously explained, it can be rightfully stated that practically all payments in Euros between EMU states are settled through TARGET, hence making it an interesting instrument in measuring capital flows and the evolution of European financial integration and in analysing the microstructure of the European monetary market from a quantity-based perspective.

[1] In Spain companies which settle via TARGET are the following: Bolsa de Barcelona, Bolsa de Bilbao; Latibex; MEFF Renta Fija and MEFF Renta Variable; Sociedad española de Pagos Interbancarios (SEPI); Cámara Única (Madrid Clearing House); System Nacional de Compensación Electrónica (SNCE), Sistema de Compensación y Liquidación de Valores (SCLV); Espaclear; and Central de Anotaciones de Deuda Pública del Banco de España (CADE)

As for the TARGET structure, it is a decentralised payments system composed of the national gross settlement systems in real team (referred to as RTGS hereafter, acronym for Real Time Gross-settlement Transfer System) and the payment mechanism of the European Central Bank (EPM), both of which are interconnected.

The TARGET system makes use of the existing infrastructures in the member states: Finance companies are connected to the national RTGS[2] and hold settlement accounts in their respective national central bank. In cross-border transfers, individual payment orders are directly exchanged in a bilateral manner between the two national central banks in question, using reciprocal debit and credit accounts. The European Central Bank carries out only a few centralised functions concerning co-ordination.

As for the information available and contained in the payment orders through TARGET, it should be pointed out that payments are divided into three groups according to characteristics of the issuer and the recipient. There is hence a difference between payments by clients, interbank payments and payments of central banks. Furthermore, the ISO (International Standards Organisation) code enables the country of issue and of reception of payment to be identified among the 15 EU states and the ECB.

Additionally, we must bear in mind that TARGET is not used just to settle cross-border payments, but it also enables domestic payments to be settled; in other words, between participating institutions within the same country. In fact

[2] In order to participate directly in the RTGS national system, financial institutions must meet the requisites demanded by the corresponding national central bank. Nevertheless, if a financial institution is not a direct participant of the national RTGS, it can both order and receive cross-border payments in Euros if it is represented by a direct participant, or if it is a client of a direct participant or of a national central bank connected to TARGET.

this kind of domestic operation represents about two-thirds of the value processed by TARGET.

Finally, in relation to this database, it should be pointed out that in order to continue with the study, information about the volume of daily transfers between countries via TARGET was made available. The period studied was from January 4, 1999, when TARGET first came into operation, to December 31, 2003. This involves 1,278 TARGET working days corresponding to the first 60 months of its existence. Thus, for each working day of TARGET for a period of five years, the data concerning sums of money issued and received between each member state of the EU and the rest of the EU states have been available for study.

2. The gravitational model

The gravitational model has its origins in the studies concerning the international trade where an attempt was made to explain the commercial flows between countries. According to these studies, the volume of trade between two countries depends mainly on the size of their economies and the costs of transport; these factors tend to come together as a function of the distance between both countries[3]. The literature in this field is quite extensive and continually expanding, particularly in the area of empirical studies. From a theoretical perspective, the most notable works are those by Anderson (1979), Evenett & Keller (1998) and Anderson & van Wincoop (2003).

[3] As can be observed, the basic variables of the model, size of the economies and distance between them, clearly evoke Newton's theory of gravity in that the force of gravity depends on the mass of the bodies and the distance between them, hence the name given.

In the field of financial markets, the gravitational model has also been applied to determine international financial flows, as a complement or alternative to models of portfolio compositions.

Pioneering works dealing with these aspects include those by Martin & Rey (1999) and Portes & Rey (2000). These authors propose a model in which the buying and selling of shares between countries depends on the size of the stock markets of both countries, estimated as the size of stock capitalisation, and negotiation costs, which are measured by the distance[4] between the countries. Additionally, there are variables which specifically capture the transmission of information, such as the number of telephone calls between countries, and the number of bank branches belonging to international banks; asymmetries of information between national and foreign investors[5]; and the degree of sophistication of the financial markets.

This model enables almost 70% of the variance in the volume of transactions to be explained. Of noteworthy interest is the inclusion of dummy variables, which can capture the effects on the volume of transactions of such variables as the common language, common border, common currency, or belonging to the same trading block, effectiveness of the legal system, and the existence of financial centres in a country, do not improve the initial

[4] In studies which use the gravitational model in the area of international commercial flows, the variable "distance" is used as a proxy of transport costs. Nevertheless, in the sphere of financial markets its meaning must be reinterpreted, as it will be more closely linked to transaction costs and information asymmetries. In fact, given what we find in studies of international trade, it may be a good idea to give this variable the necessary expanded meaning.

[5] French & Poterba (1991a & b), Gehrig (1993) and Kang & Stulz (1997), among others, demonstrated the relevance of the asymmetry of information in the making up of portfolios.

specification of the model. Our attention is also drawn to the fact that these authors scarcely come up with evidence that would support the theory of the international diversification of portfolios as proposed by Frankel (1982); according to this theory, investors seek to maximise profitability and minimise risk and this could be interpreted as symptomatic of the lack of integration of international financial markets.

Other more recent studies where the gravitational model is applied with success analyse the globalisation process of financial markets and the repercussion of the domestic bias. Such studies are those by Buch (2003), where international banking activity is studied, Buch *et al.* (2004), Faruqee *et al.* (2004), from a portfolio-creating perspective, and Mody *et al.* (2003), who focuses on direct foreign investment.

2.1. Specification of the model and results

Hereunder a gravitational-type model is proposed in order to describe which factors are involved in the flow of capital between EU countries whether or not they belong to the EMU.

To select the explanatory variables, we shall base on the gravitational theory. We first need to select variables representative of the size of the market of each country, such as the total value of transfers through TARGET (both domestic and cross-border), or the GDP. Second, we have to select variables which capture the distance, in this case, the distance between the financial centres of each European country. In all cases, the financial centres coincide with the capital cities of the countries, with the exception of Frankfurt, in the

case of Germany, and Milan, for Italy. Finally, it was decided that dummy variables would be introduced in the model, these having diverse characteristics: use of a common language[6], adjacent location of countries[7], belonging to the EEC since its inception in 1957[8], transfers between Germany and United Kingdom[9], and belonging or not to EMU[10].

The natural logarithm of the average volume of daily transfers through TARGET (DP) was selected as the dependent variable and it was applied to each pair of countries in the period 1999–2003. Given that the sample is made up of 15 countries, it involves a 15 x 15 matrix of observations. The diagonal would have to be removed as it represents the size of the domestic market.

As representatives of the size of the economies, the chosen figure was result of the multiplication of the transferred sums through the local component

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[6] It is considered that the following countries share a common language: Germany, Austria and Luxembourg, German; France, Belgium and Luxembourg, French; The Netherlands and Belgium, Dutch; United Kingdom and Ireland, English; and Sweden and Finland, Swedish. The variable takes up the value of 1 if the two countries involved in the transfer share the language; otherwise it takes up the value of 0.

[7] The variable takes up a value of 1 if the two countries involved in the operation share a border; otherwise the value is 0.

[8] For countries that founded the EEC, we can assume a deeper knowledge of each other due to the number of years they have been involved in the integration process. The *dummy* variable takes up a value of 1 if the two countries involved in the transaction are founding states of the EEC; otherwise the value is 0.

[9] This dummy variable is included to verify the hypothesis, put forward by the Deutsche Bundesbank (2000) claiming that Germany acts as an intermediary between the Euro area and countries which have not adopted the Euro; in particular with the United Kingdom, the capital of which, London, is home to one of the largest foreign exchange markets in the world. The variable takes up the value of 1 for transfers from Germany to the United Kingdom and vice-versa; the value is 0 in all other cases.

[10] States which are not members of EMU, due to the fact they have not adopted the Euro as their national currency, can present behaviour different to the rest of the countries. It has been decided to exclude the United Kingdom from this group, given its condition of a world financial centre. Greece, which joined the EMU in 2001, is not included either. The variable takes up a value of 1 when the transaction involves one of these countries, whether as an issuer or receiver; the value is 0 in all other cases.

of TARGET for each pair of countries (EM) by the product of the GDPs (MGDP). The distance (D) between countries will be, as has been pointed out, the distance between their respective financial centres. The logarithmic transformation of these variables was carried out to minimise as much as possible any heteroscedasticity problems. The remaining variables are: membership of the EEC (EEC), the common language (CL), common border (CB), transaction between Germany and the United Kingdom (L), and non-membership of the EMU, excluding the United Kingdom (NEMU).

Once the potential variables were selected, with the aim of carrying out an initial selection and to avoid multicollinearity problems, the correlation matrix was calculated.

Table 1. Correlation Matrix

	DP	EM	MGDP	D	L	CB	CL	EEC	NEMU
DP	1,00								
EM	,83**	1,00							
MGDP	,76**	,82**	1,00						
D	-,67**	-,44**	-,24**	1,00					
L	,24**	,13	,21**	-,11	1,00				
CB	,46**	,31**	,24**	-,55**	-,07	1,00			
CL	,26**	,07	-,09	-,50**	-,01	,51**	1,00		
EEC	,49**	,43**	,22**	-,60**	-,11	,49**	,36**	1,00	
NEMU	-,29**	-,46**	-,11	,11	-,07	-,08	-,10	-,24**	1,00
** significant at 99% * significant at 95%									

As we can observe in the correlation matrix, the variables with the greatest explanatory power are those which are related with the size of the market and

distance. Furthermore, the signs are perfectly coherent with those predicted by the economic theory: The volume of transfers increases as the size of markets increases, and decreases as a function of the distance between both markets. Among the variables representative of the size of the market, we select ME, given that its correlation with the dependent variable is greater[11]. The reason for that correlation is that the dependent variable refers to the volume transferred between countries, and the explanatory variable EM captures the size of countries precisely as a function of the total volume transferred.

As for possible multicollinearity problems, it is easy to check that the correlation between explanatory variables is only very high in the case of variables EM and MGDP (0,82). In the case of variables D, EEC, CL and CB, the correlation is around 0.5. As the variable D will be included in the model, because it has appeared in all previous works and has the highest correlation with the dependent variable, it is interesting to obtain the partial correlation matrix with variable D as the control variable.

As can be observed in the partial correlation matrix, (Table 2), variable CL ceases to be significant and variables EEC and CB have lost a substantial amount of explanatory power.

Furthermore, if we include variable EM and variable L as the control variables, we can also verify that variables EEC and CB are no longer significant (Table 2).

[11] Nevertheless, the regressions have been repeated including the variable MGDP instead of EM. In these cases there have been problems of heteroscedasticity and an insufficient specification of the model according to Ramsey's reset test.

Table 2. Coefficients of partial correlation

Controlling for .. D				
	DP	CB	CL	EEC
DP	1,00			
CB	,14*	1,00		
CL	-,11	,33**	1,00	
EEC	,16*	,23**	,09	1,00
** significant at 99% * significant at 95%				

Controlling for.. D ME					
	DP	CB	CL	EEC	L
DP	1,00				
CB	,11	1,00			
CL	,05	,35	1,00		
EEC	-,05	,22**	,14*	1,00	
L	,25**	-,16*	-,06	-,25**	1,00
** significant at 99% * significant at 95%					

Once the preliminary studies have been carried out, we can proceed to the task of estimating the various models. The method of least mean squares will be used. The basic model will first be estimated[12], and it includes as explanatory variables EM and D.

$$PD = C + \beta_1 ME + \beta_2 D \qquad [1]$$

[12] When estimating the model with a complete sample of 210 observations, the existence of an outlier was detected; it captures the transfers from Finland to Sweden, and in many cases prevented the hypothesis of normality of residues from being met. It was decided to eliminate this observation.

The results are shown in Table 3:

Table 3. Regression analysis. Basic Model

Dependent Variable: PD

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-10.02065	2.121845	-4.722613	0.0000
ME	0.615684	0.030234	20.36389	0.0000
D	-0.947692	0.080094	-11.83218	0.0000
R-squared	0.819728	Akaike info criterion		2.300406
Adjusted R-squared	0.817977	Schwarz criterion		2.348382
F-statistic	468.3573	Prob(F-statistic)		0.000000

As can be observed, the adjusted R^2 obtained is 0.818, greater to that obtained in Portes & Rey (2000). Furthermore, we can explicitly verify that the model meets the basic hypotheses of normality and homoscedasticity, and when the Ramsey reset test is applied, we find that there are no specification problems.

The aforementioned dummy variables were then included[13], and the result showed that only variable L improved the model. The remaining variables are not significant. furthermore, the model presents heteroscedasticity problems (even when applying the transformations by White & Newy-West) and specification errors, detected in Ramsey's reset test.

[13] Different combinations of dummy variables have been tried out, but the result obtained has always been the same: lack of significance in CB, CL, EEC and NEMU. Additionally, the model has been estimated taking as variable representative of size the variable MGDP. In these cases an error of specification was detected according to Ramsey's reset test.

The estimated model was the following:

$$PD = C + \beta_1 ME + \beta_2 D + \beta_3 L + \beta_4 CB + \beta_5 IC + \beta_6 EEC + \beta_7 NUEM \quad [2]$$

The result is shown in Table 4.

Table 4. Regression Analysis. Amplified Model

Dependent Variable: DP

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-11.11989	2.438794	-4.559587	0.0000
EM	0.622853	0.034787	17.90462	0.0000
D	-0.875161	0.107551	-8.137179	0.0000
L	0.857915	0.212672	4.033974	0.0001
CB	0.223936	0.183676	1.219190	0.2242
CL	-0.116900	0.237456	-0.492301	0.6230
EEC	0.025200	0.196646	0.128152	0.8982
NEMU	0.239639	0.135117	1.773566	0.0776
R-squared	0.836677	Akaike info criterion		2.249511
Adjusted R-squared	0.830990	Schwarz criterion		2.377447
F-statistic	147.0991	Prob(F-statistic)		0.000000

As was expected, after calculating the partial correlation, variable CL was not significant. This result is in line with results obtained by Portes & Rey (2000). The reason for this can be that the front office operators of financial institutions negotiate in English and the most relevant information required for decision-making is also in this language; hence it is not necessary to speak the other European languages. In the opposite case, it would be an aspect that would warrant serious consideration, given that liquidity flows in the EU would

be determined by the number of countries sharing a common language, which would hinder the management of liquidity in financial institutions with offices in countries with minority languages. This would create stumbling blocks for the common monetary policy.

Neither are the variables EEC and CB significant. The variable EEC is an approximation to the flow and quality of the information to measure the existence of asymmetries of information between the founding-states of the EEC and the rest. It has been shown hence that the countries which created the EEC do not share exclusive relevant information[14].

In relation to the variable CB, the fact that states may share a common border does not condition the volume of transfers. This is due to the fact that the effect that this circumstance could have on the explanatory variable has already been captured by the explanatory variables EM and D, as has been demonstrated by the partial correlation analysis.

The final model is specified thus:

$$PD = C + \beta_1 ME + \beta_2 D + \beta_3 L \qquad [3]$$

Table 5 shows the result of the regression analysis.

[14] This information refers to, for example, the management of credit lines and, broadly speaking, the control of credit risk between financial institutions.

Table 5. Regression Analysis. Final Model

Dependent Variable: PD

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-9.516403	2.054781	-4.631346	0.0000
EM	0.604407	0.029362	20.58500	0.0000
D	-0.931651	0.077519	-12.01830	0.0000
L	0.807800	0.205037	3.939780	0.0001
R-squared	0.832416	Akaike info criterion		2.236989
Adjusted R-squared	0.829964	Schwarz criterion		2.300957
F-statistic	339.4232	Prob(F-statistic)		0.000000

The inclusion of the variable L has incremented the adjusted R^2 to practically 83% and the AIC obtained is inferior to that of previous models. The model agrees with the basic hypotheses of normality and homoscedasticity, and is correctly specified according to Ramsey's reset test.

This model is parsimonious in that it only requires three explanatory variables; nonetheless, in spite of its simplicity, it manages to explain a fairly high percentage of the variance in the dependent variable.

Interpreting the significance of the model, we see that the variables related with the volume of interbank transfers between any two EU countries, are firstly the joint size of both countries in terms of transfers via TARGET and secondly, the distance between the financial centres of both countries. Examining the sign of the coefficients, we can determine that the volume of transfers between countries increases as interbank activity increases in the countries in question, while the distance between countries have a negative effect on the volume transferred.

In relation to the term independent, its negative sign shows us that even for countries which are neighbours, it is necessary for the domestic interbank market to reach a minimum size before transfers with other countries can take place.

Adding the dummy variable L to the basic model has proven to be significant and appears in the model with a positive sign. It indicates that between Germany and the United Kingdom there is a much greater transfer of capitals than the value obtained if the variables used in the model are EM and D. Hence the importance of Germany as a counterpart for the British market which in turn maintains its pre-eminence in the international foreign exchange market. These results reflect the predominant role of Germany in the European interbank scene, as well as the importance of London as a financial centre, which acts as an intermediary between European markets and the rest of the markets in the world.

Conclusions

This paper has studied the degree of integration in the European monetary market and has examined its microstructure in the period between 1999 and 2003 by analysing gross monetary flows between countries. A quantity-based approach was followed instead of the usual approach stemming from the convergence of prices, which offers an original perspective and enables new information to be obtained concerning the running of the European monetary market.

The monetary flows were obtained from the TARGET database. This database, which had not been used before in the analysis of the financial integration process, is the only one that enables us to carry out a study of this nature as TARGET liquidates the sum total of payments directly related to the monetary policy of the Eurosystem and practically the whole of the interbank operation which represents 95% of the volume transferred between countries.

A gravitational model has been estimated to identify the variables which determine the flow of capital between EU countries. The results confirm the relevance of the variables “size of market” and “distance”, which are inherent in the standard basic specification of the model. However the “market size” variable has a much greater influence than the variable “distance” Furthermore, the dummy variable which captures the transfers between Germany and the United Kingdom, is also significant. The final model proposed has high descriptive power, with an adjusted R^2 of 83%, this being superior to values obtained by other similar models in the literature.

When an attempt is made to improve the model by including other variables such as language, sharing a common border, belonging to the EMU or being a founding member of the EEC, it has been shown that these variables are not significant.

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