ISSN 2392-1641

Economics and Business Review

Volume 1 (15) Number 2 2015

CONTENTS

ARTICLES

BOOK REVIEWS

Poznań University of Economics Press

Paper based publication

ISSN 2392-1641

POZNAŃ UNIVERSITY OF ECONOMICS PRESS
ul. Powstańców Wielkopolskich 16, 61-895 Poznań, Poland
phone +48 61 854 31 54, +48 61 854 31 55, fax +48 61 854 31 59
www.wydawnictwo-ue.pl, e-mail: wydawnictwo@ue.poznan.pl
postal address: al. Niepodległości 10, 61-875 Poznań, Poland

Printed and bound in Poland by:
Poznań University of Economics Print Shop

Circulation: 300 copies

Economics and Business Review, Vol. 1 (15), No. 2, 2015: 130–148
DOI: 10.18559/ebr.2015.2.7

Investments and long-term real interest rate in Poland. Study of investment structure, current account and their correlation with long-term real interest rates[1]

Jakub Krawczyk, Szymon Filipczak[2]

Abstract: One of the effects of the globalization of financial markets is unhampered international capital flows that can be freely reallocated amongst different countries. Considering that the investor's aim is to look for the most profitable investment opportunities, they have natural inducement to invest in emerging economies. Taking into account differences in the level of interest rates between Poland and developed economies we claim that the contribution of foreign capital in domestic investments decreases the cost of capital in Poland. The two main aims of this paper are to identify crucial channels of foreign capital flows to Poland and to find out whether co-financing by foreign investment in Poland influences the domestic cost of capital (long-term real interest rate). Our findings, based on empirical analysis, appear to confirm that there is a connection between the structure of investors and the cost of capital.

Keywords: international finance, current account, investments, interest rate, capital flows.

JEL codes: E22, E43, E44, F21, F30.

Introduction

Long term economic success of every country is inseparable from growth of effective investments, especially financed by private capital. They create fundamentals for other components of the economy, such as private consumption or industrial production. Significant role of investments for economy was a matter of interest for many academics. They investigated it from a perspective of

[1] Article received 20 May 2014, accepted 19 February 2015.

[2] Poznań University of Economics, Department of Capital Investments and Financial Strategies, al. Niepodległości 10, 61-875 Poznań, Poland, corresponding author: kuba-krawczyk@wp.pl.

real economy as well as from financial perspective. Overtime second issue has gained on importance due to, among others, global competition for capital.

The main focus in this paper are investments, as a crucial component of Gross Domestic Product (GDP) growth (see Figure 1). It played a vital part in the transformation of developing economies towards those more market-oriented. We would like to analyze it in the Polish context as one of the biggest European economies, that used to be a part of communist block and now is a European Union (EU) member and benefited from a high increase of investment flows over years (see Section 2).

Investment was one of the GDP growth component in recent years, especially positively contributing in 2011, what is illustrated in Figure 1. On the other hand, in last available quarters (third quarter 2012 – second quarter 2013) investment contributed negatively and GDP growth was maintained mostly by net export.

It is obvious that there is a link between investment and GDP growth, however our aim was not to prove such a relationship, as it has already been analyzed by others. For example Rydarowska-Kurzbauer [2012] calculated that the correlation coefficient of GDP growth rate versus changes in investments amounted to 0.955 for Poland in the period 2000–2007. Our goal has been to investigate the historical investment patterns, relationships between foreign in-

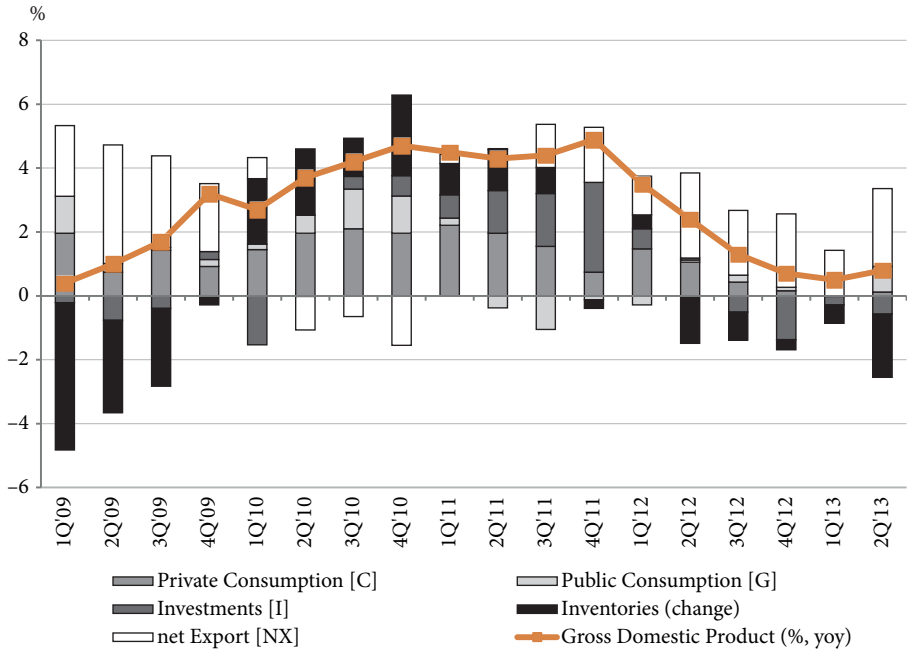

Figure 1. GDP real growth and the contribution of main components, 1Q'2009 – 2Q' 2013

Source: Eurostat

vestment flows and the real interest rate as well as the identification of the most important channels of cash flows that end up as an increase in the fixed capital formation in Poland. What is more, we believe that findings from this research may help a better understanding of Polish future economy developments.

The paper is divided into three sections and a conclusion. The first section is devoted to a literature overview. In the second section we make a short overview of historical data associated with our research field. The third section deals with empirical analysis substantiating our claim.

1. Literature overview

Investments in the Central and Eastern Europe (CEE) region and particularly in Poland have been the subject of numerous studies most of which, however, did not approach it in a broader context (we would like to emphasise that we have focused on studies which concern the CEE region). Most authors dealt with one specific channel of investment and investigated determinants and effects for the economy resulting from it (e.g. foreign direct investments (FDI)). Sometimes in analyses of flows to the CEE region authors put more stress on regional factors and did not go into specific reasons for certain situations in Poland, which is the centre of our interest. What is more, usually interest rates were not at the forefront (in the context of foreign investment) and frequently were not deeply investigated. Additionally, some of the analyses were prepared some time ago; therefore, do not cover recent developments.

A wide-ranging study of foreign capital flows to the region that we are interested in was conducted by Claessens, Oks & Polastri [2000]. They investigated capital flows to the whole of Central and Eastern Europe and the former Soviet Union in the period from 1990 till 1997. Their scope of interest was the whole region rather than one particular country; however, some of their findings were relevant for major countries in the region, including Poland. They brought out the fact that in the beginning of Polish transition investment flows were dominated by official flows, which has changed towards a more balanced official versus private split over the years (parallel to an increase in investment over that time). The bulk of increasing private flows took the form of FDI driven by the Polish good macro performance, the convertibility of the currency, moderate fiscal deficit and favourable prospects for EU membership. About 20% of them were accounted for by privatization. Of course the liberalization of the capital account was gradual in the early 90's with preference for long-term investments at the beginning which had its impact on the flow structure [Arvai 2005]. Claessens, Oks & Polastri also tried to approach the interest rate influence on investments (especially portfolio investments), by calculating interest rate differentials (domestic interest rate corrected for the devaluation and London Interbank Offered Rate (LIBOR)) and comparing it with non-equity

portfolio investments which led them to the conclusion that there is a positive association. Claessens, Oks & Polastri found on the basis of output analysis that private flows, and FDI in particular, were determined first by reform efforts and then by prospective EU membership and credit worthiness. It is of interest that the sustainability of capital flows was associated with the continuation of reform efforts. It implies a source of financing (public versus private) and type of flows (reforms support FDI investments whilst they have a negative impact on short-term debt flows). Foreign Direct Investments flows were further investigated by others. Dunning [1993] focused on determinants and divided motives for FDI into four groups: resource seeking, market seeking, efficiency seeking and strategic asset seeking. It had been investigated in the Polish context by Gorynia, Nowak, and Wolniak [2007], who have analyzed seven cases of FDI in Poland in the 90's with respect to the first three motives pointed out by Dunning and concluded that foreign investments were motivated by market seeking (e.g. looking for access to the new market) and efficiency seeking (e.g. low labour cost). In any case resource seeking was identified as an important factor. Number of theories explaining internationalization and FDIs were revived and categorized by Trąpczyński [2014, p. 33] in his study of determinants FDI performance in the internationalisation process of Polish companies. Nevertheless he focused on outward FDI from Poland.

Following Claessens, Oks, and Polastri [2000] study, Garibaldi, Mora, Sahay, and Zettelmeyer [2001] looked at 25 economies in the region (transition economies in Europe and the former Soviet Union) and analyzed in greater detail the heterogeneity of capital flows to transition economies in quantitative terms. What is more, their study covered three more years (1991–1999) and was primarily focused on direct and portfolio investments for which Garibaldi, Mora, Sahay, and Zettelmeyer ran regression. Their studies show that direct investment patterns can be explained by a set of standard economic fundamentals. Inward direct investments are attracted mainly by a macroeconomic environment (measured by economic growth and a high fiscal balance as well as state of economic liberalization), economic reforms (using EBRD Trade and Foreign Exchange Index), the privatization methods (insider privatization discourages direct investments whilst equal access for foreign investors encourages same) and the presence of natural resources. What is of interest is that their sample does not reveal that wages have a stimulating impact on direct investments. In terms of portfolio investment a relatively small number or explanatory variables have been noted (at least in the model in question). The presence of market infrastructure and the protection of property rights seem to be the only significant factors.

Ancypowicz [2009] looks into FDI's evolution in the context of Polish accession to the European Union. She points out that the influence of accession should not be overestimated and states that the amount of greenfield investments after accession was lower than the amount of reinvested earnings and

bank borrowings of companies that were already present in Poland before EU accession; therefore their impact on GDP growth was not that significant (based on the data from the years 1995–2008 she calculated the correlation between GDP growth and investments to be 0.89, however GDP growth versus FDIs was only 0.25). In our opinion, investments that were made before EU accession were probably somehow anticipating Polish accession; therefore, they should be taken into account as well. Nevertheless, foreign investments provided a major stimulus for domestic entrepreneurs to develop their businesses (improve organization, logistics, technology) so as to be able to compete successfully). Bijsterbosch and Kolasa [2009] draw attention to the positive impact of FDIs as well, concluding that FDI inflows played an important role in accounting for productivity growth in the CEE region (with critical dependence on the capacity to absorb).

International capital flows and their impact on economy growth in CEE countries that joined the European Union in 2004 and 2007 were also investigated by Śliwiński [2011]. He performed an analysis of determinants for capital and financial accounts. Based on the research of others [e.g. Calvo, Leiderman, and Reinhardt 1993; Hernandez, Mellado, and Valdes 2001; Carlson and Hernandex 2002; Ralhan 2006; Culha 2006; Schmitz 2009 and others] he created a list of potential determinants for CEE the region and tried to verify them using GLS, OLS and LSDV methods. He found out that there is a limited effect of international interest rates and GDP growth in the EU on flows to CEE countries that were chosen for the study. On the other hand, there was a positive relationship between domestic GDP growth and capital flows. A similar positive relationship has been established with the real currency rate. What is not surprising is that he found out that there is a negative relationship between budget deficit and portfolio flows. Changes in the overall current account deficit (which we treat as a foreign capital inflow – it is explained later) were investigated by Sobański [2010]. He carried out a signal analysis and logistic regression for developing countries (including some of the CEE countries). He found out that e.g. low export/foreign debt ratio or low export dynamics may predict some current account adjustments that result in changes in their value. What is interesting from our perspective, Sobański concluded that the higher the difference between domestic and foreign interest rate, the lower the risk of rapid current account adjustments.

Going beyond the analyses discussed above the consequences of such flows are interesting as well. In a somewhat broader context they were looked at by Janicka [2008]. She points out that the liberalization of capital flows has a number of advantages such as better capital allocation, efficiency improvement of domestic companies, the possibility of creating more diversified portfolios of investments and a decrease in cost of capital for companies. The latter point was confirmed by Henry [2000] who investigated 11 developing countries (unfortunately none of them from the CEE region) and proved that there are good

grounds for accepting a supporting thesis that stock market liberalization positively influences investments (it is worth mentioning that Henry's contribution focused on private investments). On the other hand, Janicka [2008] mentions that liberalization might create some threats such as the outflow of domestic capital, difficulties in macroeconomic and monetary policies, a possible decrease in tax inflows (due to capital outflow). According to Stiglitz, Janicka mentioned also that especially short-term capital might generate a risk of financial crisis and destabilization that might not be compensated for by advantages of liberalization. In a narrower context (only FDI, not capital flows in general) the effects of foreign investments on the Polish economy were investigated by Weresa [2009]. She reviewed literature on that topic and found out that from a theoretical point of view it was proven that FDIs might have a positive or negative influence on specific area of an economy (e.g. trade) depending on circumstances and countries. She claimed that FDIs have two opposite effects on investment activity in Poland. First, they increase the level of available financing, thereby support investment by entities with foreign capital. On the other hand, it indirectly limits the investment potential of domestic competitors. According to Weresa, FDI has a positive impact on the labour market by creating new jobs directly (especially through greenfield investments) as well as indirectly. What is more, they have a positive impact on labour efficiency. Weresa's analysis of FDI suggests that in the case of Poland it has rather positive consequences on trade (due to the fact that foreign capital usually flows to sectors in which Poland has comparative advantages). Impact on innovation of an economy depends on the sector; sometimes FDIs have positive influence (e.g. car industry) or there is no correlation (e.g. high tech). On the other hand, Weresa investigated portfolio investments which had positively affected the development of the Polish capital market (however a high level of foreign portfolio flows might create risks as well). Nevertheless FDIs have a bigger impact on the economy than portfolio investments.

The importance of the structure of capital flows – one of our main objects in this paper – was also brought up by Mitra [2011]. However, Mitra went a step further and tried to investigate flows distinguishing those that end up in the real estate sector. According to her research flows to this sector have a greater impact on GDP (surges and collapses) than other sectors. Nevertheless it shows that the destination and channel of capital flow matter, especially in the context of possible financial crises and swings in GDP.

2. Historical data overview

At this point we would like to make a short overview of historical data associated with our research field. Based on Eurostat data we divided investments into the following groups: households, financial corporations, non-financial

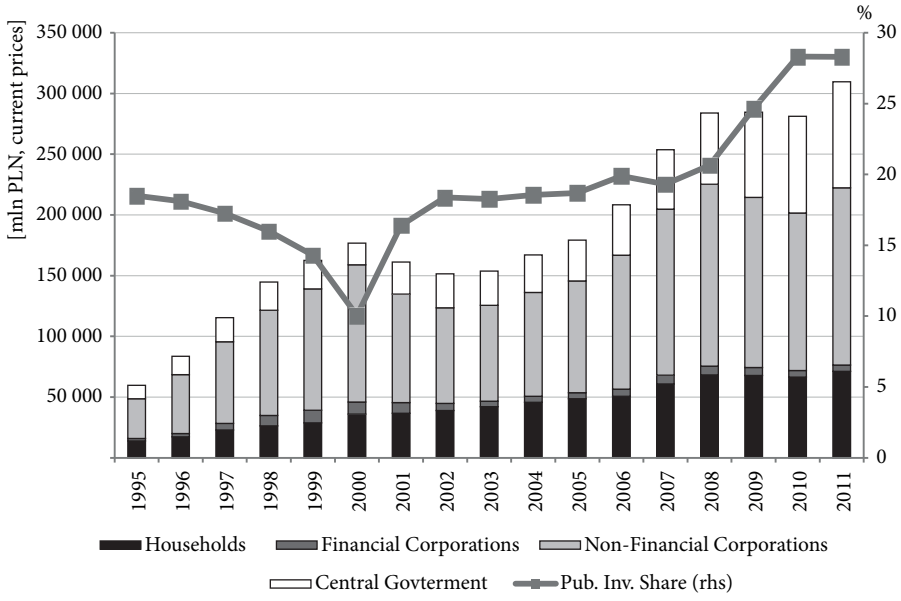

Figure 2. Structure by investor of the gross fixed capital formation in Poland, 1995–2011
Source: Eurostat

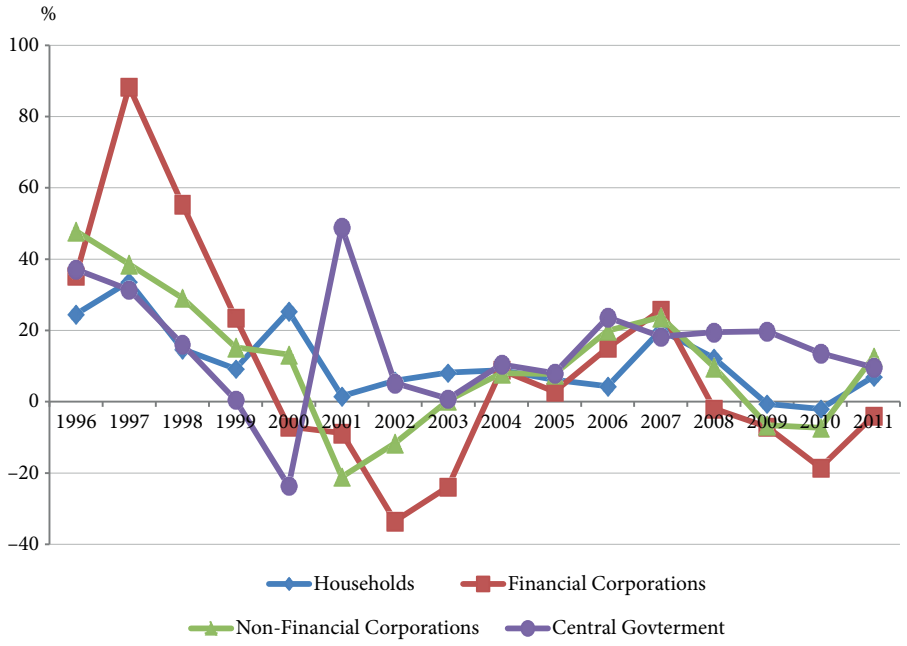

Figure 3. Nominal growth rates of gross fixed capital formation made by the following groups, 1996–2011
Source: Eurostat

corporations and central government. Absolute data and the nominal growth of those groups are illustrated in Figure 2 and Figure 3.

Over the years the main source of investments in Poland were non-financial corporations (see Figure 2), however with a negative growth rate observed in the period from 2000 to 2004 and from 2008 to 2011 (see Figure 3). It coincided with the economic situation at that time. Investments by financial corporations were more volatile but their value was not that important for the economy (as illustrated in Figure 2). Much more stable were household investments which were mainly associated with the purchase of real estate. The government of the country made a significant contribution to investments as well (see Figure 2). What is of interest in times of economic uncertainty public investments were characterized by a positive nominal growth rate which was probably an effect of an expansionary fiscal policy. Moreover, assuming that the current account balance equals investment and domestic savings in the economy (CA = S – I), so the current account deficit can be treated as foreign capital inflow (foreign investment) and the current account surplus can be treated as capital outflow and we define relationship of current account to investments as a share of investment financed by foreign investors. Given this assumption, Figure 4 illustrates the structure of financial investments in Poland over the years.

As illustrated in Figure 4 domestic capital was the main source of investment financing in Poland in recent years. This is of course not surprising tak-

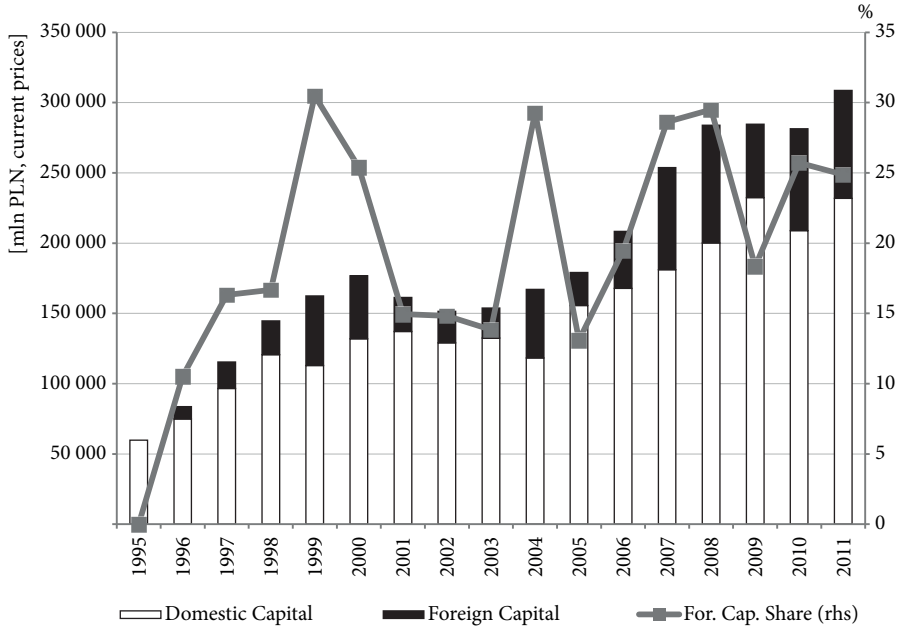

Figure 4. Structure of financial investment in Poland, 1995–2011
Source: Eurostat

ing into account that liberalization of capital flows started in 90's (as mentioned in Section 1) and therefore foreign capital started to gain importance around 1995. In longer perspective share of foreign capital amounted from ca. 13% to 30% of overall investments.

3. Analyses of investment's relationship with the long-term interest rate

One of the two goals of this paper is to look for connections between foreign capital flows and the long-term real interest rate in Poland. In our study we consider the real long-term interest rate as an approximation of cost of capital for the Polish economy. We would like to leave aside discussion about the best definition of a real interest rate. Taking into account that investments are characterized by their long-term nature, in our calculation we define the real rate as the yield of the tenyear Polish government bonds denominated in polish zloty adjusted by current consumer price index (CPI). Moreover the relationship of the current account to investments tells us what share of investments was financed by foreign capital. Considering that the level of interest rates in Poland is more attractive for investors from developed economies (because it is higher) it creates an inducement to invest in Poland. Clearly there are some additional risks associated with investment abroad and especially risks associated with investment in emerging market which should be taken into consid-

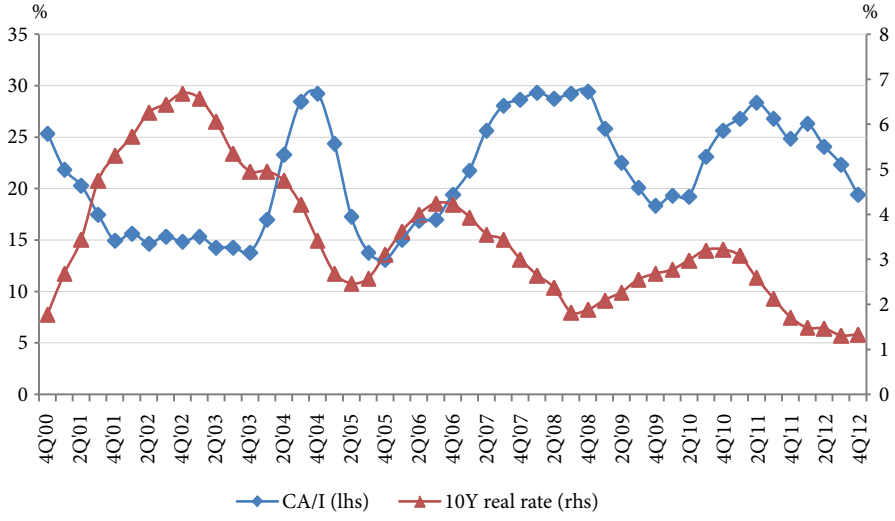

Figure 5. Fourth quarter averages of the current account relative to investments and the ten-year real rate, 4Q'2000–4Q'2012
Source: Eurostat, NBP, Bloomberg

eration. Under that assumption the level of interest rates should be influenced by the presence of foreign investors because they create additional demand for domestic investment and above all they are benchmarked to their local rates.

To test that hypothesis we collected quarterly data for the period 2000–2012. To minimize the influence of seasonal factors we decided to work on fourth quarter average real rate (data shown in Figure 5).

In general, relation of current account to investments vary from 13% to 30%. Interest rate, after 2002/2003, was in downward trend.

The results basically confirm our expectations and that which Janicka [2008] points out after Henry [2000] in terms of the decreasing cost of capital after stock market liberalization. The share of investments financed by foreign investors is negatively correlated with the long-term real rate, Pearson's r coefficient is –0.61. Based on 49 observations we carried out regression analysis, that is statistically significant. P-value is 0.0000038 that is less than assumed level of significant $\alpha = 0.05$ (Table 1).

Table 1. Regression summary output

Regression Statistics						
Multiple R	0.607					
R Square	0.368					
Adjusted R Square	0.355					
Standard Error	0.012					
Observations	49					
ANOVA						
	df	SS	MS	F	Significance F	
Regression	1	0.004	0.004	27.388	0.000	
Residual	47	0.007	0.000			
Total	48	0.011				
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	0.071	0.007	9.935	0.000	0.057	0.085
CA/I	–0.170	0.032	–5.233	0.000	–0.235	–0.104

It is worth mentioning that R square is 0.36 therefore there are some other factors determining the interest rate. This finding is consistent with Claessens, Oks, and Polastri conclusion that there is a positive link between interest rate differentials and capital flows. Additionally we decided to illustrate the path of data relations which can be helpful in identifying crucial moments (Figure 6).

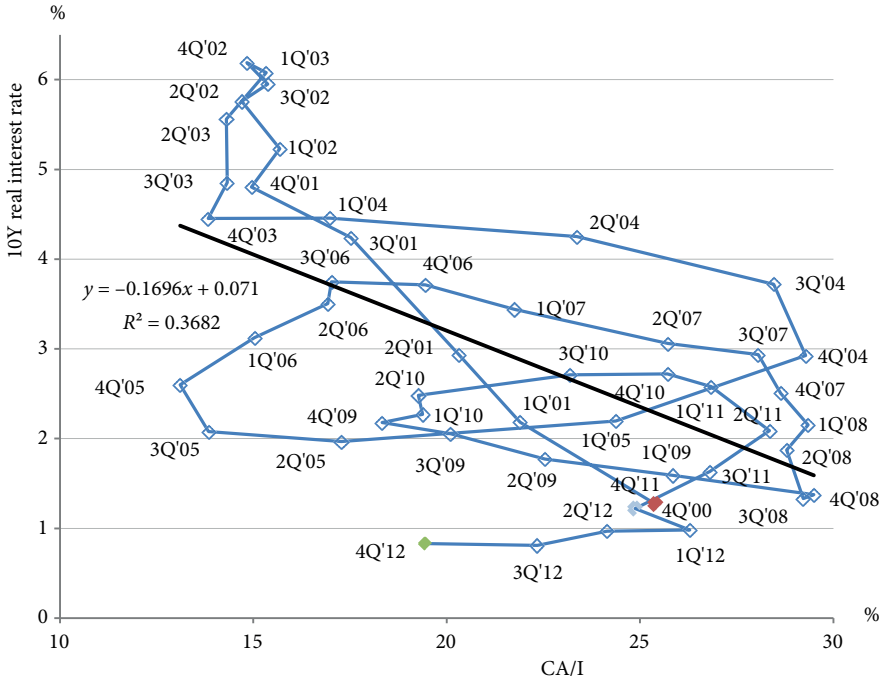

Figure 6. Path of relations of the current account relative to investments and the ten-year real interest rates, 4Q'2000–4Q'2012

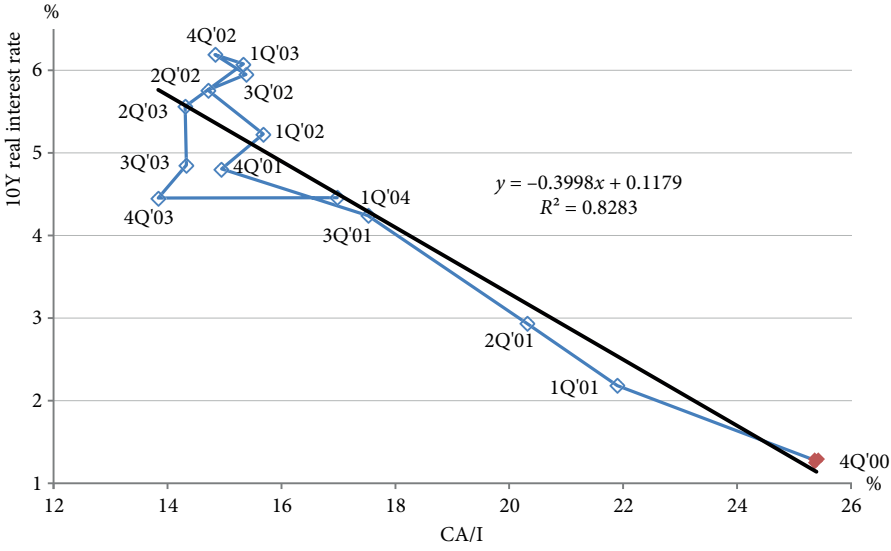

Figure 7. Path of relations of the current account relative to investments and the ten-year real interest rate, 4Q'2000–1Q'2004

What is interesting is that since Poland's accession to the European Union (2Q'04) the relationship started to change and became much more volatile (data in Figure 7 versus data in Figure 6) which might have been the result of the capital flow liberalization that is required in the EU accession process [Arvai 2005]. Figure 7 illustrates the path of the relationship up to 1Q'04, once Figure 6 gives broader perspective. The above conclusions give us a background for further analysis, however at this point it seems reasonable to sum up critical views about our results. First of all, the interest of foreign investors in capital allocation in emerging markets is partly affected by market sentiment in a broad sense. One may say that a negative sentiment is also the reason for the rising yield of government bonds and therefore data would be falsely correlated. Secondly, the assumption that the long-term real rate is considered a cost of capital for Polish economy it should be influenced mostly by the level of investment, regardless of its origin (domestic or foreign). Last but not least, our study makes use of relative data (the share of foreign financed investment to overall investment) but a perspective on absolute data would also be worthy of note. We opted for relative data to neutralize the effect of inflation and changes in the level of investment.

We next attempted to establish which channels of capital flow are most significant. The current account is financed mostly by the financial account but what is characteristic for Poland (and similar CEE economies) is that the capital account is crucial, mostly caused by European Union co-funding. On the basis of data provided by the National Bank of Poland, we classified specific channels into categories: capital account, net FDI, long-term capital flows, short-term capital flows, others, errors and omissions and change in official reserves. Additionally, long-term capital flows were subdivided into government debt flows and credit flows, whereas, short-term flows were divided into equity, government debt and credit. In order to identify the most important channels we used the Principal Component Analysis (PCA), which helps to limit the number of variables to the most important. PCA procedure starts with the creation of correlations matrix (Table 2). The next step requires the calculation of eigenvectors and eigenvalues (Table 3). To confirm calculation correctness Aw must be equal to λw (Table 4). At the end PCA tells us how much each factor contributes to the total variance of the data (Table 5). Results show that the capital account, net FDI and long-term capital flows are responsible for over 70% of the total variance. Long term credit, equity, short term debt and short term credit had definitely lower contribution. It is compatible with previous research, that short-term flow has a speculative character and should not be taken into consideration in the fundamental analysis (see Section 1).

Taking into account only long-term flows in relation to all investments (Figure 8) and repeating the above procedure we find out that that the correlations with the long-term real rate is still strong and statistically significant, $r = -0.59$ (Table 6). Based on 49 observations we carried out regression analy-

Table 2. Correlation matrix of channels of capital flow

Correlation matrix	CapAc	net FDI	LT Gov. debt	LT Credit	Equity	ST Gov. debt	ST Credit	Others	Errors and omissions	Reserve
CapAc	1.000	–0.051	0.178	0.376	0.397	0.163	–0.151	–0.041	–0.420	–0.151
net FDI	–0.051	1.000	0.039	0.164	–0.263	–0.178	–0.105	–0.156	–0.065	–0.189
LT Gov. debt	0.178	0.039	1.000	–0.341	0.235	–0.260	–0.161	–0.167	–0.134	–0.498
LT Credit	0.376	0.164	–0.341	1.000	–0.085	0.216	0.113	0.068	–0.500	0.110
Equity	0.397	–0.263	0.235	–0.085	1.000	–0.104	–0.170	–0.259	–0.092	0.027
ST Gov. debt	0.163	–0.178	–0.260	0.216	–0.104	1.000	0.070	0.144	–0.220	0.123
ST Credit	–0.151	–0.105	–0.161	0.113	–0.170	0.070	1.000	–0.103	–0.004	0.259
Others	–0.041	–0.156	–0.167	0.068	–0.259	0.144	–0.103	1.000	–0.306	–0.547
Errors and omissions	–0.420	–0.065	–0.134	–0.500	–0.092	–0.220	–0.004	–0.306	1.000	0.070
Reserve	–0.151	–0.189	–0.498	0.110	0.027	0.123	0.259	–0.547	0.070	1.000

Table 3. Eigenvectors and Eigenvalues of the correlation matrix of channels of capital flow

	CapAc	net FDI	LT Gov. debt	LT Credit	Equity	ST Gov. debt	ST Credit	Others	Errors and omissions	Reserve
Eigenvalues	2.0846	2.0082	1.6559	1.2805	0.9169	0.7359	0.5515	0.4260	0.3035	0.0370
CapAc	0.5040	0.0884	0.3482	−0.0424	0.0499	−0.0486	−0.4603	0.3011	0.5501	−0.0703
net FDI	0.0198	0.0690	−0.2257	−0.7683	0.1340	−0.1913	−0.0702	−0.4609	0.1918	−0.2120
LT Gov. debt	0.0750	0.5652	0.1127	−0.0693	−0.4059	−0.3486	0.2261	0.2495	−0.2351	−0.4499
LT Credit	0.4313	−0.3702	0.0261	−0.3184	0.0279	0.2494	−0.1574	0.2267	−0.6358	−0.1772
Equity	0.1308	0.2468	0.5750	0.1860	0.0830	0.2474	−0.0705	−0.6543	−0.2095	−0.1082
ST Gov. debt	0.2439	−0.3441	−0.0200	0.3203	0.1536	−0.7860	−0.0586	−0.2231	−0.1477	−0.0516
ST Credit	−0.1275	−0.3428	0.0306	−0.0042	−0.8430	0.0143	−0.3112	−0.2222	0.0886	−0.0201
Others	0.2897	0.0241	−0.5640	0.3924	0.0023	0.3045	0.0055	−0.1678	0.1720	−0.5413
Errors and omissions	−0.5624	0.0803	−0.0109	0.0890	0.2483	−0.0561	−0.6559	0.1299	−0.1767	−0.3551
Reserve	−0.2467	−0.4764	0.4053	−0.0509	0.1061	0.0474	0.4144	0.1045	0.2583	−0.5314

Table 4. Testing if $Aw = \lambda w$

Aw									
1.050754	0.17752	0.576639	−0.054329	0.045747	−0.035742	−0.253855	0.128293	0.166991	−0.002601
0.041367	0.138497	−0.373697	−0.983813	0.122821	−0.140752	−0.03872	−0.196349	0.058205	−0.007845
0.156437	1.135109	0.186535	−0.088688	−0.372201	−0.256545	0.12469	0.106301	−0.071354	−0.016646
0.899187	−0.74352	0.04327	−0.407705	0.025554	0.183556	−0.086806	0.096592	−0.192988	−0.006556
0.272733	0.495676	0.952087	0.238203	0.076105	0.182065	−0.038891	−0.278732	−0.063598	−0.004002
0.508532	−0.691062	−0.033142	0.41017	0.140798	−0.57843	−0.032336	−0.095062	−0.044821	−0.001908
−0.265741	−0.688484	0.050632	−0.005392	−0.772906	0.010532	−0.171604	−0.094655	0.02689	−0.000742
0.603821	0.048355	−0.933892	0.502439	0.002123	0.224093	0.003042	−0.071497	0.052212	−0.020024
−1.17231	0.161343	−0.018007	0.114006	0.227694	−0.041271	−0.361698	0.055353	−0.053648	−0.013138
−0.51421	−0.956727	0.671122	−0.065235	0.097247	0.034889	0.228547	0.044527	0.0784	−0.019661
λw									
1.050754	0.17752	0.576639	−0.054329	0.045747	−0.035742	−0.253855	0.128293	0.166991	−0.002601
0.041367	0.138497	−0.373697	−0.983813	0.122821	−0.140752	−0.03872	−0.196349	0.058205	−0.007845
0.156437	1.135109	0.186535	−0.088688	−0.372201	−0.256545	0.12469	0.106301	−0.071354	−0.016646
0.899187	−0.74352	0.04327	−0.407705	0.025554	0.183556	−0.086806	0.096592	−0.192988	−0.006556
0.272733	0.495676	0.952087	0.238203	0.076105	0.182065	−0.038891	−0.278732	−0.063598	−0.004002
0.508532	−0.691062	−0.033142	0.41017	0.140798	−0.57843	−0.032336	−0.095062	−0.044821	−0.001908
−0.265741	−0.688484	0.050632	−0.005392	−0.772906	0.010532	−0.171604	−0.094655	0.02689	−0.000742
0.603821	0.048355	−0.933892	0.502439	0.002123	0.224093	0.003042	−0.071496	0.052212	−0.020024
−1.17231	0.161343	−0.018007	0.114006	0.227694	−0.041271	−0.361698	0.055353	−0.053648	−0.013138
−0.51421	−0.956727	0.671122	−0.065235	0.097247	0.034889	0.228547	0.044527	0.0784	−0.019661
TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE

Table 5. Share of total variance

Factor	Eigenvalue	[%]	[Σ %]
CapAc	2.084642	20.85	20.85
net FDI	2.008222	20.08	40.93
LT Gov. debt	1.655852	16.56	57.49
LT Credit	1.280483	12.80	70.29
Equity	0.916881	9.17	79.46
ST Gov. debt	0.735918	7.36	86.82
ST Credit	0.551451	5.51	92.33
Others	0.426014	4.26	96.59
Errors and omissions	0.303541	3.04	99.63
Reserve	0.036996	0.37	100.00

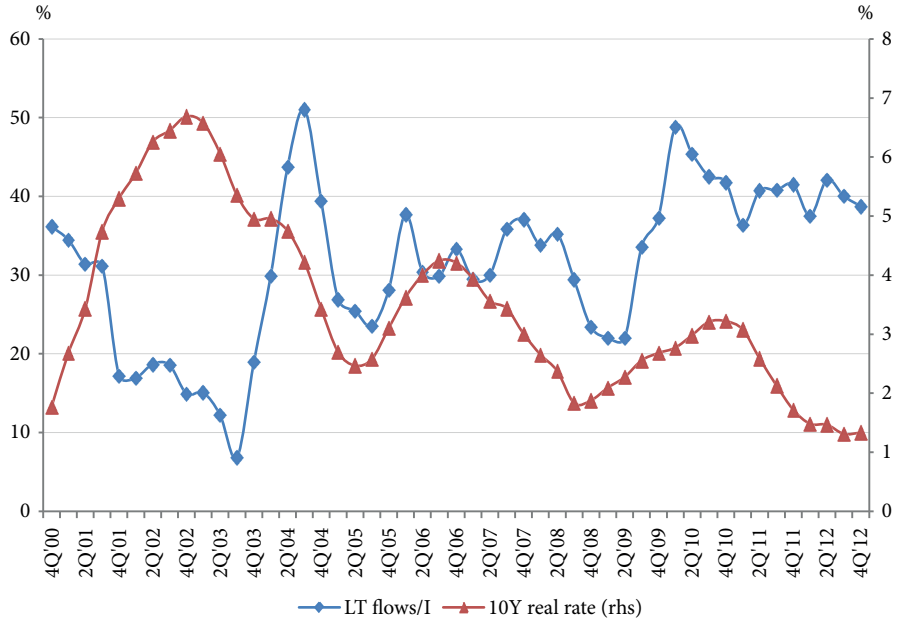

Figure 8. Fourth quarter averages of long-term flows relative to investments and the ten-year real rate, 4Q'2000–4Q'2012

sis, that is statistically significant. P-value is 0.000010 that is less than assumed level of significant $\alpha = 0.05$, R square amounted to 0.3435. We think that this analysis can be useful for further studies of the foreign capital flows influence on the domestic economy.

Table 6. Regression summary output

Regression Statistics						
Multiple R	0.5861					
R Square	0.3435					
Adjusted R Square	0.3295					
Standard Error	0.0122					
Observations	49					
ANOVA						
	df	SS	MS	F	Significance F	
Regression	1	0.004	0.004	24.587	0.000	
Residual	47	0.007	0.000			
Total	48	0.011				
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	0.062	0.006	10.735	0.000	0.050	0.074
LT flows/I	–0.087	0.018	–4.959	0.000	–0.122	–0.052

Conclusions

A short overview of historical statistics for investment in Poland shows us that the most important source of them were companies whose activity coincided with the economic situation. On the other hand public investment were characterized by a positive nominal growth rate at the time of economic uncertainty. Households investment were much more stable but were mainly associated with the purchase of real estate. This paper aimed to identify crucial channels of foreign capital flow to Poland and find out whether co-financing by foreign investment influences the domestic cost of capital in Poland. To test our hypothesis we analyzed empirical data for the period 2000–2012. Based on our analysis we state that the cost of capital, measured as a long-term real interest rate, is influenced by foreign capital flows. Share of investments financed by foreign investors is negatively correlated with the long-term real rate ($r = -0.61$). In our opinion, the reason for it is that foreign investors are willing to accept lower interest rate because it is still higher than on developed markets. Moreover, the results of the Principal Component Analysis suggest that the most important channels of capital flow are capital account (mainly effect of co-funding investment by the EU), net FDI and long-term flows. They are responsible for over 70% of the total variance. It provides background for further analyses.

One might carry out similar research in respect of a wider range of countries, especially from Eastern Europe. Another question which our paper raises is how the level of disparity of the interest rate between developed and emerging economies influences the domestic cost of capital.

References

Ancypowicz, G., 2009, *Wpływ bezpośrednich inwestycji zagranicznych na wzrost polskiej gospodarki w okresie poakcesyjnym*, Główny Urząd Statystyczny.

Arvai, Z., 2005, *Capital Account Liberalization, Capital Flow Patterns, and Policy Responses in the EU's New Member States*, IMF Working Paper, no. 213.

Bijsterbosch, M., Kolasa, M., 2009, *FDI and Productivity Convergence in Central and Eastern Europe: An Industry-level Investigation*, ECB Working Paper Series, no. 992.

Calvo, G.A., Leiderman, L., Reinhart, C., 1993, *Capital Inflows and Real Exchange Rate Appreciation in Latin America: The Role of External Factors*, IMF Staff Paper, no. 40.

Carlson, M., Hernandez, L., 2002, *Determinants and Repercussions of the Composition of Capital Inflow*s, Board of Governors of the Federal Reserve System International Finance Discussion Paper, no. 717.

Claessens, S., Oks, D., Polastri, R., 2000, *Capital Flows to Central and Eastern Europe and the Former Soviet Union*, National Bureau of Economic Research (Capital Flows and the Emerging Economies: Theory, Evidence and Controversies): 299.

Culha, A.A., 2006, *A Structural VAR Analysis of the Determinants of Capital Flows into Turkey*, Central Bank Review, no. 2: 11–35.

Dunning, J.H., 1993, *Multinational Enterprises and the Global Economy*, Addison-Wesley Publication Company, Harlow, Essex.

Garibaldi, P., Mora, N., Sahay, R., Zettelmeyer, J., 2001, *What Moves Capital to Transition Economies?*, IMF Staff Papers, vol. 48: 109–145.

Gorynia, M., Nowak, J., Wolniak, R., 2007, *Motives and Modes of FDI in Poland: An Exploratory Qualitative Study*, Journal for East European Management Studies, vol. 12, no. 2: 132–151.

Henry, P.B., 2000, *Do Stock Market Liberalization Cause Investment Booms?*, Journal of Financial Economics, vol. 58, no. 1–2: 301–334.

Hernandez, L., Mellado, P., Valdes, R., 2001, *Determinants of Private Capital Flows in the 1970s and 1990s: Is There Evidence of Contagion?*, IMF Working Paper, no. 64.

Janicka, M., 2008, *Liberalizacja przepływów kapitałowych – korzyści i zagrożenia*, Bank i Kredyt, vol. 39, no. 3: 34–49.

Mitra, P., 2011, *Capital Flows to EU New Member States: Does Sector Destination Matter?*, IMF Working Paper, no. 11/67.

Ralhan, M., 2006, *Determinants of Capital Flows: A Cross Country Analysis*, Econometrics Working Papers, no. 0601, Department of Economics, University of Victoria.

Rydarowska-Kurzbauer, J., 2012, *GDP Fluctuation and Changes in Consumption and Investment. Comparative Analysis of Polish Economy and Some Countries of the European Union*, Equilibrium – Quarterly Journal of Economics and Economic Policy, vol. 7, iss. 3: 52.

Schmitz, M., 2009, *Financial Reforms and Capital Flows to Emerging Europe*, The Institute for International Integration Studies, IIIS Discussion Paper, no. 278.

Sobański, K., 2010, *Empiryczne modele oceny stabilności deficytu obrotów bieżących w krajach rozwijających się i ich aplikacja w krajach Europy Środkowo-Wschodniej*, in: Najlepszy, E., Sobański, K. (red.), *Niestabilność równowagi zewnętrznej krajów rozwijających się*, PWE, Warszawa.

Stiglitz, J.E., 2000, *Capital Market Liberalization, Economic Growth, and Instability*, World Development, vol. 28, no. 6: 1075–1086.

Śliwiński, P., 2011, *Przepływy kapitału międzynarodowego a wzrost gospodarczy w krajach Europy Środkowo-Wschodniej w latach 1994–2008*, Wydawnictwo Uniwersytetu Ekonomicznego w Poznaniu, Poznań.

Trąpczyński, P., 2014, *Determinants of Foreign Direct Investment Performance in the Internationalisation Process of Polish Companies*, Doctoral dissertation, Poznań University of Economics, Poznań, http://www.wbc.poznan.pl/dlibra/docmetadata?id=325673&from=publication [access: 31.10.2014].

Weresa, M.A., 2002, *Skutki inwestycji zagranicznych dla gospodarki kraju przyjmującego – doświadczenia Polski*, Zeszyty BRE Bank – Centrum Analiz Społeczno-Ekonomicznych, Fundacja Naukowa, nr 62.

Aims and Scope

Economics and Business Review is the successor to the Poznań University of Economics Review which was published by the Poznań University of Economics Press in 2001–2014. The Economics and Business Review is a quarterly journal focusing on theoretical and applied research work in the fields of economics, management and finance. The Review welcomes the submission of articles for publication dealing with micro, mezzo and macro issues. All texts are double-blind assessed by independent reviewers prior to acceptance.

Notes for Contributors

1. Articles submitted for publication in the Economics and Business Review should contain original, unpublished work not submitted for publication elsewhere.
2. Manuscripts intended for publication should be written in English and edited in Word and sent to: review@ue.poznan.pl. Authors should upload two versions of their manuscript. One should be a complete text, while in the second all document information identifying the author(s) should be removed from files to allow them to be sent to anonymous referees.
3. The manuscripts are to be typewritten in 12' font in A4 paper format and be left-aligned. Pages should be numbered.
4. The papers submitted should have an abstract of not more than 100 words, keywords and the Journal of Economic Literature classification code.
5. Acknowledgements and references to grants, affiliation, postal and e-mail addresses, etc. should appear as a separate footnote to the author's name[a, b, etc] and should not be included in the main list of footnotes.
6. Footnotes should be listed consecutively throughout the text in Arabic numerals. Cross-references should refer to particular section numbers: e.g.: See Section 1.4.
7. Quoted texts of more than 40 words should be separated from the main body by a four-spaced indentation of the margin as a block.
8. Mathematical notations should meet the following guidelines:
   - symbols representing variables should be italicized,
   - avoid symbols above letters and use acceptable alternatives (Y*) where possible,
   - where mathematical formulae are set out and numbered these numbers should be placed against the right margin as... (1),
   - before submitting the final manuscript, check the layout of all mathematical formulae carefully (including alignments, centring length of fraction lines and type, size and closure of brackets, etc.),
   - where it would assist referees authors should provide supplementary mathematical notes on the derivation of equations.
9. References in the text should be indicated by the author's name, date of publication and the page number where appropriate, e.g. Acemoglu and Robinson [2012], Hicks [1965a, 1965b]. References should be listed at the end of the article in the style of the following examples:
   Acemoglu, D., Robinson, J.A., 2012, *Why Nations Fail. The Origins of Power, Prosperity and Poverty*, Profile Books, London.
   Kalecki, M., 1943, *Political Aspects of Full Employment*, The Political Quarterly, vol. XIV, no. 4: 322–331.
   Simon, H.A., 1976, *From Substantive to Procedural Rationality*, in: Latsis, S.J. (ed.), *Method and Appraisal in Economics*, Cambridge University Press, Cambridge: 15–30.
10. Copyrights will be established in the name of the E&BR publisher, namely the Poznań University of Economics Press.

More information and advice on the suitability and formats of manuscripts can be obtained from:

Economics and Business Review
al. Niepodległości 10
61-875 Poznań
Poland
e-mail: review@ue.poznan.pl
www.puereview.ue.poznan.pl

Subscription

Economics and Business Review (E&BR) is published quarterly and is the successor to the Poznań University of Economics Review. The E&BR is published by the Poznań University of Economics Press.

E&BR is listed in ProQuest, EBSCO, and BazEkon.

Subscription rates for the print version of the E&BR: institutions: 1 year – €50.00; individuals: 1 year – €25.00. Single copies: institutions – €15.00; individuals – €10.00. The E&BR on-line edition is free of charge.

Correspondence with regard to subscriptions should be addressed to: Księgarnia Uniwersytetu Ekonomicznego w Poznaniu, ul. Powstańców Wielkopolskich 16, 61-895 Poznań, Poland, fax: +48 61 8543147; e-mail: info@ksiegarnia-ue.pl.

Payments for subscriptions or single copies should be made in Euros to Księgarnia Uniwersytetu Ekonomicznego w Poznaniu by bank transfer to account No.: 96 1090 1476 0000 0000 4703 1245.