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**INTERNATIONAL MIGRATION AND THE ROLE OF REMITTANCES
IN EASTERN EUROPE**

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Abstract

Many studies have addressed the effect of migration on both home and host countries, but few have focused on the effect of the economic flows derived from migration, especially for the Central and East European (CEE) countries. In this paper we analyse the effect of remittances on employment performance for CEE economies. To model the macro effects of remittances on the source country we proceed along the lines of Mancellari *et al* (1996) who extended the model of Aghion and Blanchard (1994) by adding migration. The impact of remittances on unemployment depends on its effect on productivity growth and entrepreneurial investment. In order to empirically analyse the impact of remittances we estimated a productivity equation using a set of 11 transition countries during the 1990-1999 period. We also analyse the impact of remittances on investment and consumption. Our results show support for the view that remittances have a positive impact on productivity and employment both directly and indirectly through its effect on investment.

JEL Classification: E24, J61, O15

Keywords: Unemployment, migration, remittances.

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INTERNATIONAL MIGRATION AND THE ROLE OF REMITTANCES IN EASTERN EUROPE

1. Introduction

The relationship between migration and development in poor countries has been a topic of debate for a long time. There are two main views. The negative view holds that international migration results in an increase in the dependency of the country of origin on remittances and, furthermore, it distorts the development process since the remittances only benefit the “lucky” few, creating wealth disparities and therefore political and economic unrest. The other view regards remittances as one of the key factors in poverty alleviation in labour-sending countries and a good source of economic development.¹

The unresolved debate about the positive and negative effects of remittances on countries of emigration notwithstanding, there is no doubt that the amount of remittances is sizeable and an important source of foreign exchange for most developing countries, and Central and East European countries (CEECs) are no exception.² Although the poorest seldom have the means to migrate, remittances have been shown to play an important role in poverty alleviation for migrant households and in sub-national areas of out migration, especially in countries with high income and wage disparities like Albania, Bulgaria, Romania and FYR Macedonia.

Most of the literature on the role of migration and remittances in developing countries is

¹ For a more detailed discussion of costs and benefits of international migration see Finkle and McIntosh (1982), Russell (1986) and Keely and Tran (1989).

² Total remittance credit for selected CEEC in 1999 was \$7 billion. However, this figure is probably much lower than the real one since transfers of illegal immigrants are not included in the official calculation.

based on the traditional model of migration in which only long-term migration is studied (see for example, Birks and Sinclair, 1980; Gilani *et al*, 1981; Ebiri, 1985; Lucas and Stark, 1985; Gunatilleke, 1992). However, this has changed in a significant way since the collapse of the Soviet Union. Migration from most of the CEECs is short-term or “temporary” rather than long-term or “permanent.”³ The difference between the ‘temporary’ migration models and the traditional ones in terms of impact rests on two aspects. First, short-term migrants are able to use their newly acquired skills relatively quickly in the home country. Secondly, the main component of the migrant’s savings or remitted funds from earnings abroad is not consumption⁴ but rather the use of those funds in productive activities in the home country. Emigration, therefore, will have a positive effect on employment through both skill formation and increased investment through remittances.

One of the main reasons for migration from CEECs to the European Union is the significant wage gap between the two regions.⁵ GDP per capita in Eastern Europe at the end of the 1980s was 1/8th of the average in Western Europe and fell by as much as 10% (up to 12% in Bulgaria) by 1991. The transition process exacerbated the already beleaguered economies resulting in massive increases in unemployment rates in most of the CEECs.^{6,7} Therefore, for

³ By “temporary” we mean migration for less than a year and more than 2 months whereas “permanent” is anywhere between one year and 20 years. However, both are labour migrations as opposed to other kinds of movements, i.e., due to war, famine, etc.

⁴ Most studies on the use of remittances conclude that a substantial portion of remittances is consumed rather than invested in productive activities (for reviews see Papademetriou and Martin, 1991 and Taylor *et al*, 1996).

⁵ For an overview of push and pull factors in the migration process in CEECs, see Piracha and Vickerman (2001).

⁶ For instance, the unemployment rate in Bulgaria and Poland was nearly 11% in 1991 and is still quite high at nearly 10%.

⁷ The speed of transition has been an important issue of debate since 1990. A high speed of transition is considered good because it reduces uncertainty which would make the business decision environment more efficient and consequently positively affect the private sector. On the other hand, a slow speed is reckoned ideal since that will mean slower adjustment of the

the unemployed, an alternative has been to migrate temporarily to western Europe. This has benefits both for the individual/family and for the overall economy of the source country. At the individual level the migrant earns wages by gaining employment and acquires skills which can enhance the migrant's chances of getting employment after returning to the home country. Migration also helps overcome any capital constraints that an individual may face in the home country to start an enterprise. The benefit to the country is a lower unemployment level and therefore less burden on the welfare system. In addition, returning migrants bring the much needed capital which could help the development process of the home country.⁸

The purpose of this paper is to study the macroeconomic impact of migration on selected Central and East European countries, by analysing the contribution of return migrants to the development process after transition. As far as we are aware, this is the first systematic analysis of the effect of return migration on the Central and East European region. In addition, whereas previous models of migration have concentrated on the role of emigration as an alternative avenue for labour force adjustment, our paper, taking a simple theoretical framework as a starting point, empirically tests the significance of return migration as a source for economic development in the emigration countries.

economy from state-owned to private-owned enterprises which results in a lower level of unemployment at any given period of time. So far there is no clear-cut answer to the issue. Poland went the slow route and made successful progress. Czech Republic, Hungary, Estonia and Latvia took the speedy route which worked well for them but Russia, which took the same route was much less successful. The results are similarly mixed for other countries.

⁸ This is a well established fact in most of the traditional migrating countries. For example, Adelman and Taylor (1990) show that Mexico's GNP increased by at least \$2.69 for every dollar remitted or brought back from migrants earning abroad and Robinson (1986) shows that almost 86% of the Pakistan's trade is financed from remittances from overseas Pakistanis. See Taylor (1999) for a longer bibliography of studies that show positive effects of migration on countries like South Korea, Bangladesh, Sri Lanka etc.

Two aspects of migration are considered: (i) the role of migration on the productivity levels of return-migrants and (ii) the role of remittances on the macroeconomic performance of selected CEEC.⁹ We hypothesise that returning migrants may bring skills that contribute to economic prosperity in the home country through higher productivity levels. In addition, remittances/retained savings may be used both to finance consumption and used in productive entrepreneurial activities which contribute to wealth generation and therefore creation of jobs.¹⁰ We find that an increase in the number of return migrants increases labour productivity and that remittances encourage both investment and consumption.

The rest of the paper is organised as follows. In the next section we outline the economic model of remittances. Section 3 presents the empirical analysis and the last section concludes the paper.

2. Theoretical Framework

The macroeconomic gains of migration and remittances on the source country can be formalised along the lines of Mancellari *et al* (1996) who extended the model of Aghion and Blanchard (1994) by adding migration. The model will allow us to extract a set of conditions under which migration and remittances may positively affect employment. It is primarily concerned with job creation and destruction after the privatisation of industries since 1990. We assume that a person could either be employed in the private or state sector or be

⁹ Bulgaria, Croatia, Czech Republic, Hungary, Macedonia, Poland, Romania, Russia, Slovakia, Slovenia, and Ukraine.

¹⁰ Note that we are only concerned with the macroeconomic effects of migration. For an analysis of the optimal activity choice of migrants after returning, see Dustmann and Kirchkamp (2001).

unemployed. The option for the unemployed is either to remain in the country and earn unemployment benefits or migrate and earn wages.¹¹ Assuming that a fraction α remains in the ‘source’ country, we have $U^s = \alpha U$, where U^s is the number of unemployed who remain in the source country and U is the total unemployment, i.e. unemployed who remain in the source country plus those who migrated.

One important difference between migration from the CEE countries and those of the more traditional countries is that most of the CEECs migration is temporary. Therefore, the unemployed are assumed to migrate for only one period and are hence back either to look for a job or set-up a business in the source country in the next period. The value functions of an unemployed and employed individual are written, respectively, as follows:

$$iV^U = \alpha b + (1 - \alpha)w^* + (H/U)(V^N - V^U) + dV^U / dt \quad (1)$$

$$iV^N = w + dV^N / dt \quad (2)$$

where i is the interest rate, V^U is the value of being unemployed, V^N is the value of being employed in the private sector, b is the unemployment benefit received in the home country and w^* is the wage rate in the foreign country net of costs. H is the job creation in the private sector which depends on the gap between the average product of labour γ and the cost of labour w , which is the wage rate.¹²

$$H = a(\gamma - w). \quad (3)$$

We can now interpret equation (1). The first two terms on the right hand side determine the expected return on unemployment in the first period, i.e. before migration. The second term is

¹¹ Note that we restrict our attention to the role migration and remittances play in achieving higher investment and productivity levels in Central and East European countries. Therefore we use the option of employment in the state and private sector only to make the model tractable rather than for any analysis of flow of employment from state to private sector.

¹² The wage rate includes the tax per employee paid by the firm.

the difference between the value of being employed and unemployed weighted by the rate of outflow from unemployment (H/U) and the third term is the intertemporal value of being unemployed.

Subtracting equation (1) from equation (2), we get the wage equation

$$w = \alpha b + (1 - \alpha)w^* + k(i + H/U) \quad (4)$$

where $k > 0$ is the difference between V^N and V^U and is constant.¹³ Note that the foreign wage is net of any remittances sent home to the rest of the household who had forgone consumption to finance migration. A part of remittances (and retained savings that the migrant takes home upon his return) are in turn used to establish businesses at home which, along with the proportion of unemployed who migrate, could positively affect the average product in the source country. This is given by

$$\gamma = \gamma^* + \beta(1 - \alpha)w^* \quad (5)$$

where γ^* is the average product in the absence of migration and β captures two different aspects of migration: (a) the extent to which foreign earnings are used in financing new businesses and (b) the effect migration has on the average product of labour through skill formation.¹⁴

Substituting equations (4) and (5) in (3) we get the final equation

$$H = \frac{aU}{U + ak} [\gamma^* - ik - (1 - \beta)(1 - \alpha)w^* - \alpha b] \quad (6)$$

¹³ This is due to efficiency wage considerations. It also implies that $dV^N / dt - dV^U / dt = 0$.

¹⁴ Skills include experience of working in an efficient, market-oriented and entrepreneurial environment.

To determine the impact of emigration on the labour market of the source country differentiate equation (6) with respect to α ,

$$\frac{\partial H}{\partial \alpha} = \frac{aU}{U + ak} [(1 - \beta)w^* - b] \quad (7)$$

which is negative when $\beta \geq 1$, i.e., migration has positive impact on the labour market if it improves the average product of labour in the source country and generates investment through remittances.¹⁵ However, if $\beta < 1$ then the above expression is negative only if

$\frac{w^*}{b} < \frac{1}{1 - \beta}$, which means that migration is only beneficial if either the foreign wages are low

or domestic benefits are high. The intuition is as follows. Emigration in the presence of higher benefits results in an increase in domestic wages which results in an increase in job creation whereas a lower w^* means that there is lower pressure on wages in the domestic country. However, if we consider the total effect of migration, i.e., increased productivity due to the skill formation aspect of migration and increased investment due to remittances and/or retained savings then it is reasonable to assume that $\beta > 1$.

3. An Empirical Assessment

The model presented in the last section illustrates the ways in which migration and remittances can have a positive impact on employment. From there we obtained three conditions under which migration would reduce unemployment. The first condition, i.e. a high wage gap and low social protection at home, can safely be considered true for migration

¹⁵ In dynamic terms one can think of $(1 - \alpha)$ as net migration effect, i.e., the effect of return migrants on average labour productivity. Therefore differentiating equation (6) with respect to $(1 - \alpha)$ we get a term proportional to $(\beta - 1)w^*$ which is positive for $\beta > 1$ and hence migration has a positive impact on job creation.

from CEECs to EU countries. The second and third conditions, i.e. that returned migrants have a positive impact on labour productivity and that remittances help starting-up new businesses, are clearly subject to empirical investigation. In this section we analyse the impact of migration on labor productivity as well as the effect of remittances and received employees' compensation on both investment and consumption in a panel of CEECs. This analysis has relevance even outside the context of the particular model presented here. For instance, the mere analysis of the impact of remittances on investment and consumption will contribute to test the validity of the hypothesis that remittances encourage excessive consumption and dependency.

The econometric estimates consist of a productivity equation, an investment function and a consumption function. The first one includes 11 countries: Bulgaria, Croatia, Czech Republic, FYR Macedonia, Hungary, Poland, Romania, Russia, Slovakia, Slovenia and Ukraine. The investment and consumption functions exclude Russia due to problems of data availability for remittances in the balance of payments. The period of estimation is 1990-1999. The panel is unbalanced and for many countries we could only use a few contiguous years of data. Hence, the number of observations will change depending on the variables included. The main data sources are Countries in Transition (2000) from the Vienna Institute for International Economic Studies (WIIW, 2000) and the TransMONEE 2000 database from the Innocenti Research Centre of the UNICEF (2000). A more detailed description of the variables and sources used is given in the Appendix.

Table 1 provides the results for the productivity equation. We regress the log of labour productivity on net migration, measured as the number of net migrants per 1000 population

plus a set of control variables.¹⁶ According to the model, returning migrants will have a positive effect on productivity and we expect the coefficient on net migration (NETMIG) to have a positive sign. In column one we provide the fixed effects estimates including the investment-output ratio (IO), share of agriculture in GDP (AS), foreign direct investment flows as a percentage of GDP (FDI) and the gross enrolment rate in secondary education (EDU). All the variables have the expected sign except FDI, and EDU is not significant. The fact that FDI has a negative impact is not due to a lagged effect since column 2 presents the random effects estimate¹⁷ of the same equation including the lagged value of FDI and we found its coefficient very small and insignificant. The negative – and significant – impact of FDI on productivity may be due to the fact that FDI destroys excess production at a faster rate than it destroys employment and its positive effects cannot be captured for this short period of time using annual data.

We also tried several specifications including the effect of inflation (INFL), and inflation squared (INFL²) to capture non-linearities. In no case were they found to be significant. The inclusion of the degree of openness (OPEN) turns out to be highly significant as shown in column 4. Column 5 shows the estimation of the same equation from column 4 but using a mixed random-fixed effects specification. On inspection of the correlation of the independent variables with the fixed effects we only found IO to be significantly correlated. Hence, we compute a fixed effects estimation of the equation using instrumental variables for IO¹⁸ to obtain the error variances assuming that only IO is correlated with the fixed effects. We then

¹⁶ TransMONEE provided migration data from CEECs as “net migration” only, which they defined as inflows minus outflows.

¹⁷ The choice of a GLS estimator is based on the Hausman test.

¹⁸ The instruments used for IO are its deviations from the mean IO for each country. This estimator is similar to that proposed by Hausman and Taylor (1981).

use these error variances to compute the GLS estimator, which is more efficient. Finally, in column 6 we include the lagged value of the productivity level since some signs of autocorrelation were found before. Although $PROD_{t-1}$ was found not significant, it would be preferable to use GMM estimation methods for this equation. However, when using a simple 1st-stage GMM estimator, the instruments are found to be weak. We could only use the variables lagged once as instruments. This is because introducing a second lag made the computation of the estimator impossible due to lack of degrees of freedom. Therefore given the limited number of observations, GMM methods are not an appropriate choice.

The important aspect of these estimates is that the coefficient of NETMIG remains stable and significantly greater than zero in all equations. The semi-elasticity of productivity with respect to migration seems to be robust and takes a value of around 0.039. This implies an average elasticity across the 11 countries of 0.0126. Given a standard deviation of net migration across the panel of more than 200, this could imply a large effect. Therefore it could be concluded that the return of migrants to the country of origin has had a positive impact on labour productivity in the last 10 years for the CEECs.¹⁹

Table 2 reports the estimates of the investment function. The dependent variable is Gross Fixed Capital Formation over GDP (the investment-output ratio). We want to test whether remittances contribute to an increase or a decline of investment as a share of GDP. The variable REMIT is the sum of migrant remittances and compensation of employees working abroad as a share of GDP. It hence includes all the *legal* economic flows generated by

¹⁹ Reverse causality could be possible here. However, given that these short run migrants are usually bound by a short-term employment contract, the possibility that the decision to return is influenced by other factors such as productivity in the sending country is very low.

migrants to their country of origin. The four columns provide the results for the different control variables used. In column 1 we include real output growth to capture accelerator effects (YGR), the real interest rate (RR) and GDP per capita (GDPpc) to capture the effect of the level of income on investment through the generation of savings. Only REMIT and GDPpc seem to be significant. In column 2 we separated RR into its two components, nominal interest rate (NR) and inflation, and included inflation squared to capture non-linearities.²⁰ Although NR remains insignificant, we can see that both the coefficient on INFL and on $INFL^2$ are significant and suggest an inverted U shaped relationship between investment and inflation. Finally, in columns 3 and 4 we included the effect of the agricultural share and FDI. AS has a negative impact on IO as expected, whilst FDI does not seem to have a significant effect.

Regarding the impact of REMIT, we can see that, in all cases, its coefficient is positive and significant. Its value is again robust to the choice of control variables and distributed around 0.375.²¹ This is in itself an important result. We can see that, in the CEECs, migrant remittances have contributed to an increase in investment. Although the relationship is less than 1 to 1, we can see that remittances are, amongst other things, used for the formation of fixed capital. Hence, there is also an indirect channel linking migration with productivity.

Finally, in order to have a better grasp of the impact of remittances by expenditure component, we estimated a consumption function in which the ratio of private consumption to GDP is the dependent variable (CO). This is reported in Table 3. We included again GDPpc

²⁰ Both columns 2 and 3 were estimated correcting for heteroscedasticity using White's (1980) covariance transformation since we found signs of heteroscedasticity in the errors.

²¹ This implies an elasticity of IO with respect to REMIT of 0.0541, for the whole sample of countries. This impact is relatively small given that remittances have a low sample variance.

and RR according to the Keynesian and intertemporal substitution models of consumption. GDPpc shows the wrong (positive) sign, although when we substitute RR by NR and INFL, it loses its significance, pointing towards a consumption smoothing process. The positive value of the nominal interest rate points out a stronger income than substitution effect, although the impact of inflation is not symmetric to that of NR. CO and inflation show a U-shaped relationship. Periods of moderate inflation would reduce consumption and periods of high inflation – above 6% in our function – would increase it as expected. We also included the inverse of the GDPpc ($1/\text{GDPpc}$), in order to test for a non-linear relationship between the consumption ratio and income but, again, found it not significant. Finally, we also controlled for the growth of GDP²² and the unemployment rate. Neither of these variables was found to have a significant impact on CO.

Overall, we can see that, as in the previous cases, the impact of remittances on consumption is stable except for the results in column 5. This impact is positive and has a value of around 0.647.²³ These values indicate that, contrary to what some theories suggest, remittances are only used partly for consumption the rest being saved by households. These results indicate that remittances allow for the expansion of both consumption and investment without generating current account deficits. On the other hand, given that the average IO for the full sample is 21% and the average CO is 62%, our results show that remittances are distributed in a similar way, although more biased towards investment.

Although data limitations constrain our empirical results and give little space for further analysis, our results are theoretically consistent and statistically robust. Migration in the

²² The growth of GDP is included as suggested by the Life Cycle hypothesis. We would expect a lower consumption-output ratio the higher the rate of growth.

²³ The average elasticity of CO with respect to REMIT for all the countries is 0.0326, which is lower than that for IO.

CEECs can potentially reduce unemployment because it has a positive impact on labour productivity and it generates economic transfers that help increasing investment in the countries of origin.

4. Conclusion

This paper is a first attempt in analysing the role of return migration and remittances in the development process of selected transition countries. We have argued, based on our theoretical model, that a priori remittances may have an important effect due to the large size of, primarily, short-term migration from CEEC to Western Europe. Part of remittances (and retained savings that the migrant takes home upon his return) are in turn used to establish businesses at home which, along with the proportion of unemployed who migrate, could positively affect the average product in the source country. The impact of migration on unemployment would thus depend on its direct effect on productivity growth and indirectly through the use of remittances in self-employment activities of return migrants.

Our econometric tests on data from CEECs show that return of migrants has had a positive and significant effect on the productivity level of the source country. Furthermore, we find that remittances significantly contribute in increasing the investment level in the source country. We also estimated a consumption function and found it to be positively affected by remittances though the effect is not as strong as on investment. This result is quite different from the previous work on the impact of remittances in the traditional emigration countries in which consumption was by the far the biggest component of the remitted funds.

Data limitations constrain the scope of our empirical analysis. However, although the study is aggregative, the results help disentangling some interesting stylised facts that may be of relevance when examining the role of migration on the development of transition economies.

REFERENCES

- Adelman, I and J Edward Taylor (1990), "Is Structural Adjustment with a Human Face Possible? The Case of Mexico", *Journal of Development Studies*, 26:387-407
- Aghion, P and O Blanchard (1994), "On the Speed of Transition in Central Europe", *Discussion Paper in Economics No. 87*, Nuffield College, Oxford.
- Birks, J S and C A Sinclair (1980), *International Migration and Development in the Arab Region*, ILO, Geneva.
- Dustmann, C and O Kirchkamp (2001), "The Optimal Migration Duration and Activity Choice after Re-migration", Discussion Paper No. 266, IZA, Germany.
- Ebiri, K (1985), "Impact of Labour Migration on the Turkish Economy", in Rogers, R (ed.) *Guests Come to Stay: The Effects of European Labour Migration on Sending and Receiving Countries*, Westview, Boulder.
- Finkle, J and C McIntosh (1982), "The Consequences of International Migration for Sending Countries in the Third World", Report for the Bureau of Policy and Program Coordination, USAID, Washington, D.C.
- Gilani, I, M F Khan and M Iqbal (1981), "Labour Migration from Pakistan to the Middle East and its Impact on the Domestic Economy", Final Report. Research Project on Export of Manpower from Pakistan to the Middle East, World Bank, Washington, D.C.
- Gunatilleke, G (1992), *The Impact of Labour Migration on Households: A Comparative Study in Seven Asian Countries*, United Nations University Press, Tokyo.
- Hausman, J A and W E Taylor (1981) "Panel Data and Unobservable Fixed Effects", *Econometrica*, 49:1377-1398.
- Keely, C and B N Tran, (1989) "Remittances for labour migration - evaluations, performance and implications", *International Migration Review*, 3:500-525
- Lucas, R E B and O Stark (1985), "Motivations to Remit: Evidence from Botswana", *Journal of Political Economy*, 93:901-916.
- Mancellari, A, H Papapanagos and P Sanfey (1996), "Job Creation and Temporary Migration: The Case of Albania", *Economies in Transition*, 4.
- Papademetriou, D G and P L Martin (1991), *The Unsettled Relationship: Labour Migration and Economic Development*, Greenwood, New York.
- Piracha, M and R Vickerman (2001), "International Migration and European Integration", mimeo, University of Kent at Canterbury.
- Robinson, V (1986), "Bridging the Gulf: The Economic Significance of South Asian Migration to and from the Middle East", in R King (ed.), *Return Migration and Regional Economic Problems*, London.
- Russell, S (1986), "Remittances from International Migration: A Review in Perspective", *World Development*, 14:677-696.
- Taylor, J E (1999), "The New Economics of Labour Migration and the Role of Remittances in the Migration Process", *International Migration*, 37:63-88.

Taylor, J E, D S Massey, J Arango, G Hugo, A Kouaouci and A Pellegrino (1996), "International Migration and Community Development", *Population Index*, 62: 397-418.

UNICEF Innocenti Research Centre (2000). TransMONEE 2000 database. UNICEF-IRC. Florence, Italy.

White, H (1980) "A Heteroscedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroscedasticity" *Econometrica*, 48:817-838.

WIIW (2000). Countries in Transition 2000. The Vienna Institute for International Economic Studies, Vienna.

APPENDIX

Variables list

The definition and source of the variables used for estimation is as follows:

PROD: log of the GDP measured in constant 1990 US dollars per total employment. Source: WIIW (2000).

NETMIG: measured as (inflows – outflows)/1000 population. Source: TransMONEE 2000.

IO: Gross Fixed Capital Formation in current US dollars over GDP in current US dollars. Source: WIIW (2000).

AS: share of agriculture gross value added in total gross value added. Source: WIIW (2000).

FDI: total FDI inflows over GDP (both in current US dollars). Sources: TransMONEE 2000 and WIIW (2000) where data from the former was not available.

OPEN: current exports plus imports in US dollars over current US\$ GDP.

EDU: percentage of persons enrolled in secondary education over total population. The gross enrolment rates are based on the number of students, regardless of age, enrolled in general upper secondary education, divided by the total number of the population that corresponds to the age group specified for this level of education, typically 15-18 years. Source: TransMONEE 2000.

INFL: annual average percentage change of the consumer price index. Sources: TransMONEE 2000 and, where not available, WIIW (2000).

NR: average lending rate of the financial system. For Romania the refinancing rate of the National bank of Romania was used. Source: WIIW (2000).

RR: $NR - INFL$.

CO: share of private domestic consumption on GDP both measured in current US\$.

REMIT: workers' remittances plus compensation of employees received from abroad – as defined in the UN Balance of Payments statistics – over GDP, both measured in current US\$. For some cases we used the item 'private transfers' when workers' remittances was not explicitly available. Source: WIIW (2000).

UNEMP: average rate of registered unemployment per total labour force. Source: TransMONEE 2000.

TABLE 1**Panel Estimates of the Productivity Equation (PROD_t)**

	1	2	3	4	5	6
	FE	GLS	FE	FE	GLS-IV	FE
NETMIG	0.045 (2.378)*	0.039 (1.929)**	0.036 (2.173)*	0.039 (3.818)*	0.037 (2.202)*	0.039 (1.813)**
IO	0.023 (2.412)*	0.024 (2.597)*	0.037 (3.754)*	0.032 (3.818)*	0.033 (3.251)*	0.021 (1.922)**
AS	-0.021 (-1.986)*	-0.018 (-1.992)*	-0.030 (-1.742)**	-0.032 (-2.164)*	-0.034 (-2.977)*	-0.029 (-2.121)*
FDI	-0.197 (-9.179)	-0.183 (-8.054)*	-0.193 (-7.981)*	-0.185 (-2.374)*	-0.183 (-7.304)*	-0.194 (-8.190)
FDI_{t-1}	-	0.004 (1.193)	-	-	-	-
OPEN	-	-	-	0.245 (4.061)*	0.233 (2.162)*	0.228 (1.870)**
EDU	0.510 (1.224)	-	-	-	-	-
INFL	-	-	-0.001 (-0.331)	-	-	-
INFL²	-	-	0.000 (0.789)	-	-	-
PROD_{t-1}	-	-	-	-	-	0.158 (1.546)
Nobs	76	72	79	81	81	77
R²	0.874	0.539	0.838	0.827	0.992	0.849
F no eff (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
Hausman (p-value)	0.001	0.323	0.056	0.388	N/A	0.011
Autoc (p-value)	0.046	N/A	0.109	0.084	N/A	N/A

Notes:

1. * and ** denote significant at the 5% and 10% confidence level respectively.
2. FE, GLS and IV denote Fixed Effects, Generalised Least Squares and Instrumental Variables estimation.
3. F no eff. is an F-test for the null of no fixed effects in the equation.
4. The explanations of the variables can be found in the text and Appendix I.

TABLE 2

Panel Estimates of the Investment-Output Equation (IO_t)

	1	2	3	4
	FE	FE-Het	FE-Het	FE-Het
REMIT	0.272 (2.356)*	0.461 (3.146)*	0.365 (2.590)*	0.399 (2.637)*
YGR	-0.001 (-0.763)	-	-	-
RR	0.024 (0.922)	-	-	-
NR	-	-0.014 (-1.030)	-0.015 (-1.101)	-0.015 (1.093)
INFL	-	0.026 (2.666)*	0.026 (2.985)*	0.026 (2.960)*
INFL²	-	-0.002 (-3.090)*	-0.002 (-2.914)*	0.002 (2.748)*
GDPpc	0.087 (4.440)*	0.110 (5.766)*	0.101 (5.626)*	0.105 (5.712)*
AS	-	-	-0.004 (2.001)*	-0.004 (2.019)*
FDI	-	-	-	-0.159 (-0.924)
Nobs	66	66	66	66
R²	0.831	0.851	0.859	0.860
F no eff (p-value)	0.000	0.000	0.000	0.000
Hausman (p-value)	0.050	0.034	0.040	0.048
Autoc (p-value)	0.120	0.113	0.112	0.101

Notes:

1. * and ** denote significant at the 5% and 10% confidence level respectively.
2. FE and FE-Het denote Fixed Effects and Heteroscedasticity-Consistent Fixed Effects estimation respectively.
3. F no eff. is an F-test for the null of no fixed effects in the equation.
4. The explanations of the variables can be found in the text and Appendix I.

TABLE 3**Panel Estimates of the Consumption-Output Equation (CO_t)**

	1	2	3	4	5
	FE	FE-Het	FE-Het	FE-Het	FE-Het
REMIT	0.685 (2.540)*	0.631 (3.040)*	0.638 (3.048)*	0.635 (3.034)*	1.163 (3.958)*
GDPpc	0.059 (2.480)*	0.018 (0.887)	-	0.019 (0.934)	0.031 (1.350)
1/GDPpc	-	-	-1.172 (-0.899)	-	-
RR	0.006 (1.096)	-	-	-	-
NR	-	0.091 (5.728)*	0.090 (5.625)*	0.094 (6.146)*	0.064 (4.036)*
INFL	-	-0.062 (-4.885)*	-0.061 (-4.618)*	-0.066 (-5.118)*	-0.035 (-3.037)*
INFL²	-	0.005 (4.733)*	0.005 (4.477)*	0.005 (4.996)*	0.003 (2.840)*
YGR	-	-	-	-0.083 (-0.875)	-
UNEMP	-	-	-	-	0.068 (0.451)
Nobs	66	66	66	66	53
R²	0.870	0.934	0.934	0.935	0.943
F no eff (p-value)	0.000	0.000	0.000	0.000	0.000
Hausman (p-value)	0.000	0.002	0.001	0.003	0.010
Autoc (p-value)	0.110	0.085	0.076	0.046	0.001

Notes:

1. * and ** denote significant at the 5% and 10% confidence level respectively.
2. FE and FE-Het denote Fixed Effects and Heteroscedasticity-Consistent Fixed Effects estimation respectively.
3. F no eff. is an F-test for the null of no fixed effects in the equation.
4. The explanations of the variables can be found in the text and Appendix I.