Brunel
UNIVERSITY
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Department of
Economics and Finance

Economics and Finance Working Paper Series

Working Paper No. 09-33

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Institutional Determinants of Investment in Transition Economies

August 2009

http://www.brunel.ac.uk/about/acad/sss/depts/economics

Institutional determinants of investment in transition economies

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ABSTRACT

Investment has been found to be a significant determinant of growth. This paper analyses the effects of institutions and transition progress on investment rates of transition economies since the collapse of the Socialist Bloc. Political institution is measured by the Freedom House's Political Rights and Civil Liberties indexes; economic institution is proxied by the Index of Economic Freedom compiled by the Heritage Foundation; and transition progress is documented by the European Bank for Reconstruction and Development's transition index. Panel data estimation techniques are applied and the results show that institutions and transition progress have expected and significant effect on investment rates of transition economies. However, it is the progress in all aspects of economic freedom that matters; just some individual economic freedom measures are significant marginally. Besides, as conditioning variables, growth, saving and financial development (liquid liabilities as % of GDP) are also found to have significant and positive effect on investment in transition economies. This paper highlights the indirect effect of institutions on economic growth via investment.

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Institutional determinants of investment in transition economies

I.   Introduction

Investment is the key to maintaining and expanding the capital stock and production capacity of an economy. In the neoclassical growth framework higher capital accumulation means higher output and higher growth in transition to the steady state of an economy. In endogenous growth theory investment affects growth directly through accumulation of input and indirectly through improved factor productivity. New investment in physical and human capital introduces new technologies into the production base of an economy, thus improving its efficiency and productivity and altering its long run growth rate. The role of investment has been empirically confirmed in many studies such as: Barro (1990), Rebelo (1991), Mankiw et al. (1992), De Long and Summers (1991), Fischer (1993), Khan and Kumar (1997), Bouton and Sumlinski (2000) and others. In fact, investment is one of the few determinants of growth that remain significant in a sensitivity analysis by Levine and Renelt (1992).

Since the fall of the Soviet Bloc the former socialist countries in Central and Eastern Europe and Central and Eastern Asia have embarked on largely different growth paths. All of them except East Asian ones saw their output plunge in the early 1990s. Following initial production collapse in Eastern and Central Europe and former Soviet Union some countries quickly settled down and regained positive growth as early as 1992 or 1993 (Poland and Czech Republic) while others dragged on with their output contraction until 1995-1996 (Russia, Ukraine, and some other former Soviet Union countries). One the basis of growth performance, there seems to be some geographical pattern. Countries of the former Soviet Union had to endure longest output drop. Those in Central Europe and Baltic area had a shorter period of recession. Those in East Asia did not suffer from any output loss at all.

Many researchers have formulated theoretical explanations and empirical tests for various factors that may have caused the marked variation in the growth performance of transition economies. Among the often cited determinants of the growth variation are initial conditions, liberalization and transition policies, and institutional factors[1]. The question about what drives investment has been long studied[2]. However,

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[1] See, for example, De Mello et al. (1996 & 2001), Krueger and Ciolko (1998), Fidrmuc (2003), Harvrylyshyn and Roden (2003), Falcetti et al. (2006) for details.

[2] Some examples are: Levine and Renelt (1992), Ozler and Rodik (1992), Dawson (1998), Ghura and Goodwin (2000), Attanasio et al. (2000) and Campos and Nugent (2003).

works in this field study broad cross sections or panels of countries that do not cover transition economies. To our best knowledge, the literature on investment in transition countries is focused on firms' investment constraints and behaviour. Budina et al. (2000) study the relation between liquidity constraints and firms' investment in Bulgaria and find that liquidity constraints only bind for small firms; large firms still have access to easy bank finance. Similarly, Konings et al. (2003) find soft budget constraints for firms in Bulgaria and Romania but Polish and Czech's firms face hardened liquidity constraints which are an impediment for investment. Mueller and Peev (2007) study investment returns of publicly traded firms in Central and Eastern Europe and find evidence of under investment due to asymmetric information and over investment due to managerial discretion. In general, these studies use firm level data and relate firms' investment behaviour to financial constraints. None has tried to explain difference in investment rates for the whole group of transition countries. The purpose of this paper is to fill this gap in literature on transition economies. Since institutions are theoretically proposed and empirically found to be a very important determinant of growth and development, we are particularly interested in examining the role of institutions and reform policies in explaining investment difference among transition economies.

Analyzing a dataset on transition economies over the period 1990-2007 we find that institutional factors, both economic and political, have significant effect on the investment rate. In addition, more transition progress is also found to be associated with higher investment. Domestic saving and financial deepening are strong determinants of investment as well.

Section II of this paper will discuss institutional development and investment in transition economies since the early years of the transition process. Section III will explore possible determinants of investment in transition economies. After that Section IV will present the data and empirical approach for estimating the effects of institutional factors on investment. Section V will discuss the results and the paper is concluded in Section VI.

II. Institutions and investment in transition economies

1. Institution building in transition economies

Transition economies are in a process of building new market-based institutions to promote economic growth. Most of them started with an "institutional collapse" (Campos and Coricelli, 2002) which is often cited as one of the reasons for the initial output drop in these economies. However, institutional quality in transition economies

has improved quickly and substantially. Figure 1 shows the evolution of the Heritage Foundation's Index of Economic Freedom[3] (IEF) and the Freedom House Index (FHI)[4]. The IEF is a composite index of ten different factors of economic freedom rated on the scale of 0-100, with higher value representing more freedom. The FHI is a measure of political freedom which is a simple average of civil liberties (CL) and political rights (PR) with score going from 0 to 7 with 7 being no freedom. In Figure 1, for the ease of comparison, the Freedom House Index is rescaled to the 0-100 range and higher value means more freedom[5]. The lines in Figure 1 represent the averages of either IEF or FHI for three groups of transition economies: Central and Eastern Europe (CEE), former Soviet Union (FSU) and East Asia (EA). All three groups have made significant moves towards freedom, both economic and political, but the CEE countries are the fastest. They started with better institutional quality and are now in a much better position than the FSU or EA countries. The EA countries started at the lowest level of freedom and are still far behind the others.

Another widely used measure of economic freedom is the Fraser Institute's Economic Freedom Index (EFI)[6]. This index is available from 1970 but before 2000 it is only available for every five years. Besides, we have EFI for only 21 transition countries. The EFI scores ranges from 0 to 10, with 10 being most free. Figure 2 shows the changes of EFI for three groups of transition economies over 2000-2006 and we can see the same trend as shown in Figure 1.
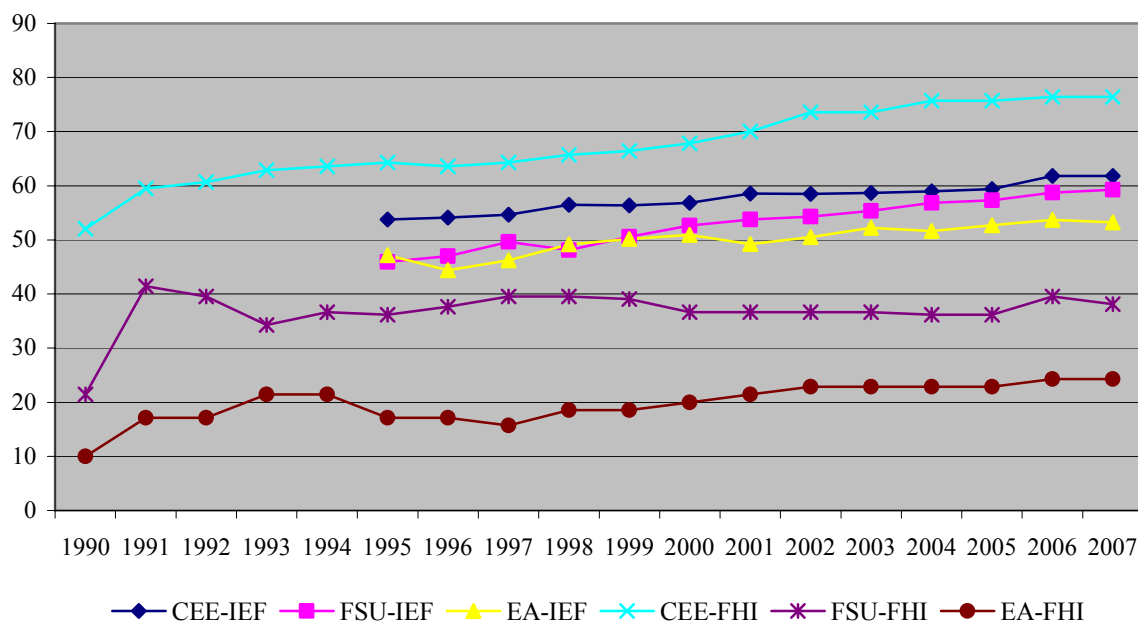
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[3] Holmes et al., 2008

[4] Data available at http://www.freedomhouse.org/template.cfm?page=439

[5] See more details about these indexes in Section IV

[6] See Gwartney et al., 2008 for details

**Figure 1: Fraser Institute's Index of Economic Freedom (1995-2007)
and Freedom House Index (1990-2007)**

There is a wide gap in institutional quality between transition economies. Some countries have achieved institutional quality that is at the same level or even higher than developed countries. In 2008 Latvia, Czech Republic and Hungary had higher IEF score than France or Portugal. At the same time Russia, Belarus and Turkmenistan were ranked 136, 147 and 152 respectively out of 157 countries in 2008. In terms of political freedom, the Freedom in the World Report 2008 categorizes all CEE countries as free while most of FSU and EA countries as not free. The experience of transition economies in terms of building a completely new institutional system (in Central and Eastern Europe and former Soviet Union countries) or reforming an old system (in East Asia) for the functioning of a market economy can be viewed as something close to a natural experiment for analyzing the effect of institutions on investment.

**Figure 2: Fraser Institute's Economic Freedom Index, 2000-2006**
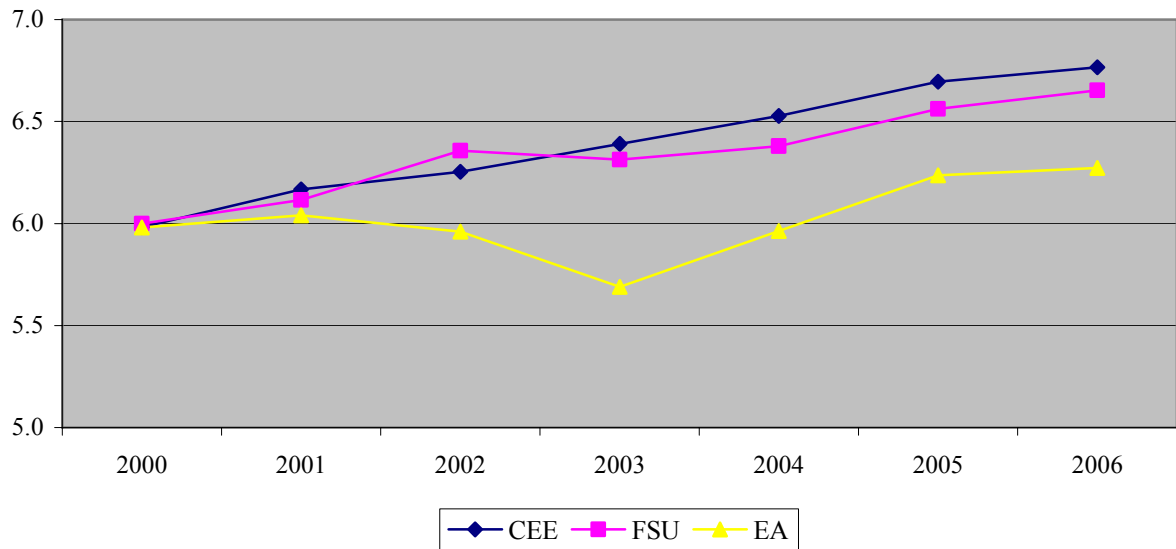
2. *Investment in transition economies*

Initially, investment fell sharply in the CEE and FSU countries. When the government revenue was low and business environment was just taking form this was quite a foreseeable situation. In East Asian countries, though the investment did not fall but it hardly saw any growth in the early 1990s. Figure 3 shows that the investment was cut the most in the FSU countries and these are the last who recovered from investment downturn. On average, EA has the highest investment growth (11.13%), followed by CEE (6.62%) and FSU (3.65%).

Figure 4 depicts the investment-GDP rates of transition economies by groups. Except for 1990 the EA has always maintained a higher investment rate than those of CEE and FSU. Since 1997 this rate has gone up from around 25% to 33% (in 2007). The investment rates of CEE and FSU have also increased from 20% in early 1990s to 25% in 2007.

Figure 3: Growth rate of investment, 1992-2007
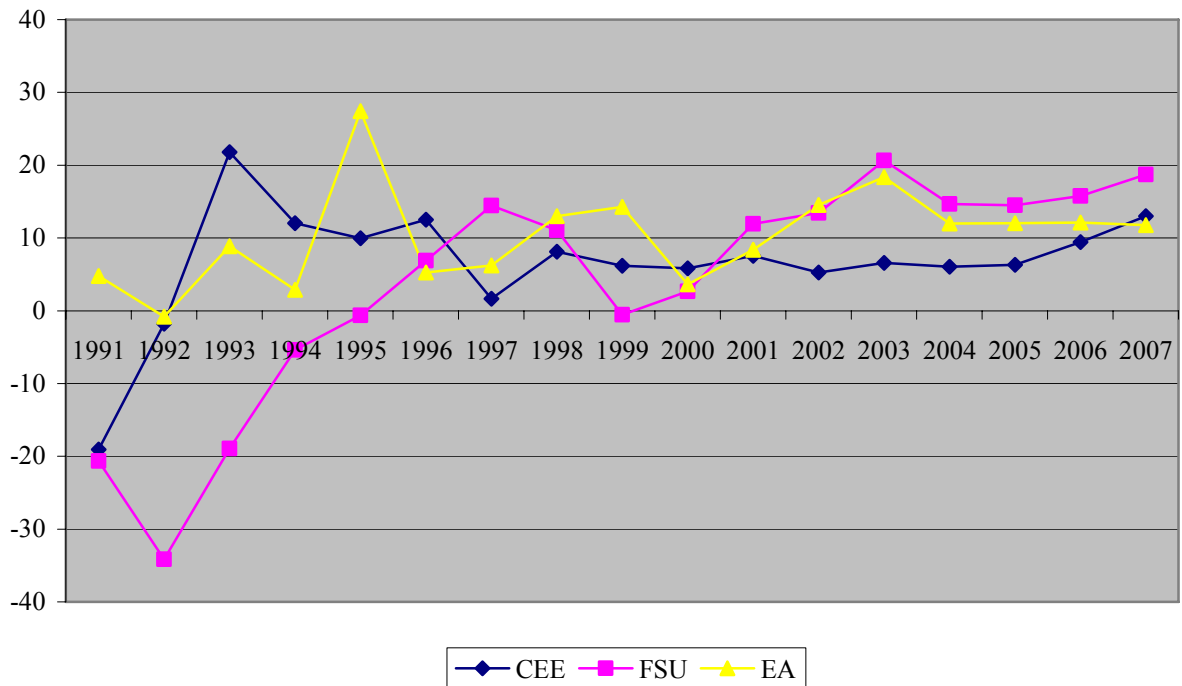
Figure 4: Investment/GDP (%), 1990-2007
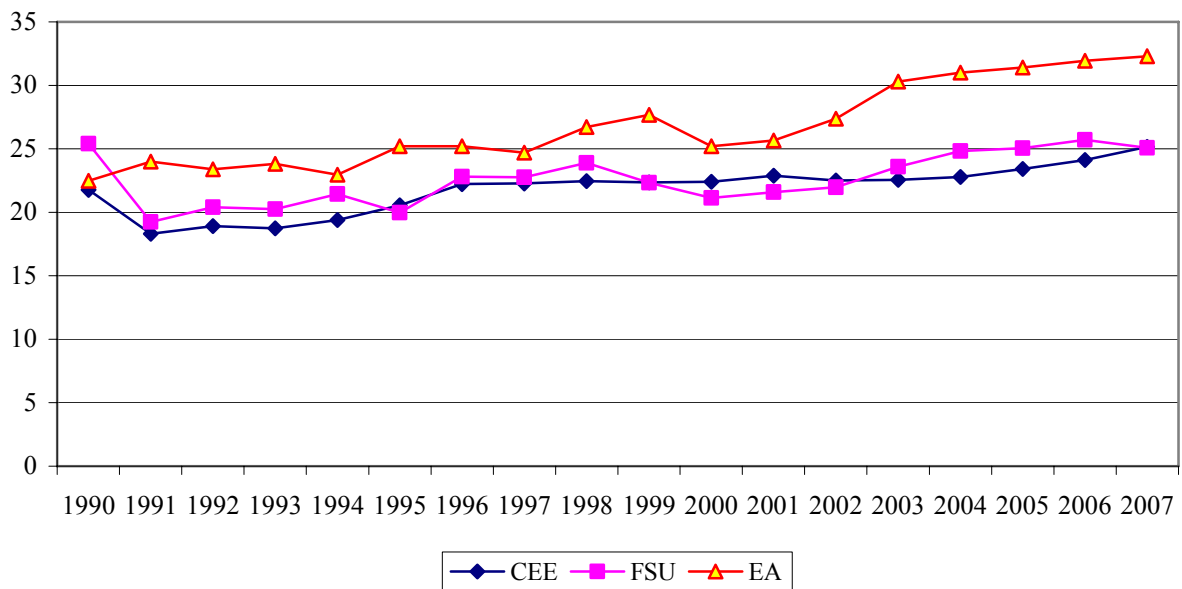
Figure 5 is a scatter plot of the investment rate and GDP growth rate in 30 transition economies over the 1995-2006 period. It shows us some positive association between growth rate and investment rate. Though the investment-growth relation is not the subject of this paper it helps justify the purpose of this paper. If we know factors

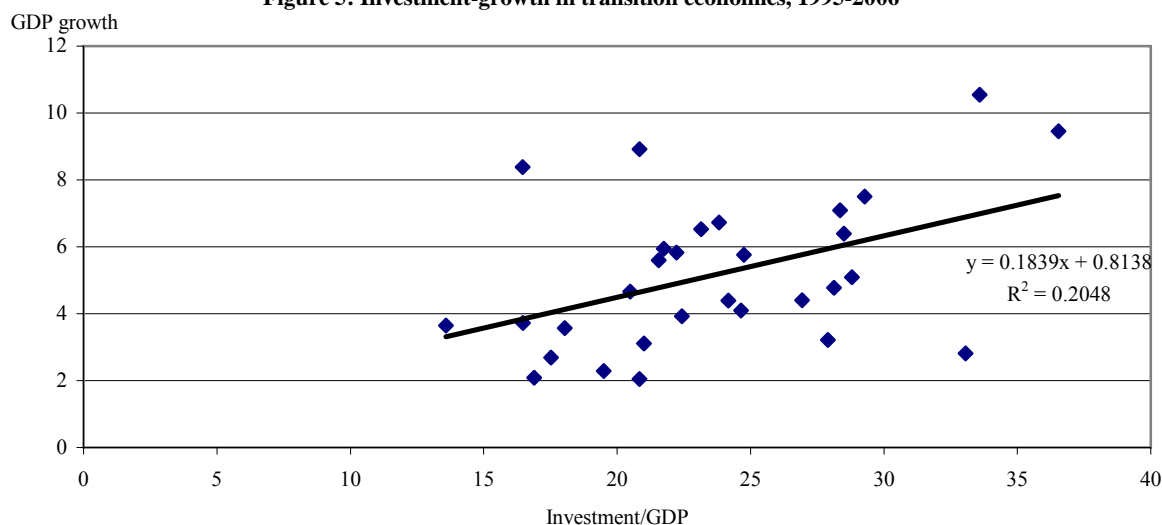that drive investment we may know what drives growth, at least partially. To better understand causes of growth we need to understand the factors that determine the investment rate.

Figure 5: Investment-growth in transition economies, 1995-2006

Source: see Figure 3

III. Literature review - determinants of investment rate

In this paper we explore some essential factors that are theoretically expected and empirically proven to affect investment rate in contexts other than transition economies. They are categorized as institutions, transitional reform policies, macroeconomic factors, and financial development.

1. Institutional factors

Institutions in the words of North (1991) "define the choice set and therefore determine transaction and production costs and hence the profitability and feasibility of engaging in economic activity…Institutions provide the incentive structure of an economy; as that structure evolves, it shapes the direction of economic change towards growth, stagnation or decline."[7] Accordingly, institutions facilitate economic exchanges, determine resource allocation and efficiency of economic activities. Institutions are associated with constraints, both natural and man-made, that economic actors face. An important institution is the level of freedom, both economic and political, that economic actors face in pursuit of their economic goals. When people are free from fear of expropriation and troubles inherent in market (information, agency,

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[7] North, 1991, p.97

coordination, etc.) they have more incentive to invest in economic activities and do so with higher efficiency.

With regard to investment the most important institution is the protection of property rights. Without secure property rights the incentives to invest will be reduced, especially in research and development activities that require large investment but, potentially, are very profitable. When properties are not properly protected resources will be diverted away from production, often to rent-seeking activities which further deter investment while encouraging further rent-seeking. Murphy et al. (1993) argue that rent-seeking activities exhibit natural increasing returns, which may lead to multiple equilibria with high levels of rent-seeking and low output. Acemoglu (1995) shows that rent-seeking reduces marginal productivity of investment and that increased rent-seeking makes rent-seeking relatively more attractive compared to investment in production. It has been argued by many authors, like North (1990) and Knack and Keefer (1995), that the private property rights are the backbone of the prosperous Western capitalism.

Transaction cost is a big hurdle for economic exchange and evolution of institutions through economic history has been the finding of solutions to the problem of high transaction cost. New institutions help reduce transaction cost, encourage more production and exchanges, thus allowing economic actors to realize gains from specialization and trade. As a result productive activities become more attractive and more investment is made. With the same level of investment, lower transaction cost means more output.

Corruption is an example of bad institutions and it is very harmful to investment. Corruption is a kind of tax, hence raising costs and uncertainty for business activities. Worse than tax, corruption is not transparent, not predictable and not reliable. Corruption tends to reduce government revenues (Gray and Kaufmann, 1998) because corruption is the most manifest in tax collection and the corrupt money, instead of being spent by the government on investment or consumption, goes into private pockets. Therefore the level of investment will be lower when corruption is rampant, which is proved empirically by Mauro (1995). More seriously, corruption makes investment less efficient. In public sector corruption may shift public investment away from the most profitable projects to less profitable ones that offer more opportunities for corruption (Shleifer and Vishny, 1993). Pritchett (2000) cites an example of a steel mill in Nigeria where spending overshot by US$ 4 billion and US$ 2 billion are reported to be stolen by government officials. In the private sector, corruption favours those with connections

with government officials over those who have high productive efficiency (Elliott, 1997). In addition, bad governance reduces the incentive to invest in R&D (Meon and Weil, 2005), thus limiting opportunities to improve efficiency.

Apart from institutions that constrain directly economic activities, political and civil institutions are also very important for capital accumulation. Rodrik (2000) considers democracy as a meta-institution for building good institutions and argues that participatory political systems are the most effective ones for processing and aggregating local knowledge which is essential for building institutions. Sandholtz and Koetzle (2000) find that corruption is lower when democratic norms and institutions are stronger. In an effort to explain causes of corruption Treisman (2000) also concludes that democracy reduces corruption though it is well-established democracy rather than recent democratization process that matters (Sung (2004) also comes to similar conclusion). As Dawson (1998) empirically shows, political and civil liberties stimulate investment in a cross section of 85 countries.

2. *Transitional factors*

Transition process involves liberalization of markets and prices, privatization of state-owned firms, restructuring firms towards market incentives and building economic and social institutions and infrastructures to promote growth. When markets and prices are liberalised, investors have more incentives to invest and do business because they have the freedom to set prices and sell and buy goods to where/who they want. Privatization of state assets is perhaps the most important drive for investment because more assets are in private sector's hand with their rights recognized by the state. Privatization is a signal of commitment to private ownership and offers profitable investment opportunities, especially in public utilities sector (Holland and Pain, 1998). Besides, governments would have larger budget from privatization proceeds to spend on public investment.

Structural reforms in transition countries have been implemented extensively, especially privatization of small scale enterprises (IMF, 2000). However, the reform progress has been uneven across countries. In 2005 the Transition Index, which is constructed by European Bank for Reconstruction and Development's (EBRD) to reflect the transition progress, ranges from 1.89 (Turkmenistan) to the highest level of 4.3 (Hungary, Czech Republic and some others).

Reform as measured by the EBRD Transition Index is expected to boost investment in transition countries because they create room for private sector's

participation in economic activities through privatization and incentives for entrepreneurs to invest. Moreover, privatization generates government revenue for government investment development programmes.

3. Macroeconomic and financial factors

Macroeconomic policies, together with institutions, shape the incentive structures that investors face when making investment decision. Domestic saving and growth provide the necessary resources for both government and entrepreneurs to invest. Trade policy, macroeconomic stability (inflation) and public finance are important factors to be considered. Financial system is the blood vessel of an economy that channel funds from saving to investment and the level of financial development is expected to have a strong role in determining investment of an economy.

3.1. Savings

The relationship between saving and investment has been a focal topic in economic literature since the study of Feldstein and Horioka (1980), which identified what later came to be called the Feldstein-Horioka puzzle. Contrary to the prediction of the perfect capital mobility theory, Feldstein and Horioka observe that, for OECD countries, domestic saving rates and domestic investment rates are highly correlated. Nowadays, global financial integration has gone very far but most transition economies still face many obstacles in accessing the international capital market and domestic savings is still critical for investment and growth. Analyzing a panel of 150 countries over 1960-1994 period, Attanasio et al. (2000) find that lagged saving rates are positively correlated with investment rates. As a result, we expect that lagged savings rate in transition economies should have a positive effect on the investment rate.

3.2. Growth

The significant role of investment in growth has been found in many cross section studies as mentioned in the Introduction. Some other growth models suggest that a rise in productivity growth causes both growth rates and investment rates to move together (Barro, 1991 and Islam, 1995). For the effect of growth on investment the accelerator theory argues that high growth rates lead to high demand for capital stock and real investment and vice versa though the adjustment may take time. The effect could also run indirectly through saving rate as Loayza et al. (2000) shows that private saving rates rise with the level and growth rate of real income. Empirically, when the dynamics of the growth-investment relation is studied it has been shown that "growth

rates Granger-cause investment rates with a positive sign" (Attanasio et al., 2000). Therefore, we expect lagged growth rate to have positive effect on investment.

3.3. Trade Policy

Gains from trade have long been studied and emphasized in the economic literature. A more export-oriented economy would have more access to world market, which makes it possible for producers to invest and obtain gains from economy of scale. More export would bring about more foreign exchange earnings necessary to finance import of capital goods, which is very important for economies in the process of restructuring their production base. However, trade liberalization may lead to domestic market being swamped by imported goods and domestic producers find it hard to compete, thus limiting domestic producers' investment and expansion activities. Therefore, there is an argument for protection of some infant industries with high level of externalities, learning by doing and economy of scale against foreign competition (Rodriguez and Rodrik, 1999). Of course whether the infant industries grow to be competitive internationally requires much more than protection by trade measures.

3.4. Inflation

According to Fisher (1993) inflation is the most important single indicator of the macroeconomic environment as far as investment and growth is concerned. Inflation signals uncertainty and makes it difficult for investors to evaluate their investment projects, thus forcing them to postpone investment. During high inflation episodes economic actors tend to switch from long term to short term transactions, which increase transaction cost. In some empirical studies inflation has been found to have significantly negative effect on private investment (e.g. Greene and Villanueva, 1991; and Ozler and Rodrik, 1992). However, high inflation often means low real interest rate, which makes borrowings cheaper for investors. Romer (2001) argues that inflation is also a potential source of government revenue through seignorage and under some conditions it is optimal for government to use this revenue resource in addition to usual taxes. Empirically, Bleaney (1996) finds no negative effect of inflation on total investment. Therefore, we can expect some mixed or insignificant effect of inflation on investment.

3.5. Government consumption expenditure

Analyzing an endogenous growth model with government spending, Barro (1990) argues an increase in non-productive government expenditures, for a given level

of productive government expenditures, would raise income tax rate. As a result, private sector investment would go down because individuals have less incentive to invest. In reality, it is possible that an increase in non-productive government spending leads to a decrease in investment in both public and private sectors. Especially, if government consumption is financed by borrowing it gives rise to public debt and consequently investors' doubt about the stability of the macroeconomic environment and future tax burden. Empirically, Barro (1991) shows that higher government consumption is associated with lower growth in a panel of 98 countries in the 1960-1985 period. Therefore, higher level of government consumption relative to GDP is expected to have negative impact on investment.

3.6. Financial development

Availability of finance is one of the most important factor for entrepreneurs to carry out business activity. Financial system pools savings together and channels funds from savers to investors. Without a financial system savers often hoard their savings in non-productive assets such as gold and jewellery. According to Levine (1997) individual savers may not have the time, capability and means to collect and process information on firms and investment opportunities, therefore they are not willing to invest. Financial institutions help solve this information problem. Financial institutions select, supposedly, the best investors who can make the most from available funds. Financial system in developing or transition economies play an even more important role because firms in these economies depend more on external financing than those in developed economies (Oshikoya, 1994). In addition, financial intermediation creates money and provides means of transaction, reducing transaction cost and promoting economic exchange and expansion of production (Levine, 1997). Without a well-functioning financial system it is very difficult for firms to engage in selling their products to foreign markets and importing capital goods for investment and expansion. In general, we can expect a positive effect of financial deepening on investment.

IV. Data and model

1. Data

For economic freedom the Heritage Foundation's Index of Economic Freedom (IEF) and the Fraser Institute's Economic Freedom Index (EFI) are the most popular

measures. However, the Fraser Institute's EFI covers only 21 transition countries[8] and before 2000 it was only available for every five years. In this paper we use the Heritage Foundation's IEF as a proxy of economic freedom. The data start in 1995 and are available for all transition countries. The IEF is a simple average of 10 individual freedoms which are considered vital to the development of personal and national prosperity. The individual freedoms are: business freedom, trade freedom, fiscal freedom, government size, monetary freedom, investment freedom, financial freedom, property rights, freedom from corruption and labour freedom. The methodology for constructing the freedoms has been revised several times to enhance the robustness and the entire time series have been recalculated accordingly. For the 2008 version of the IEF the authors use a 0-100 percent grading scale so that a higher score represents more freedom. The difference between this data set and others is that the values of the variables are calculated with data available from various sources like the World Bank Development Indicators[9], which are more objective than subjective survey data. For available data, the correlation coefficient between the Heritage Foundation's IEF and the Fraser Institute's EFI is 0.83 (126 observations).

For political institutions, two measures are widely used in the literature[10]: civil liberties (CL) and political rights (PR) reported in the Freedom House's *Freedom of the World*. The Freedom House uses surveys and assessment reports to evaluate the actual rights and freedoms enjoyed by individuals in almost all countries in the world since 1972. Political rights refer to free participation in the political process, right to vote freely for distinct alternatives in legitimate elections, right to compete for public office, join political parties and organizations. Civil liberties mean the freedoms of expression and belief, associational and organizational rights, rule of law, and personal autonomy without interference from the state. *The Freedom of the World* does not rate government or government performance per se but the real world rights and freedoms. The PR and CL are scored from one to seven for each country in each year with larger number indicating less freedom. The PR and CL are highly correlated (0.94) in this sample.

The EBRD transition scores are the judgement of the EBRD's Office of the Chief Economist about country-specific progress in transition. The scores range from 1 to 4+, with 4+ coded as 4.33 and 4- equal 3.67 and so on. Averages are obtained by rounding down. For example, a score of 2.6 is treated as 2+, but a score of 2.8 is treated

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[8] 18 Central and Eastern European countries and three East Asian countries.
[9] See Miles et al. (2006) for details.
[10] See Rodrik (2000) and Havrylyshyn and Rooden (2003) for example.

as 3-. The higher the scores the more transition progress a country has made. The following aspects of transition are assessed and scored: large scale privatization, small scale privatization, governance and enterprise restructuring, price liberalization, trade and foreign exchange system, competition policy, banking reform and interest rate liberalization, securities market and non-bank financial institutions, and infrastructure reform. Due to data availability, we do not use scores of infrastructure reform in this paper. The data on transition indicators is available for download from the EBRD's website. Unfortunately, we do not have the transition indicators for four East Asian transition countries: Cambodia, China, Laos and Vietnam as the EBRD does not report them for these countries.

Data for dependent variable and control variables other than institutional ones are collected from the World Bank Development Indicators (2008). Investment is total fixed capital formation as percentage of GDP. Saving is domestic saving as percentage of GDP. Growth is the real GDP growth rate. Openness is measured by the sum of import and export as percentage of GDP. For inflation we use the change in GDP deflator instead of change in Consumer Price Index (CPI) because the CPI inflation series has more missing observations. For financial development we use a very popular indicator which is the liquid liabilities as percentage of GDP (M3/GDP).

Table 1

Descriptive statistics

Variable	Observation	Mean	Std. Dev.	Min	Max
Investment	508	22.931	6.970737	2.64657	53.19781
Growth	520	2.2598	8.842172	-44.9	34.5
Saving	515	17.888	14.54631	-71.8218	60.2495
OPEN	524	95.038	34.40703	18.9275	181.6826
M3	444	37.609	27.68181	4.89446	163.31
Government consumption	515	16.139	5.541831	3.46506	30.12439
Inflation	519	169.77	816.6941	-5.18003	15442.3
Economic Freedom	358	54.528	9.445138	30.0193	77.96444
Transition Index	468	3.3905	1.032538	1	4.33
Freedom House Index	522	3.8736	1.964979	1	7

Source: World Bank Development Indicators, Freedom House, Heritage Foundation, EBRD; author's calculation

Table 1 presents the summary statistics of variables used in the paper and Table 2 shows the pair wise correlation between them. As discussed in Section II, there are

quite large variations in both the dependent and independent variables. The correlation between three composite measures of institution is high, ranging from 0.58 to 0.74 in absolute value (Table 2). This suggests some consistency in measuring institutional quality in transition economies, especially between the economic freedom and transition progress index (correlation coefficient of 0.74).

Table 2

Correlation matrix of explanatory variables

	Growth (lagged)	Saving (lagged)	OPEN	M3/GDP	Government consumption	Inflation	Economic Freedom	Transition Index	Freedom House Index
Growth (lagged)	1								
Saving (lagged)	0.0565	1							
OPEN	-0.0383	0.0509	1						
M3	0.0985	0.388	-0.0356	1					
Government consumption	-0.2411	0.153	0.1256	0.0996	1				
Inflation	-0.4558	-0.066	0.066	-0.0635	-0.0685	1			
Economic Freedom	0.1899	-0.004	0.3012	0.2325	0.1723	-0.2452	1		
Transition Index	0.4567	-0.192	0.1612	0.1706	-0.0163	-0.2613	0.7448	1	
Freedom House Index	0.0411	0.0772	-0.2753	-0.1181	-0.3493	0.0916	-0.6628	-0.5858	1

2. Model and methodology

In order to test empirically for the role of institutions in determining investment rate we estimate a panel data model as follows:

$$INV_{it} = \alpha_0 + \alpha_1 INS_{it} + \alpha_2 GRO_{it-1} + \alpha_3 SAV_{it-1} + \alpha_4 OPEN_{it} + \alpha_5 INF_{it} + \alpha_6 M3_{it} + \alpha_7 GCON_{it} + c_i + \varepsilon_{it}$$

(1) with i=1, 2, …N and t=1, 2, …, T

The dependent variable INV is investment as percentage of GDP and c_i is an unobserved effect that is country specific and time constant. The ε_{it} are the idiosyncratic errors that change across time t and country i. INS is institutional variable which can be composite indexes like IEF, FHI and EBRD or any individual factors of them. GRO is the (lagged) real GDP growth rate[11]. SAV is the (lagged) gross domestic saving as percentage of GDP. OPEN is the level of openness of an economy or the ratio of the

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[11] Use of real GDP per capita growth rate does not change the result.

sum of import and export to GDP. INF is inflation rate based on GDP deflator and M3 is the ratio of liquid assets to GDP. GCON is the government consumption as percentage of GDP.

This is a panel data model with a country specific unobserved effect that can be estimated by either fixed effect (FE) estimation or random effect (RE) estimation techniques. The difference between FE and RE is that the RE model assumes no correlation between the regressors and c_i. If the assumption is correct, together with assumptions on the idiosyncratic error, the RE is more efficient than the FE. Otherwise, the RE is not consistent but the FE is. When estimating this model we try both FE and RE and test for the one that fits the data better and report results accordingly[12]. Besides we also test for the exogeneity of the regressors[13]. We always report results which are robust to serial correlation and heteroskedasticity.

As we can see in the Table 2, the IEF, FHI and EBRD are highly correlated. Therefore they are entered to the regression equation separately[14]. For estimation with IEF and its factors we use the data for the period 1995-2007 because the IEF is only available from 1995. For estimation with FHI, EBRD and their components the data is from 1990-2007 but the EBRD data is only available for 26 countries (former socialist countries in Eastern Europe and members of the former Soviet Union plus Mongolia). Because of missing observations our dataset is an unbalanced panel. A list of countries in the dataset and country averages of variables used in our regression can be found in the appendix.

V. Results and discussion

First, we estimate equation (1) with the composite measures of economic freedom (IEF), political freedom (FHI) and transition progress (EBRD). The results are shown in Table 3. All indicators of institutions and transition progress are significant and have expected signs. The political freedom effect is larger due to the fact that FHI ranges from 1 to 7 while the IEF varies between 0 and 100. On average a ten point increase in the composite measure of economic freedom, all else equal, is associated with 1.6% increase in the investment rate and an additional point in political freedom (a

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[12] Hausman test is often used to determine the choice of RE or FE but Hausman test is not robust to heteroskedasticity of the error term. We use a robust method suggested by Wooldridge (2002, p.290) which is done by "xtoverid" command in STATA.

[13] Under strict exogeneity, γ should not be significant in the regression $\Delta y_{it} = \Delta x_{it}\beta + w_{it}\gamma + \Delta\varepsilon_{it}$ where w_{it} is a subset of x_{it} (Wooldridge, 2002, p. 285).

[14] When any pair of them is used in a regression at least one variable becomes insignificant. Consequently, they are used separately.

lower score of FHI by one point) is associated with 1.36% increase in the investment rate. Of the political freedom measures, only the political rights have significant effect on investment but the inclusion of civil liberties in the political freedom measure reinforces the effect (see column (2) and (4) in Table 3). This may be due to the fact that we have more variation in PR than in CL[15]. If the general indicator of transition progress EBRD is one point higher we can expect to have a 1.78% increase in the investment rate though the effect is only significant at 10% level. Our result here concurs with what is found in Dawson (1998) and Ghura and Goodwin (2000) with regard to the effect of institutions on growth.

Lagged GDP growth rate is highly significant in all estimations except for that with IEF (column (1)). When political freedom or transition index are used the effect of lagged growth on investment is from 0.13 to 0.17, which means a 1% increase in last year's growth is associated with an increase of from 0.13% to 0.17% in investment rate. The lagged saving rate also has significant impact on investment as expected and the magnitude of the impact does not change much across estimations. A 1% increase in lagged saving rate causes the investment to increase by from 0.11% to 0.13%.

Table 3

Estimation results with economic freedom (IEF), political freedom (FHI)

and transition progress (EBRD)

Dependent variable: investment/GDP

	IEF	FHI	EBRD	PR	CL
	(1)	(2)	(3)	(4)	(5)
Institution	0.16***	0.136***	1.779*	0.11***	0.045
Lagged growth	-0.014	0.162***	0.132***	0.169***	0.165***
Lagged saving	0.129**	0.126***	0.11***	0.131***	0.115***
OPEN	0.009	0.006	0.013	0.006	0.019
M3/GDP	0.102***	0.055***	0.072***	0.069***	0.061***
Inflation	-0.001	0	0.001	0	0
Govcon	0.105	-0.073	-0.09	-0.096	-0.119
constant	6.449*	12.24***	11.85**	13.2***	21.26***
Est. method	FE	FE	RE	FE	RE
No. of obs.	325	408	361	408	408
R^2	0.3	0.31	0.27	0.3	0.28

*, ** and *** indicates significance at 10%, 5% and 1% respectively (based on robust standard errors).

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[15] PR and CL have means of 3.85 and 3.88 and standard deviations of 2.21 and 1.77 respectively.

In these estimations, the trade openness and inflation rate have no significant effects on investment rate of transition economies[16]. The indicator of financial development M3/GDP is always significant and positive, which means more financial deepening is associated with higher investment rate. The government consumption expenditure has negative coefficients in all estimations but the effect is not significant.

The use of composite indexes of economic freedom aggregated from various components has been criticised by several authors (Heckelman and Stroup, 2000) on the ground of the arbitrariness of weighting schemes and differences in effects of different freedom components[17]. Therefore, one question we want to answer is which individual economic freedoms and transition indicators have significant effect on investment and which are not.

Table 4

Estimation results with nine individual economic freedoms

Dependent variable: Investment/GDP

	Business	Trade	Fiscal	Government	Monetary	Investment	Finance	Property	Corruption
Institution	0.07*	0.034	0.036	0.017	0.018*	0.018	0.028	-0.01	0.045*
Lagged growth	0.035	0.016	0.003	0.022	0.008	0.03	0.027	0.027	0.022
Lagged saving	0.135**	0.149**	0.154***	0.146**	0.14**	0.143**	0.144**	0.148***	0.149**
OPEN	0.022	0.014	0.011	0.015	0.013	0.018	0.014	0.016	0.017
M3/GDP	0.113***	0.112***	0.117***	0.123***	0.112***	0.125***	0.12***	0.122***	0.118***
Inflation	-0.002	-0.002	-0.001	-0.001	-0.001	-0.002	-0.002	-0.002	-0.001
Govcon	0.069	0.108	0.086	0.092	0.127	0.102	0.108	0.099	0.088
constant	9.52**	11.56***	11.69***	12.65***	12.83	12.23***	12.24***	13.87***	12.18
Est. method	FE	FE	FE	FE	FE	FE	FE	FE	FE
No. of obs.	325	325	325	325	325	325	325	325	325
R^2	0.28	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27

*, ** and *** indicates significance at 10%, 5% and 1% respectively (based on robust standard errors).

Table 4 shows results of estimations with nine individual economic freedoms[18]. To our surprise, of the nine economic freedoms, we find that only three have significant effect on investment rate: business freedom, monetary freedom and freedom from

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[16] Lagged inflation rate is also used in place of current inflation rate but the result does not change. Ghura and Goodwin (2000) do not find significant effect of inflation either.

[17] Carlsson and Lundstrom (2002) find that only legal structure, private ownership and freedom to use alternative currency have positive and robust relation with growth.

[18] We do not use labour freedom because data for labour freedom is only available from 2005.

corruption. The result shows that when individual freedoms are considered they do not have strong effect on investment because each of them does not make a considerable difference to the investment environment. However, when they stand together in the form of a composite indicator (IEF) they have a significant joint effect on investment. This calls for improvement of the quality of economic institutions in all aspects in order to promote investment (an expectedly growth). With regard to other explanatory variables the same results emerge in Table 4. Financial depending is consistently significant and positive while trade openness, inflation and government consumption are not significant.

Table 5

Estimation results for eight EBRD individual transition indicators

Dependent variable: Investment/GDP

	Large scale privatization	Small scale privatization	Governance and enterprise restructuring	Price liberalization	Trade and foreign exchange system	Competition policy	Bank reform and interest liberalization	Securities market and non-financial institutions
Institution	2.812***	1.681**	1.773*	0.626	1.223*	2.328**	1.563***	1.374**
Lagged growth	0.092**	0.11*	0.141***	0.167***	0.136***	0.14***	0.13***	0.135***
Lagged saving	0.101**	0.116***	0.109***	0.107***	0.108***	0.096**	0.108***	0.104***
OPEN	-0.01	0.009	0.015	0.02	0.018	0.008	0.012	0.014
M3/GDP	0.075**	0.075***	0.063***	0.065***	0.069***	0.057**	0.058***	0.057**
Inflation	0.001*	0.001	0.001	0	0.001	0	0.001	0
Govcon	-0.068	-0.087	-0.114	-0.131	-0.095	-0.062	-0.096	-0.117
constant	12.21	12.58***	14.96***	16.17***	13.64	13.87	15.23***	16.57***
Est. method	FE	RE	RE	RE	RE	FE	RE	RE
No. of obs.	361	361	361	361	361	361	361	361
R^2	0.31	0.27	0.25	0.23	0.26	0.26	0.26	0.25

*, ** and *** indicates significance at 10%, 5% and 1% respectively (based on robust standard errors).

Table 5 shows estimation results when individual transition indicators are used. All of them, except price liberalization, have a significant and positive effect on investment rate. The result of price liberalization is unexpected because it is one of the most advocated topics in transition reform. Among the transition indicators large scale privatization has the highest effect on investment rate. The reason may be that large scale privatization is a strong signal of commitment to restructuring of an economy and determination to develop a market economy, which stimulates investment from private sector. In addition, large scale privatization is an important source of revenue for

governments to carry out their development programmes. Progress in reforming securities market and non-financial institutions have the smallest effect on investment. It may reflect the fact that financial market in transition economies are still in the very initial stage of development and they are mostly dependent on the banking system to cater for their investment needs (Mueller and Peev, 2007). Once again, financial development in form of the ratio of liquid assets to GDP has positive and significant effect on investment rate.

In Table 3 we use indexes of economic freedom and liberalization which are aggregated by equal weighting. Because arbitrary weighting schemes may not appropriately reflect the magnitude or even the direction of each individual element's marginal impact (Heckelman and Stroup, 2000) we use principal components analysis (PCA) to construct composite measures of freedom that best reflect the original data. The PCA helps reduce the dimensionality of the data while retains the maximum variation of the underlying variables. More importantly, the PCA does not impose any subjective judgement but combine variables together according to their relative variance. Moreover, by construction the principal components are independent of each other. Usually, the number of principal components to retain for estimation is determined by the parallel analysis and the Velicer's minimum average partial correlation analysis. Another "rule of thumb" is the Kaiser's eigenvalue>1 but it is not very popular. After applying the PCA for nine IEF variables and eight EBRD variables and selecting the number of components according to those methods, we come up with two principal components (PC1 and PC2) for both the economic freedom measures and the liberalization indexes. The reason is because for the economic freedom data Velicer's method suggests one, while the parallel analysis and Kaiser's eigenvalue suggest nine, which is not meaningful. For the EBRD data the Velicer's method suggests two while the parallel analysis and the Kaiser's eigenvalue indicate that two components should be used.

Though principal component analysis has a nice property of allowing the data to determine both the proper magnitude and sign for aggregating the elements into a single index, this method is not without caveat which is the difficulty in interpreting the coefficients of the components because they are not chosen on the basis of any relationship to the explained variable. In order to make sense of the components we need to look at the relation between them and the underlying variables whose relationship with the explained variable are better known to us. Table 6 shows the eigenvectors of the components we retain. The left panel is for the first two components

of the IEF data and the right panel is for those of the EBRD data. Concerning the IEF data, the first component is strongly and positively related to investment freedom, financial freedom, property rights and freedom from corruption but it is strongly and negatively related to freedom of government. If we have higher score for this component it can be attributed to either advance in investment freedom, financial freedom, property rights and freedom from corruption or less freedom from government. If the coefficient of this component is positive and significant we can say that more involvement of the government in the economy is associated with higher investment rate, which is not surprising given that we use total investment measure. The second IEF component is dominated by monetary freedom and freedom from government. Concerning the EBRD data, the first component is positively and strongly correlated with all measures of liberalisation. It can be seen as representing the overall liberalization progress. The second EBRD component is positively related to liberalisation scores in securities market, banking and interest rate and level of competition but negatively related to liberalisation scores in terms of price and trade and foreign exchange. So it can be thought of as a contrast between financial sector liberalisation and price liberalisation. We have seen that price liberalisation alone does not have significant effect on investment while other liberalisation indexes do in Table 5.

Table 6

Eigenvectors of principal components (PC1 and PC2)

IEF			EBRD		
Variable	PC1	PC2	Variable	PC1	PC2
BIZF	0.2609	-0.0416	LSPRI	0.3891	0.1627
TRAF	0.1811	0.0711	SSPRI	0.4284	-0.186
FISF	-0.0176	0.2881	RESTRU	0.2927	0.2772
GOV	-0.4076	0.4608	PLIB	0.3277	-0.4889
MONF	0.274	0.8098	TRA_FOREX	0.4757	-0.4339
INVF	0.418	-0.0259	COMPET	0.2262	0.35
FINF	0.4949	0.1109	BANK_IR	0.3582	0.2697
PROPF	0.3813	-0.1659	SECU	0.2574	0.4895
CORF	0.3044	-0.0388			

Using these principal components for regression we obtain the results as presented in the Table 7. As we can see the first components of both IEF and EBRD data are positive and significant while both of the second components are not. The

results for economic freedom is reassuring when the simple average index is significant but just some of individual variables are (Table 3 and 4). The result for the EBRD component confirms the importance of liberalisation, including price liberalisation. An increase in any liberalisation measures will lead to considerably higher score for the first principal component and this is associated with higher investment rate. With regard to control variables we have similar results as compared to previous specifications.

Table 7

Estimation results with first two components (PC1 and PC2) of IEF and EBRD

Dependent variable: Investment/GDP

Variable	IEF	EBRD
PC1	0.037**	1.366***
PC2	0.014	0.34
Lagged growth	0.003	0.085*
Lagged saving	0.131**	0.102**
OPEN	0.012	-0.008
M3/GDP	0.106***	0.077***
Inflation	-0.002	0.002**
Govcon	0.14	-0.036
constant	9.394***	8.218*
Est. method	FE	FE
No. of obs.	325	361
R^2	0.29	0.3

Note: PC1 and PC2 are first two components retained from the principal component analysis of the underlying IEF and EBRD variables. *, ** and *** indicates significance at 10%, 5% and 1% respectively (based on robust standard errors)

VI. Conclusion

Investment is the vehicle of growth and efficiency. Without investment growth can not be sustained. More importantly, investment is the channel of "creative destruction" that both raises production capacity and improves efficiency. For transition countries investment plays a very important role because they need to restructure their economies to shift production from central planning to market economy. Therefore, it is important to understand what drives investment in transition economies.

This paper shows that institutional factors play a significant role in explaining investment differences. In general, higher degree of both economic and political freedoms is associated with higher rate of investment to GDP ratio. However, it should

be stressed that one individual economic institution alone would not make much difference. It is the overall bettering of the economic institutions that matter in inducing investment. As far as political freedom is concerned both political rights and civil liberties are important in promoting investment through the effect of political rights is stronger than that of civil liberties. Since many studies have confirmed that institutions have significant effect on growth, even after controlling for investment, and given the fact that investment has been found to have significant effect on growth, our results further strengthen the argument for institutions as significant factors in explaining growth. This is in line with Dawson's (1998) claim that institutions affect growth directly through total factor productivity and indirectly through investment.

In addition, this paper shows that those who are ahead in the transition process have higher investment rate, especially with regard to large scale privatization. Almost all indicators of transition reform have significant effect on investment rate. This should be an encouragement for transition countries that are still lagging behind in the race to building a mature market economy. Last but not least, domestic saving and financial development is crucial if transition countries are to boost investment and achieve healthy growth. In general, the findings in this paper are in line with previous findings in the literature on determinants of investment.

Appendix

Transition economies and averages of variables used in the regressions (1990-2007)

Country	Investment[1]	IEF[2]	FHI	EBRD	Growth	Saving[1]	Openness	M3[1]	Inflation	Government consumption[1]
Albania	20.34	56.20	3.72	3.64	2.813	-5.979	59.70	61.64	29.58	12.07
Armenia	22.43	61.70	4.15	3.39	3.757	0.703	80.13	21.10	375.50	12.50
Azerbaijan	29.46	48.21	5.44	2.91	3.778	23.109	92.35	21.01	232.01	15.12
Belarus	25.51	41.00	5.59	2.06	2.776	23.464	122.54	19.83	338.90	20.27
Bulgaria	17.99	53.66	2.11	3.55	0.775	13.786	108.89	57.32	91.14	16.86
Cambodia	14.48	59.10	5.72	N/A	8.571	5.1236	86.63	14.54	3.64	5.63
China	35.18	52.95	6.72	N/A	9.983	42.542	47.42	126.74	5.76	14.97
Croatia	21.50	51.81	3.06	3.96	1.373	14.233	103.15	50.14	137.14	24.22
Czech Republic	27.57	67.86	1.47	4.01	2.021	27.475	117.03	68.64	8.76	21.64
Estonia	26.84	73.28	1.68	3.84	2.702	24.419	151.71	41.16	71.65	19.90
Georgia	20.60	55.60	4.06	3.38	-1.652	2.5051	79.67	12.24	1286.97	11.20
Hungary	21.62	61.26	1.47	4.06	1.793	23.065	110.38	48.73	14.54	10.64
Kazakhstan	23.26	51.78	5.38	3.22	2.211	25.443	90.47	19.65	277.01	12.29
Kyrgyz Republic	16.39	56.09	4.65	3.62	0.027	4.902	85.55	17.74	117.84	19.25
Lao PDR	28.50	39.41	6.50	N/A	6.42	17.881	60.53	15.99	23.74	7.77
Latvia	20.87	64.58	1.88	3.78	1.974	21.072	100.75	32.67	73.39	19.07
Lithuania	22.60	63.98	1.68	3.74	1.595	16.294	107.27	28.02	96.96	18.85
Macedonia	17.35	58.63	3.25	3.88	0.482	7.0175	93.49	29.18	118.61	19.95
Moldova	19.14	54.47	3.68	3.24	-2.734	8.357	113.83	31.14	137.48	17.74
Mongolia	28.57	56.15	2.42	3.44	2.719	19.684	120.67	30.91	49.19	17.85
Poland	19.90	58.94	1.53	4.10	3.942	19.315	58.36	39.23	16.18	19.45
Romania	20.32	51.32	2.83	3.51	1.205	16.267	64.11	33.97	71.32	11.00
Russia	19.76	51.61	4.38	3.26	0.398	32.5	57.57	26.32	182.12	17.64
Slovak Republic	28.57	60.27	1.89	3.97	2.564	23.892	133.02	61.10	9.10	21.70
Slovenia	23.37	58.79	1.41	3.97	2.88	24.924	120.47	40.35	27.15	19.15
Tajikistan	14.94	47.35	5.88	2.78	-1.272	9.058	111.10	7.83	180.02	12.47
Turkmenistan	33.21	43.02	6.89	1.66	-1.787	32.885	135.71	16.08	647.15	13.39
Ukraine	21.68	47.67	3.47	2.91	-1.655	25.128	88.20	29.15	379.08	19.41
Uzbekistan	26.48	40.51	6.56	2.30	2.483	21.93	59.28		220.74	19.77
Vietnam	29.14	44.35	6.72	N/A	7.509	21.745	104.74	48.05	15.36	7.23

Note: [1] as % of GDP; [2] only available from 1995. Source: WBDI (2008), Heritage Foundation (2008), Freedom House (2008) and EBRD Transition Index (2008)

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