

Weller, Christian E.

Working Paper

The finance-investment link in a transition economy: Evidence for Poland from panel data

ZEI Working Paper, No. B 04-1999

Provided in Cooperation with:

ZEI - Center for European Integration Studies, University of Bonn

Suggested Citation: Weller, Christian E. (1999) : The finance-investment link in a transition economy: Evidence for Poland from panel data, ZEI Working Paper, No. B 04-1999, Rheinische Friedrich-Wilhelms-Universität Bonn, Zentrum für Europäische Integrationsforschung (ZEI), Bonn

This Version is available at:

<https://hdl.handle.net/10419/39460>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Zentrum für Europäische Integrationsforschung
Center for European Integration Studies
Rheinische Friedrich-Wilhelms-Universität Bonn



Christian Weller

**The Finance-Investment
Link in a Transition
Economy: Evidence for
Poland from Panel Data**

Working Paper

**B99-04
1999**

**THE FINANCE-INVESTMENT LINK IN A TRANSITION ECONOMY :
EVIDENCE FOR POLAND FROM PANEL DATA**

Christian Weller
Center for European Integration Studies
University of Bonn
Walter-Flex-Str. 3
53113 Bonn
Germany
weller@united.econ.uni-bonn.de

March 1999

Abstract

Real investment in Poland declined from 1990 to 1993, and only slowly recovered, while real credit decreased for a number of years, too. Has declining credit adversely affected investment? Controlling for industry and time fixed effect, and using dynamic panel data techniques, I estimate an investment model, which includes external and internal finance as investment determinants. The results suggest that internal and external finance are positively related to investment. Thus, industries seems to operate under hard budget constraints. Also, internal finance is more important than external finance in determining investment, thus indicating that credit rationing occurs. Finally, the effects of external finance are slightly larger among durable goods producing industries than in non-durable goods producing industries.

JEL Classifications: E22; F36; O16

I would like to acknowledge helpful comments on an earlier draft by Leonce Ndikumana, Jerry Epstein, Jim Crotty, Robert MacCulloch, as well as two anonymous referees. All remaining errors are mine.

I. Introduction

Transition economies have experienced dramatic economic changes in the recent past, while they are also facing formidable challenges in the near future. The prime example for the roller coaster ride of transition is Poland which started with introducing financial reforms in early 1989, and followed with its “shock therapy” in 1990. The Polish GDP declined subsequently by 11.6% and 7.6% before it began to grow again. It also shows a similar, yet somewhat delayed trend in business investment as this declined rapidly until 1993 before recovering some lost ground (table 1). The issue arises as to whether investment is growing fast enough to allow Polish firms to make up for lost ground and to improve their competitive position, particularly in light of Poland’s bid for EU membership. Understanding the determinants of Polish investment in the transition should also provide insights into the institutional changes which could help Polish firms to undertake their necessary investments, and to improve their competitive position.

An improved economy, and the prospect of EU membership should raise investment in Poland. So far, investment has followed the upswing in output growth with a lag. This is partly due to depressed future expectations of investors, following the rapid decline in the first years of the transition. No firm would sink often irrecoverable costs into a project if it expects the economy to continue its slump. Hence, it is no surprise that expectations and investment would improve after a turn around in the economy. Further, the political desire of policy makers to join the EU has raised pressures for firms to improve their technology and become more competitive.

A company’s intention to invest is one thing, realizing it is certainly another. Realizing investment decisions depends largely on well functioning capital markets if internal capital is not available instead. In Poland, firms depend largely on external financing, particularly in the form of bank credit as equity markets are underdeveloped. However, in 1990, 1993 and 1994 real credit declined overall, and it declined for state owned firms from 1990 to 1996. Are these credit contractions reflections of a gradual imposition of hard budget constraints? More importantly, are firms’ ability to invest adversely affected during part of the early transition period?

If there is a positive link between credit and investment, it would show that Polish industries operate under hard budget constraints, and that the credit decline led firms to undertake less than their desired fixed capital formation. Polish industries, particularly where SOEs are dominant, are often perceived as being funded by accommodating banks, thus possibly delinking financing and investment. While real credit for SOEs is declining for most of the time (table 1), this decline may only reflect a gradual privatization, and may not be connected to business investment. If decreasing real credit significantly affects investment behavior across industries, though, this would signal that hard budget constraints were introduced early in the transition process, which would imply that the declining real credit restricted firms’ investment activities.

The remainder of this paper is organized as follows. Section II presents some background on the theoretical basis as it applies to the Polish case, while section III presents the empirical results for Polish industries. Finally, a few concluding remarks follow in section IV.

II. Background

The connection between external finance and fixed capital formation is based on financial market

imperfections resulting from informational asymmetries. Here, financing constraints may exist if firms have to rely on external financing. If lenders and borrowers have asymmetric information and if they cannot write complete contracts, borrowers cannot obtain the necessary amount of finance for their investments (Stiglitz and Weiss, 1981; Gertler, 1988; Stiglitz, 1988; Bernanke 1993). Finance matters for real outcomes because lenders set the lending rate below the market clearing rate to avoid adverse incentives for excessive risk taking, thereby rationing credit to borrowers, and keeping investment below its optimum. Further, if information asymmetries matter, we would expect internal finance to be more important than external finance for investment as outside investors require a greater rate of return than owners to compensate for the risk of imprudent behavior on the part of managers. A couple of studies using firm level data for the US have found a significantly different impact of internal versus external finance on business investment (Fazzari, Hubbard, Petersen, 1988; Ndikumana, 1999).

An important aspect of financial market changes, especially increased competition, in transition economies is that market discipline should entice lenders now to establish and enforce hard budget constraints on firms as their own viability depends on them. However, as financial intermediaries in formerly centrally planned economies allocated credit to accommodate the requirements of the plan, it has been expected that political priorities would dominate the credit allocation at least in the early stages of the transition (Raiser, 1996; Kornai, 1993; Schmieding and Buch, 1992). External finance should not matter for investment outcomes in industries that are dominated by formerly state-owned enterprises if soft budget constraints are prevalent.

So far, it is assumed that Polish firms have actually decided to invest, and that their decision may either be aided by accommodating lenders, or hampered by market mechanisms. The decline in credit has hence not been attributed to decreasing finance demand by firms. It seems clear that investment needs of SOEs, privatized and newly created private firms are generally large. For one, the Polish economy has slowly been improving since 1992 (table 1), which should improve future expectations and raise firms' desired investment. Also, the new market economy has created pressures for firms to modernize to remain competitive, which are only augmented by Poland's bid to join the EU in the near future. Considering the SOEs' outdated equipment, modernization of production facilities, and financing demand, should continue for years to come. Similarly, capital needs of start-up companies are generally high in the early years of operation¹. Thus, it is not surprising to find that demand for investment financing by the most dynamic companies remains high, too (Abel, Szekely, and Siklos, 1998; Anderson and Kegels, 1998).

Even though some factors indicate increased investment demand, the future uncertainty in a rather volatile environment could potentially lead firms to postpone their investment decisions (Dixit and Pindyck, 1994). Since the expected distributions of future prices, interest rates, and labor costs vary largely early in the transformation, firms may be better off waiting for a while than to undertake investments. However, factor and output prices have become more stable, while international competition has increased as the rapid growth of FDI shows (table 1).

¹ Some figures also suggest that capital needs may be rather large in the growing private sector. The share of GDP produced by private companies has increased from 30.9% in 1990 to about 60% by the end of 1995 (GUS, 1995; PAIZ, 1997). In 1990, private industrial firms employed 27.3% of the workforce, but had only 15.2% of all sales. In 1993, their employment grew to 41.8%, and their sales rose to 37.4% (Chmiel and Pawlowska, 1995). Similarly, the private sector as a whole produced 60% of GDP with 63% of the labor force (PAIZ, 1997).

Thus, as uncertainty declines, firms may be enticed to undertake new investments to stay in business in the new competitive environment regardless of the remaining uncertainty.

While financing needs are high, the evidence suggests that firms are finance constrained, and thus possibly unable to fund all desired investment. For instance, Cornelli, Portes and Schaffer (1996) suggest that Polish firms are actually underfunded as compared to their counterparts in the G7 countries. Compared to the benchmark of 66% debt asset ratio for non-financial firms in the G7 countries, they find a 41% ratio in Poland at the end of 1992. For the sample used here, the debt to asset ratio calculated from data in the GUS' Statistical Bulletin is about 45% for 1991, but closer to 60% by the end of 1992. In fact, the average debt to asset ratio increases to more than 100% until the first quarter of 1994, before it declines to about 70% after that. While this would put Polish firms closer to their counterparts in industrialized countries, it may still mean that they are more finance constrained, given their larger investment and financing needs during the early transition years. Their growing reliance on trade credit seems to support this, too (Abel, Siklos, Szekely, 1998). In other words, if Polish firms operate under hard budget constraints, and if they are finance constrained, their reliance on costly alternative external finance sources may inhibit investment, and may put them at a competitive disadvantage vis-a-vis their EU competitors.

III. Empirical Analysis

III.1 The Data

Very little research exists on firm and industry level finance in a transition economy, and it is especially scarce with respect to the effects of changes in credit. A few studies provide some preliminary evidence that Polish firms and industries may operate under hard budget constraints early in the transition process (Dittus, 1994; Pinto, Belka and Krajewski, 1993). In a somewhat more classified view, Raiser (1996:93) argues that “[t]he process of budget hardening has not been uniform across all enterprises [in Poland]. While inter-enterprise credits have declined and the majority of bank loans may now go to profitable firms, some SOEs are considered too big to be allowed to fail...”, and hence receive government support regardless of their financial position. The limited evidence on the supply of credit to firms, though, seems to support the hypothesis that bank and inter-enterprise credit have introduced hard budget constraints. Cornelli, Portes and Schaffer (1996), for instance, find that Polish firms experience significant finance constraints because of pervasive credit rationing. Such finance constraints were assumed in Calvo and Corricelli's (1993) study of the impact of a credit contraction on output across 85 industrial sectors in the first quarter of the Polish transition, which is also the only study that looks at the real consequences of a credit decline in Poland. However, while they find that the credit contraction led to a drop in output, the exact causality between credit and output remains subject to debate. Furthermore, since their data covers only the first quarter of the transition process, it is likely that some of the standard economic relationships do not hold due to the turbulences associated with the social, political and economic changes in Poland. Hence, my study improves on the earlier work by looking at the consequences of changes of credit over a longer period of time, and by using a more clearly defined link between finance and investment.

The data set is compiled from the GUS' Statistical Bulletin and from the NBP's Information Bulletin. The panel consists of 369 quarterly observations covering 19 industries beginning in 1994, four industries starting in the fourth quarter of 1992, and two industries from 1991 until the end of 1997. All industry specific data are taken from the GUS' Statistical Bulletin, whereas interest and inflation rates are published in the NBP's Information Bulletin.

A few patterns in investment behavior across industries are discernible from the summary statistics in tables 2-4. The industries which are neither classified as durable nor as non-durable goods producing industries show the largest investment outlays. Particularly, utility companies have the largest investment outlays with an mean investment to asset ratio of 16.39%. Similarly, water purification (13.90%), paper production (13.37%), wood processing (12.16%), coke producers (11.92%), and non-metallic minerals production (10.44%) invest more than 10% of total assets. In contrast, durable goods producing industries show the least investment as a group, while transport equipment (1.70%), leather manufacturing (2.55%), and machinery production (2.98%) have individually the lowest investment outlays with less than 3% of total assets.

The summary statistics also indicate that credit may be positively related to investment. All industries, except water purification, are heavily dependent on external financing with an average debt to asset ratio greater than 50%. Three industries, leather production (107.27%), manufacturing of audio visual equipment (115.05%), and mining (138.02%), even show ratios above 100%. As the average debt to asset ratio is increasing in 14 out of 25 industries, and as investment is positively correlated with debt in most industries, there is some indication that a credit contraction may inhibit firms' desired investment.

III.2. Estimation Model

In general, q-type investment models which have included additional variables to correct for suspected financial market imperfections have performed rather well empirically in investigating the link between finance and investment (Fazzari, Hubbard, and Petersen, 1988; Abel and Blanchard, 1986; Gilchrist and Himmelberg, 1995; Ndikumana, 1999)². However, despite its theoretical and empirical appeal resulting from forward looking and optimizing behavior that generates a readily identifiable structural parameters (Chirinko, 1987), this approach cannot be used here as market valuations, which could serve as marginal q approximations, are not available³. Hence, I use an investment accelerator model based on the a neoclassical investment function instead, which includes changes in internal finance, changes in debt, and changes in the cost of capital in addition to current and past sales growth.

The accelerator investment model can be derived from a neoclassical investment function. In the neoclassical investment theory, a firm's investment demand depends on the ratio of factor prices to the price of

² Following the insights of Tobin (1969) empirical researchers have studied the connection between finance and investment. In this approach the replacement cost of a marginal investment is compared to its capitalized value. A firm should invest if Tobin's q - defined as the ratio of the capitalized value to the replacement cost of the investment - is greater than 1.

³ Not only are capital markets underdeveloped, thus making market valuations scarce, but as all variables exist merely on an industry level, firm valuations would be problematic anyway.

output, while a firm's production technology determines the optimal capital stock. It can be shown that if a firm operates with a CES production technology of the form $Q = \gamma[\alpha K^{-\rho} + (1-\alpha)N^{-\rho}]^{1/\rho}$, the following investment equation can be derived (Jorgenson, 1963)⁴:

$$\frac{I_t}{K_{t-1}} \approx \delta + \omega(L) \left[\sigma \frac{\Delta(P/c)_t}{(P/c)_{t-1}} + \theta \frac{\Delta Q_t}{Q_{t-1}} \right] \quad (1)$$

Equation (1) shows that investment demand can be expressed as a function of relative changes of output, and relative changes in the ratio of output prices to the cost of capital. In empirical research output changes are often proxied by sales growth.

For the purpose of my study, it is important to note that for the accelerator model to hold, finance needs to be adequate to satisfy demand which is created by the accelerator. Since financial markets may be characterized by information asymmetries, firms may be able to obtain only suboptimal financing. In particular, due to these frictions, internal finance gains a cost advantage over external finance. As outside financiers cannot distinguish between the quality of good and bad projects, they cannot require different rates of return for investments of distinct quality. As a result, investors require a lemons premium to compensate for the losses that arise from the ex ante unobservable portion of bad projects. Thus, firms may be finance constrained if there is insufficient internal finance, and if external finance is either too costly or not forthcoming.

To account for financial market imperfections in determining investment demand, I have added measures for internal and external finance to the model. Here, the quarterly changes of an industry's own financial means are included as a proxy for internal finance, whereas the quarterly change in the stock of debt is employed to control for the changes in external finance:

$$\begin{aligned} \left(\frac{I}{ASSETS} \right)_{it} = & \beta_1 L \left(\Delta \left(\frac{INTFIN}{ASSETS} \right) \right)_{it} + \beta_2 \left(\Delta \left(\frac{LOANS}{ASSETS} \right) \right)_{it} \\ & + \beta_3 L(SALES)_{it} + \beta_4 L \Delta COSTK_{it} + e_{it} \end{aligned} \quad (2)$$

Here, L is a lag operator, I_{it} represents quarterly investment outlays, $ASSETS_{it}$ comprises total beginning-of-period assets, $INTFIN_{it}$ is the amount of internal financial means, $LOANS_{it}$ is the stock of liabilities, $SALES_{it}$ is the change of quarterly sales, $COSTK_{it}$ is the cost of capital⁵.

For the Polish transition, we would expect investment determinants to behave in their usual ways, with the exception of external finance. Sales growth should effect investment positively, as a good performance over

⁴ K is capital stock, Q output, N labor, P output price, c the user cost of capital, γ an efficiency parameter, α a distribution parameter, ρ an input substitution parameter, ν a scale parameter, δ the depreciation rate of capital, $\sigma = 1/(1+\rho)$, and $\theta = \sigma + (1-\sigma)/\nu$, and $\omega(L)$ a polynomial in the lag operator L .

⁵ See the appendix for lists of variables and industries.

the past quarters should increase raise expectations, such that firms undertake more investment. Further, cost of
is traditionally understood as the opportunity cost of not investing, and hence increases in the cost of capital
should
in internal finance should have a substantially larger effect on investment than changes in external finance.
finance deserves our particular attention here as it is expected to have a positive influence on a firm's
inves
to external funds may outweigh their greater costs. Put simply, firms need to access external finance first before

III.3 Estimation Results

I

internal and external finance. Regression (1) in table 5 estimates the determinants of investment using Generalized
Squares random effects. The results of estimation (1) show that current sales growth has the expected positive
sign in determining investment, while the lagged values of sales growth are insignificant.

of capital variable shows no indication either way may be an indication that the interbank lending rate is a poor

of internal and external finance growth on fixed capital formation. Industries with larger changes in internal or
finance, have hence also higher investment outlays. For instance, a one standard deviation increase in the
rate

almost one third of the variation in the investment to assets ratio. Put differently, if firms producing metal products
raise the growth rate of their debt to asset ratio to that of firms manufacturing electrical machinery, than
their investment

about 7% of the difference in the investment to assets ratio. Similarly, if firms in the apparel producing sector
increase the rate of change of internal finance across all lags to that of publishing companies, their
investment

While the estimated parameters for internal finance are all larger than that for external finance, the differences

The error term may not be independent over time in each country, an issue that I correct for by
approach has the considerable advantage of controlling for the incidence
of

in regression (2) of table 5 are Least Squares with Dummy Variables (LSDV)⁷ The impact of internal and external
finance

time fixed effects, in this case for each quarter. The use of time fixed effects requires that a country with above

Another reason is that I use Hausman's (1978) specification test to see whether random effects are appropriate. The test statistic for
greater than 47.49 is virtually zero, which is evidence that the assumption of the random effects being uncorrelated with the explanatory variables
is incorrect. Consequently, I also report regressions obtained by estimation with LSDV.

Shocks to changes in loans may be endogenously related to shocks to investment. Using the lagged values of the external finance
has a chi-squared distribution with 1 degree of freedom, has a value of 0.33 for regression (1), and 0.29 for regression (2). As in both cases, the
chance of obtaining a value of greater than the test statistic is more than 50%, I can proceed with LSDV regressions.

average investment in one quarter must also have an above average change in either internal or external finance to obtain significant coefficients. Controlling for country and time fixed effects keeps the signs of the estimated parameters for the finance variables the same, while the coefficient for current sales growth becomes insignificant in regression (3). Instead, the first lag for sales growth becomes negative. More importantly, the size of the overall effect of internal finance rises, while the impact of external finance decreases when time fixed effects are taken into consideration.

The regression results support the hypotheses that Polish industries operate under hard budget constraints, and that the composition of finance matters for Polish industries. As the coefficients for internal finance are larger than that for external finance, the results show that there is a cost wedge between the two forms of finance. Further, while it is possible that increases in external finance may lower an industry's ability to invest due to higher debt service, the opposite seems to be true here. In other words, Polish industries seem to be finance constrained such that more credit would actually increase investment. The overall decreases in real credit in 1990, 1994 and 1995, and the continuous decline of real credit for public enterprises until 1996 may have thus adversely affected business investment. The fact that increases in credit would result in more investment suggest also that Polish industries operate under hard budget constraints as Polish industries can only be credit constrained if hard budget constraints are a reality.

Clearly, investment behavior may vary according to the type of industry. As the summary statistics show (tables 2 and 3) the ratio of external to internal finance is somewhat larger for durable goods producing industries, while investment is lower among durable goods producing industries. For the case of the US, a number of studies have investigated factors which may have affected the links between investment and finance, among them industry type. It is suggested that either tax shields or differential bankruptcy costs associated with various leverage levels may explain inter-industry differences (Bowen, Daley, and Huber, 1982; Buell and Schwartz, 1981). While an exploration of the causes for the greater dependence of durables good producing firms on external finance is beyond the scope of this paper, possible explanations could be differential government subsidies for some sectors of the Polish economy⁸.

The regression results for durable goods producing and non-durable goods producing industries are presented in tables 6 and 7. Increases in external finance will lead to more investment, regardless of the industry type. Durable goods producing industries are slightly more affected by changes in external finance, though, than non-durable goods producing industries. Considering that, on average, durable goods producing industries experience a greater decline in lending relative to assets with -0.09% than non-durable goods producing industries with -0.04%, the former are more likely to be finance constrained than the latter. Furthermore, internal finance creation has almost no impact on investment for durable goods producing industries, while it is again significantly positive for non-durable goods producing industries. Thus, industries with more internal finance are not necessarily investing more. Finally, past sales growth seems to have a slightly negative impact on investment behavior for

⁸ Firm size may be another factor which may affect the impact of leverage on investment. While in industrialized economies the main reason for this distinction lies in differential access to capital markets, larger firms in the transition economies - where capital markets do not play a significant role - may have easier access to government funds. However, as I am using only industry level data, a separation of the data set by firm sizes is not feasible.

durable goods producers. However, the negative impact of sales growth over the past two quarters remains rather

As regression (1) in table 6 shows, an increase in sales growth of one standard deviation two quarters ago reduces investment outlays in the current period, by 0.007% relative to assets.

A number of previous studies have looked at the determinants of firm credit in Poland during the early years. While there seems to be some evidence in previous studies that Polish firms operated under hard budget constraints, the consequences of this shift in lending regimes are insufficiently researched.

paper consequently investigates the impact of debt on investment. My results suggest that debt plays a significant role

credit has a positive impact on business investment indicates not only that Polish industries operate under hard constraints, but that they also experience severe finance constraints during the transition period. These external finance constraints seem even more severe for durable goods producing industries.

there appears to be a positive connection between lending and investment there are some policy considerations

constraints early on. Second, public policy concerns which may have led to a restriction of real credit in a number years should be weighed against the adverse impact on business investment. In other words, if credit can be expanded

prepare for increased competition with their EU counterparts. However, further research may be needed to which firms exactly are the most finance constrained. In particular, a number of dimensions which could affect

leverage levels or debt service.

Appendix:

A. Data Sources

A.1 List of Industries:

1. Mining and Quarring
2. Manufacture of Food Products and Beverages
3. Manufacture of Tobacco Products
4. Manufacture of Textiles
5. Manufacture Wearing Apparel and Furriery
6. Processing of Leather and Manufacture of Leather Products
7. Manufacture of Wood, Straw and Wicker Products
8. Manufacture of Pulp and Paper
9. Publishing and Printing
10. Manufacture of Coke, Refined Petroleum Products and Derivatives
11. Manufacture of Chemicals and Chemical Products
12. Manufacture of Rubber and Plastic Products
13. Manufacture of Other Non-Metallic Mineral Products
14. Manufacture of Basic Metals
15. Manufacture of Metal Products (except machinery and Equipment)
16. Manufacture of Machinery and Equipment
17. Manufacture of Electrical Machinery and Apparatus
18. Manufacture of Radio, Television and Communication Equipment and Apparatus
19. Manufacture of Medical, Precision and Optical Instruments, Watches and Clocks
20. Manufacture of Motor Vehicles, Trailers and Semi-Trailers
21. Manufacture of other Transport Equipment
22. Manufacture of Furniture; Other Manufacturing
23. Electricity, Gas, Steam and Hot Water Supply
24. Collection, Purification and Distribution of Water
25. Construction

Source: GUS, *Statistical Bulletin*, Table 31: "Investment Outlays and Investments Newly Started", January 1997

TABLE A-1
LIST OF VARIABLES

Variable Name	Description
$(INV/ASSETS)_it$	ratio of investment over assets; investment is measured as the quarterly investment outlay, and assets are the current assets at the beginning of each quarter.
$(INTFIN/ASSETS)_it$	Internal finance is measured by the first difference of the ratio of financial means to beginning-of-the-period assets.
$(LOANS/ASSETS)_it$	External finance is measured by the first difference of an industry's liabilities to assets ratios. An industry's liabilities include bank credits, supplier credit and other external finance sources.
$SALESG_{it}$	Sales growth is the percentage change of real quarterly sales.
$COSTK_{it}$	The cost of capital is proxied by the change in the after tax real weighted average interest rate of interbank lending.

Sources: GUS, "Statistical Bulletin."; NBP, "Information Bulletin." Warsaw: NBP, various issues

Abel, Andrew B. and Olivier J. Blanchard, 1986, The Present Value of Profits and Cyclical Movements in *Econometrica* 54, 2:249-279.

Istvan, Pierre L. Siklos, and Istvan Szekely, 1998, *Money Economy*, Northampton MA: Edward Elgar

Ben S. and Mark Gertler, 1990, Financial Fragility and Economic Performance, *Quarterly Economics* 105 1: 87-114, February 1990

Bernanke, Ben S. and Mark Gertler, 1995, Inside the Black Box: The Credit Channel of Transmission, *Journal of Economic Perspectives*

Bernanke, Ben S., 1993, Credit in the Macroeconomy, *Reserve Bank of New York Quarterly Review* 18,

Bowen, Robert M., Lane A. Daley, and Charles C. Huber Jr., 1982, Evidence on the Existence and Determinants *Financial Management*, Winter 1982: 10-20.

Rates and Possible Effects on
the Macro-Economy, *Journal of Monetary Economics* 33, 3: 443-458.

Calvo, *IMF Staff Papers*
March 1993

Chmiel, Jozef and Zofia Pawlowska, 1995, Development of Private Sector in Poland, 1990-1993, *Center for Economic and Statistical Studies*,

Chirinko, Robert S., 1987, Tobin's Q and Financial Policy, *Journal of Monetary Economics*

Cornelli, Francesca, Richard Portes, and Mark E. Schaffer, 1996, The Capital Structure of Firms in Central and Europe, *CEPR* No. 1392, May 1996, London: Centre for Economic Policy Research.

BIS
Economic Papers

- Dixit, Avinash and Robert S. Pindyck, 1994, *Investment Under Uncertainty*, Princeton: Princeton University Press.
- Fazzari, Steven M., R. Glenn Hubbard and Bruce C. Petersen, 1988, "Financing Constraints and Corporate Investment." *Brookings Papers on Economic Activity* 1, pp. 141-195, 1988
- Gertler, Mark, 1988, Financial Structure and Aggregate Economic Activity: An Overview, *Journal of Money, Credit and Banking* 20, pt. 2, 3: 559-588, August 1988
- Gilchrist, Simon and Charles P. Himmelberg, 1995, Evidence on the Role of Cash Flow for Investment, *Journal of Monetary Economics* 36:541-572 (1995).
- GUS (Central Statistical Office), "Statistical Bulletin." Warsaw: GUS, various issues
- IMF, "International Financial Statistics." Washington D.C.: IMF, various issues
- Jorgenson, Dale W., 1963, "Capital Theory and Investment Behavior", *American Economic Review* 53, 2: 247-259.
- Kuh, Edwin and John Meyer, 1955, "Accelerator and Related Theories of Investment: An Empirical Inquiry", *Review of Economics and Statistics* 38, 3:217-230.
- Ndikumana, Leonce, 1999, Debt Service, Financing Constraints, and Fixed Investment: Evidence from Panel Data, forthcoming in *Journal of Post-Keynesian Economics*.
- NBP (National Bank of Poland), "Information Bulletin." Warsaw: NBP, various issues
- PAIZ, 1997, Privatisation and Business Infrastructure, from *PAIZ - Poland: Fundamental Facts, Figures and...* on <http://www.paiz.gov.pl/facts1d.htm>
- Pinto, Brian, Marek Belka and Stefan Krajewski, 1993, Transforming State Enterprises in Poland: Evidence on Adjustment by Manufacturing Firms, *Brookings Papers on Economic Activity* 0, 1:213-61, 1993.
- Raiser, Martin, 1996, Soft Budget Constraints and the Fate of Economic Reforms in Transition Economies and Developing Countries, *Kieler Studien* No. 281, Kiel, FRG: Institut für Weltwirtschaft.
- Stiglitz, Joseph and Andrew Weiss, 1981, "Credit Rationing in Markets with Imperfect Information." *American Economic Review* 71: 393-410, June 1981

TABLE 1
ECONOMIC AND FINANCIAL INDICATORS FOR POLAND 1990-1997

Year	Real GDP Growth (%)	Unemployment (%)	Inflation (%)	Real Inv. (mn. PLZ)	Real Credit Growth (%)			Domestic Credit/GDP (%)	FDI Flow (bn. US\$)
					Total	Nonfin. Public Enterprises	Private Sector		
1990	-11.6	6.3	585.8	11761.00	-56.23	-49.62	32.02	19.46	0.089
1991	-7.6	11.8	70.3	8927.13	46.40	-41.79	195.71	34.88	0.100
1992	2.6	13.6	43.0	7514.08	7.09	-22.03	0.53	38.20	0.300
1993	3.8	16.4	35.3	7041.24	5.38	-11.55	6.01	40.65	0.600
1994	5.2	16.0	22.2	7276.19	-2.35	-11.81	-0.75	39.17	0.500
1995	7.0	14.9	27.8	8205.79	-5.30	-4.23	14.99	34.27	1.100
1996	6.1	13.2	19.9	9637.11	9.35	-1.17	30.58	35.83	2.800
1997	6.9	10.5	14.9	11373.63	9.07	2.91	20.31	36.96	3.000

Sources: IMF, "International Financial Statistics"; Business Central Europe, "Key Data Online 1990-1997".

TABLE 2
SUMMARY STATISTICS FOR DURABLE GOODS PRODUCING INDUSTRIES

Industry	Investment/ Assets (%)		Debt/ Assets (%)		Δ Debt/ Assets (%)		Δ Internal Fin./ Assets (%)		Sales Growth (%)		Corr. between Inv. & Debt
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	
Motor Vehicles	4.41	3.15	81.28	14.33	1.46	19.59	0.09	3.22	11.34	15.53	0.9673
Medical Equip.	3.08	1.10	54.65	8.32	0.30	0.11	0.26	2.62	12.15	17.08	0.8850
Metal Products	4.15	1.69	64.54	5.35	-0.84	4.36	0.23	1.27	8.83	8.63	0.8207
Electrical Equipment	5.63	1.79	55.16	4.12	0.85	4.86	0.19	1.38	8.73	10.70	0.8178
Wood	12.16	7.76	82.73	8.49	-0.83	10.41	0.57	3.58	8.31	7.53	0.7981
Furn.	5.00	1.88	71.63	5.72	0.99	6.30	0.14	1.42	9.96	12.87	0.7889
Machinery	2.98	1.05	76.07	7.51	-1.44	5.10	0.28	1.40	7.72	7.51	0.7564
Mining	7.30	3.05	138.02	21.36	-0.60	31.52	0.00	4.03	5.47	13.17	0.6219
Audio Visual	8.48	4.49	115.05	12.23	-2.56	10.78	0.30	2.71	14.76	30.90	0.4971
Basic Metals	6.63	3.40	86.61	12.94	0.12	10.17	0.09	0.73	6.07	6.06	0.4830
Transport Equipment	1.70	0.75	77.34	14.39	1.79	8.79	2.21	12.51	14.51	39.55	0.3664
Total Durable Goods Producing Industries	5.64	4.29	83.74	27.82	-0.09	14.09	0.38	4.34	9.68	17.98	0.7479
Total All Industries	6.67	5.50	75.08	30.53	0.06	29.67	0.29	9.08	8.40	16.98	0.6640

Sources: GUS, Statistical Bulletin; NBP, Information Bulletin.

TABLE 3
SUMMARY STATISTICS FOR NON-DURABLE GOODS PRODUCING INDUSTRIES

Industry	Investment/ Assets (%)		Debt/ Assets (%)		Δ Debt/ Assets (%)		Δ Internal Fin./ Assets (%)		Sales Growth (%)		Corr. between Inv. & Debt
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	
Publishing	6.30	1.82	53.25	6.75	0.64	7.94	0.89	3.92	7.79	6.50	0.8576
Food & Bev.	6.26	1.95	60.84	19.48	1.81	20.67	0.01	2.33	6.90	7.30	0.8329
Rubber	7.99	3.00	50.41	5.23	0.22	7.07	0.58	4.23	8.97	9.60	0.8061
Tobacco	4.87	2.87	63.7	12.61	0.19	17.37	0.04	4.31	5.46	20.26	0.7409
Apparel	3.76	1.09	69.46	6.43	0.14	8.64	0.11	2.13	7.52	7.25	0.7251
Coke	11.92	12.27	77.88	91.92	0.21	1.42	0.25	45.93	4.23	13.05	0.7241
Chemicals	6.33	1.71	57.66	7.94	-0.62	5.07	0.31	1.73	6.46	6.87	0.6887
Paper	13.37	6.46	67.70	18.40	-2.30	12.53	0.06	4.99	8.66	11.92	0.6203
Textiles	3.90	1.63	98.14	25.57	-1.13	29.53	0.15	1.20	5.38	7.33	0.4939
Leather	2.55	1.25	107.27	16.33	-0.65	16.50	0.19	2.97	7.27	20.05	0.3204
Total Non-Durable Goods Producing Industries	6.41	5.35	71.75	34.91	-0.04	42.82	0.23	13.19	6.86	11.68	0.9209
Total All Industries	6.67	5.50	75.08	30.53	0.06	29.67	0.29	9.08	8.40	16.98	0.6640

Sources: GUS, Statistical Bulletin; NBP, Information Bulletin

TABLE 4
SUMMARY STATISTICS FOR UNCLASSIFIED INDUSTRIES

Industry	Investment/ Assets (%)		Debt/ Assets (%)		Δ Debt/ Assets (%)		Δ Internal Fin./ Assets (%)		Sales Growth (%)		Corr. between Inv. & Debt
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	
Construction	3.31	2.04	68.09	11.07	1.08	9.52	0.17	3.06	11.14	27.37	0.8427
Electricity	16.39	8.45	70.93	13.76	3.06	16.28	0.43	2.56	4.24	13.05	0.8312
Minerals	10.44	3.91	64.69	8.40	-1.00	6.78	0.35	3.79	10.72	26.84	0.6905
Water	13.90	4.48	43.27	17.74	-0.91	16.72	0.02	2.43	5.86	5.03	0.0854
Total Unclassified Industries	9.73	7.17	62.80	16.25	-0.04	42.82	0.23	13.19	9.14	24.07	0.6988
Total All Industries	6.67	5.50	75.08	30.53	0.06	29.67	0.29	9.08	8.40	16.98	0.6640

Sources: GUS, "Statistical Bulletin"; NBP, "Information Bulletin"

TABLE 5
REGRESSION RESULTS FOR INVESTMENT ANALYSIS WITH
INV/ASSETS AS DEPENDENT VARIABLE

Variable	(1) Random Effects	(2) LSDV	(3) LSDV
Constant	0.07000**** (0.0084)	0.05320**** (0.0074)	0.03467** (0.0164)
$\Delta(\text{INTFIN}/\text{ASSETS})_t$	0.08864** (0.0437)	0.08532* (0.0441)	0.11890**** (0.0387)
$\Delta(\text{INTFIN}/\text{ASSETS})_{t-1}$	0.16240**** (0.0263)	0.16271**** (0.0265)	0.17084**** (0.0228)
$\Delta(\text{INTFIN}/\text{ASSETS})_{t-2}$	0.10132**** (0.0239)	0.10046**** (0.1005)	0.10825**** (0.0209)
$\Delta(\text{LOANS}/\text{ASSETS})_t$	0.05888**** (0.0127)	0.05998**** (0.0129)	0.04814**** (0.0114)
SALESG _t	0.00027** (0.0001)	0.00033**** (0.0001)	0.00002 (0.0001)
SALESG _{t-1}	-0.00015 (0.0001)	-0.00008 (0.0001)	-0.00023* (0.0001)
SALESG _{t-2}	-0.00010 (0.0001)	-0.00004 (0.0001)	-0.00018 (0.0001)
COSTK _t	-0.00026 (0.0006)	-0.00021 (0.0006)	0.00015 (0.0011)
Industry Fixed Effects	No	Yes	Yes
Quarter Fixed Effects	No	No	Yes
No. of Observations	336	336	336
Adj. R-square	0.1607	0.6007	0.7101

Note: Standard errors in parentheses. * denotes significance at 10% level, ** denotes significance at the 5% level, *** denotes significance at the 2.5% level, and **** denotes significance at the 1% level.

TABLE 6

REGRESSION RESULTS FOR INVESTMENT ANALYSIS WITH INV/ASSETS AS DEPENDENT VARIABLE FOR DURABLE GOODS PRODUCING INDUSTRIES

Variable	(1) Random Effects	(2) LSDV	(3) LSDV
Constant	0.0607**** (0.0118)	0.0858**** (0.0117)	0.0865**** (0.0231)
$\Delta(\text{INTFIN}/\text{ASSETS})_t$	0.1694* (0.1043)	0.1699 (0.1054)	0.0407 (0.0897)
$\Delta(\text{INTFIN}/\text{ASSETS})_{t-1}$	0.0920 (0.0920)	0.0989 (0.0838)	0.0234 (0.0789)
$\Delta(\text{INTFIN}/\text{ASSETS})_{t-2}$	0.0768 (0.0768)	0.0805 (0.0868)	0.0807 (0.0807)
$\Delta(\text{LOANS}/\text{ASSETS})_t$	0.0541*** (0.0541)	0.0555*** (0.0214)	0.0386** (0.0184)
SALESG _t	0.0001 (0.0002)	0.0001 (0.0002)	-0.0004 (0.0002)
SALESG _{t-1}	-0.0003 (0.0002)	-0.0003 (0.0002)	-0.0006*** (0.0002)
SALESG _{t-2}	-0.0004** (0.0002)	-0.0004* (0.0002)	-0.0005*** (0.0002)
COSTK _t	0.0003 (0.0010)	0.0003 (0.0010)	0.0000 (0.0017)
Industry Fixed Effects	No	Yes	Yes
Quarter Fixed Effects	No	No	Yes
No. of Observations	137	137	137
Adj. R-square	0.0728	0.4499	0.6595

Note: Standard errors in parentheses. * denotes significance at 10% level, ** denotes significance at the 5% level, *** denotes significance at the 2.5% level, and **** denotes significance at the 1% level.

TABLE 7

REGRESSION RESULTS FOR INVESTMENT ANALYSIS WITH INV/ASSETS AS DEPENDENT VARIABLE FOR NON-DURABLE GOODS PRODUCING INDUSTRIES

Variable	(1) Random Effects	(2) LSDV	(3) LSDV
Constant	0.0655**** (0.0077)	0.0347**** (0.0083)	0.0145 (0.0208)
$\Delta(\text{INTFIN}/\text{ASSETS})_t$	0.1696**** (0.0518)	0.1731**** (0.0487)	0.1952**** (0.0467)
$\Delta(\text{INTFIN}/\text{ASSETS})_{t-1}$	0.1678**** (0.0261)	0.1684**** (0.0245)	0.1629**** (0.0228)
$\Delta(\text{INTFIN}/\text{ASSETS})_{t-2}$	0.1164**** (0.0237)	0.1161**** (0.0223)	0.1156**** (0.0205)
$\Delta(\text{LOANS}/\text{ASSETS})_t$	0.0333**** (0.0155)	0.0327** (0.0146)	0.0257* (0.0142)
SALESG _t	0.0002 (0.0003)	0.0002 (0.0003)	0.0004 (0.0003)
SALESG _{t-1}	0.0001 (0.0002)	0.0002 (0.0002)	0.0001 (0.0001)
SALESG _{t-2}	0.0000 (0.0003)	0.0001 (0.0002)	0.0002 (0.0003)
COSTK _t	-0.0009 (0.0008)	-0.0010 (0.0007)	0.0001 (0.0014)
Industry Fixed Effects	No	Yes	Yes
Quarter Fixed Effects	No	No	Yes
No. of Observations	143	143	143
Adj. R-square	0.3549	0.6740	0.7357

Note: Standard errors in parentheses. * denotes significance at 10% level, ** denotes significance at the 5% level, *** denotes significance at the 2.5% level, and **** denotes significance at the 1% level.

2008		
B01-08	Euro-Diplomatie durch gemeinsame „Wirtschaftsregierung“	<i>Martin Seidel</i>
2007		
B03-07	Löhne und Steuern im Systemwettbewerb der Mitgliedstaaten der Europäischen Union	<i>Martin Seidel</i>
B02-07	Konsolidierung und Reform der Europäischen Union	<i>Martin Seidel</i>
B01-07	The Ratification of European Treaties - Legal and Constitutional Basis of a European Referendum.	<i>Martin Seidel</i>
2006		
B03-06	Financial Frictions, Capital Reallocation, and Aggregate Fluctuations	<i>Jürgen von Hagen, Haiping Zhang</i>
B02-06	Financial Openness and Macroeconomic Volatility	<i>Jürgen von Hagen, Haiping Zhang</i>
B01-06	A Welfare Analysis of Capital Account Liberalization	<i>Jürgen von Hagen, Haiping Zhang</i>
2005		
B11-05	Das Kompetenz- und Entscheidungssystem des Vertrages von Rom im Wandel seiner Funktion und Verfassung	<i>Martin Seidel</i>
B10-05	Die Schutzklauseln der Beitrittsverträge	<i>Martin Seidel</i>
B09-05	Measuring Tax Burdens in Europe	<i>Guntram B. Wolff</i>
B08-05	Remittances as Investment in the Absence of Altruism	<i>Gabriel González-König</i>
B07-05	Economic Integration in a Multicore World?	<i>Christian Volpe Martinicus, Jennifer Pédussel Wu</i>
B06-05	Banking Sector (Under?)Development in Central and Eastern Europe	<i>Jürgen von Hagen, Valeriya Dinger</i>
B05-05	Regulatory Standards Can Lead to Predation	<i>Stefan Lutz</i>
B04-05	Währungspolitik als Sozialpolitik	<i>Martin Seidel</i>
B03-05	Public Education in an Integrated Europe: Studying to Migrate and Teaching to Stay?	<i>Panu Poutvaara</i>
B02-05	Voice of the Diaspora: An Analysis of Migrant Voting Behavior	<i>Jan Fidrmuc, Orla Doyle</i>
B01-05	Macroeconomic Adjustment in the New EU Member States	<i>Jürgen von Hagen, Iulia Traistaru</i>
2004		
B33-04	The Effects of Transition and Political Instability On Foreign Direct Investment Inflows: Central Europe and the Balkans	<i>Josef C. Brada, Ali M. Kutan, Tanner M. Yigit</i>
B32-04	The Choice of Exchange Rate Regimes in Developing Countries: A Multinomial Panel Analysis	<i>Jürgen von Hagen, Jizhong Zhou</i>
B31-04	Fear of Floating and Fear of Pegging: An Empirical Analysis of De Facto Exchange Rate Regimes in Developing Countries	<i>Jürgen von Hagen, Jizhong Zhou</i>
B30-04	Der Vollzug von Gemeinschaftsrecht über die Mitgliedstaaten und seine Rolle für die EU und den Beitrittsprozess	<i>Martin Seidel</i>
B29-04	Deutschlands Wirtschaft, seine Schulden und die Unzulänglichkeiten der einheitlichen Geldpolitik im Eurosystem	<i>Dieter Spethmann, Otto Steiger</i>
B28-04	Fiscal Crises in U.S. Cities: Structural and Non-structural Causes	<i>Guntram B. Wolff</i>
B27-04	Firm Performance and Privatization in Ukraine	<i>Galyna Grygorenko, Stefan Lutz</i>
B26-04	Analyzing Trade Opening in Ukraine: Effects of a Customs Union with the EU	<i>Oksana Harbuzyuk, Stefan Lutz</i>
B25-04	Exchange Rate Risk and Convergence to the Euro	<i>Lucjan T. Orlowski</i>
B24-04	The Endogeneity of Money and the Eurosystem	<i>Otto Steiger</i>
B23-04	Which Lender of Last Resort for the Eurosystem?	<i>Otto Steiger</i>
B22-04	Non-Discretionary Monetary Policy: The Answer for Transition Economies?	<i>Elham-Mafi Kreft, Steven F. Kreft</i>
B21-04	The Effectiveness of Subsidies Revisited: Accounting for Wage and Employment Effects in Business R+D	<i>Volker Reinthaler, Guntram B. Wolff</i>
B20-04	Money Market Pressure and the Determinants of Banking Crises	<i>Jürgen von Hagen, Tai-kuang Ho</i>
B19-04	Die Stellung der Europäischen Zentralbank nach dem Verfassungsvertrag	<i>Martin Seidel</i>

B18-04	Transmission Channels of Business Cycles Synchronization in an Enlarged EMU	<i>Iulia Traistaru</i>
B17-04	Foreign Exchange Regime, the Real Exchange Rate and Current Account Sustainability: The Case of Turkey	<i>Sübidey Togan, Hasan Ersel</i>
B16-04	Does It Matter Where Immigrants Work? Traded Goods, Non-traded Goods, and Sector Specific Employment	<i>Harry P. Bowen, Jennifer Pédussel Wu</i>
B15-04	Do Economic Integration and Fiscal Competition Help to Explain Local Patterns?	<i>Christian Volpe Martincus</i>
B14-04	Euro Adoption and Maastricht Criteria: Rules or Discretion?	<i>Jiri Jonas</i>
B13-04	The Role of Electoral and Party Systems in the Development of Fiscal Institutions in the Central and Eastern European Countries	<i>Sami Yläoutinen</i>
B12-04	Measuring and Explaining Levels of Regional Economic Integration	<i>Jennifer Pédussel Wu</i>
B11-04	Economic Integration and Location of Manufacturing Activities: Evidence from MERCOSUR	<i>Pablo Sanguinetti, Iulia Traistaru, Christian Volpe Martincus</i>
B10-04	Economic Integration and Industry Location in Transition Countries	<i>Laura Resmini</i>
B09-04	Testing Creditor Moral Hazard in Sovereign Bond Markets: A Unified Theoretical Approach and Empirical Evidence	<i>Ayse Y. Evrensel, Ali M. Kutan</i>
B08-04	European Integration, Productivity Growth and Real Convergence	<i>Taner M. Yigit, Ali M. Kutan</i>
B07-04	The Contribution of Income, Social Capital, and Institutions to Human Well-being in Africa	<i>Mina Balamoune-Lutz, Stefan H. Lutz</i>
B06-04	Rural Urban Inequality in Africa: A Panel Study of the Effects of Trade Liberalization and Financial Deepening	<i>Mina Balamoune-Lutz, Stefan H. Lutz</i>
B05-04	Money Rules for the Eurozone Candidate Countries	<i>Lucjan T. Orłowski</i>
B04-04	Who is in Favor of Enlargement? Determinants of Support for EU Membership in the Candidate Countries' Referenda	<i>Orla Doyle, Jan Fidrmuc</i>
B03-04	Over- and Underbidding in Central Bank Open Market Operations Conducted as Fixed Rate Tender	<i>Ulrich Bindseil</i>
B02-04	Total Factor Productivity and Economic Freedom Implications for EU Enlargement	<i>Ronald L. Moomaw, Euy Seok Yang</i>
B01-04	Die neuen Schutzklauseln der Artikel 38 und 39 des Beitrittsvertrages: Schutz der alten Mitgliedstaaten vor Störungen durch die neuen Mitgliedstaaten	<i>Martin Seidel</i>
2003		
B29-03	Macroeconomic Implications of Low Inflation in the Euro Area	<i>Jürgen von Hagen, Boris Hofmann</i>
B28-03	The Effects of Transition and Political Instability on Foreign Direct Investment: Central Europe and the Balkans	<i>Josef C. Brada, Ali M. Kutan, Taner M. Yigit</i>
B27-03	The Performance of the Euribor Futures Market: Efficiency and the Impact of ECB Policy Announcements (Electronic Version of International Finance)	<i>Kerstin Bernoth, Juergen von Hagen</i>
B26-03	Sovereign Risk Premia in the European Government Bond Market (überarbeitete Version zum Herunterladen)	<i>Kerstin Bernoth, Juergen von Hagen, Ludger Schulknecht</i>
B25-03	How Flexible are Wages in EU Accession Countries?	<i>Anna Iara, Iulia Traistaru</i>
B24-03	Monetary Policy Reaction Functions: ECB versus Bundesbank	<i>Bernd Hayo, Boris Hofmann</i>
B23-03	Economic Integration and Manufacturing Concentration Patterns: Evidence from Mercosur	<i>Iulia Traistaru, Christian Volpe Martincus</i>
B22-03	Reformzwänge innerhalb der EU angesichts der Osterweiterung	<i>Martin Seidel</i>
B21-03	Reputation Flows: Contractual Disputes and the Channels for Inter-Firm Communication	<i>William Pyle</i>
B20-03	Urban Primacy, Gigantism, and International Trade: Evidence from Asia and the Americas	<i>Ronald L. Moomaw, Mohammed A. Alwosabi</i>
B19-03	An Empirical Analysis of Competing Explanations of Urban Primacy Evidence from Asia and the Americas	<i>Ronald L. Moomaw, Mohammed A. Alwosabi</i>

B18-03	The Effects of Regional and Industry-Wide FDI Spillovers on Export of Ukrainian Firms	<i>Stefan H. Lutz, Oleksandr Talavera, Sang-Min Park</i>
B17-03	Determinants of Inter-Regional Migration in the Baltic States	<i>Mihails Hazans</i>
B16-03	South-East Europe: Economic Performance, Perspectives, and Policy Challenges	<i>Iulia Traistaru, Jürgen von Hagen</i>
B15-03	Employed and Unemployed Search: The Marginal Willingness to Pay for Attributes in Lithuania, the US and the Netherlands	<i>Jos van Ommeren, Mihails Hazans</i>
B14-03	FICs and Economic Activity: Some International Evidence	<i>Charles Goodhart, Boris Hofmann</i>
B13-03	The IS Curve and the Transmission of Monetary Policy: Is there a Puzzle?	<i>Charles Goodhart, Boris Hofmann</i>
B12-03	What Makes Regions in Eastern Europe Catching Up? The Role of Foreign Investment, Human Resources, and Geography	<i>Gabriele Tondl, Goran Vuksic</i>
B11-03	Die Weisungs- und Herrschaftsmacht der Europäischen Zentralbank im europäischen System der Zentralbanken - eine rechtliche Analyse	<i>Martin Seidel</i>
B10-03	Foreign Direct Investment and Perceptions of Vulnerability to Foreign Exchange Crises: Evidence from Transition Economies	<i>Josef C. Brada, Vladimír Tomsík</i>
B09-03	The European Central Bank and the Eurosystem: An Analysis of the Missing Central Monetary Institution in European Monetary Union	<i>Gunnar Heinsohn, Otto Steiger</i>
B08-03	The Determination of Capital Controls: Which Role Do Exchange Rate Regimes Play?	<i>Jürgen von Hagen, Jizhong Zhou</i>
B07-03	Nach Nizza und Stockholm: Stand des Binnenmarktes und Prioritäten für die Zukunft	<i>Martin Seidel</i>
B06-03	Fiscal Discipline and Growth in Euroland. Experiences with the Stability and Growth Pact	<i>Jürgen von Hagen</i>
B05-03	Reconsidering the Evidence: Are Eurozone Business Cycles Converging?	<i>Michael Massmann, James Mitchell</i>
B04-03	Do Ukrainian Firms Benefit from FDI?	<i>Stefan H. Lutz, Oleksandr Talavera</i>
B03-03	Europäische Steuerkoordination und die Schweiz	<i>Stefan H. Lutz</i>
B02-03	Commuting in the Baltic States: Patterns, Determinants, and Gains	<i>Mihails Hazans</i>
B01-03	Die Wirtschafts- und Währungsunion im rechtlichen und politischen Gefüge der Europäischen Union	<i>Martin Seidel</i>
2002		
B30-02	An Adverse Selection Model of Optimal Unemployment Assurance	<i>Marcus Hagedorn, Ashok Kaul, Tim Mennel</i>
B29B-02	Trade Agreements as Self-protection	<i>Jennifer Pédussel Wu</i>
B29A-02	Growth and Business Cycles with Imperfect Credit Markets	<i>Debajyoti Chakrabarty</i>
B28-02	Inequality, Politics and Economic Growth	<i>Debajyoti Chakrabarty</i>
B27-02	Poverty Traps and Growth in a Model of Endogenous Time Preference	<i>Debajyoti Chakrabarty</i>
B26-02	Monetary Convergence and Risk Premiums in the EU Candidate Countries	<i>Lucjan T. Orlowski</i>
B25-02	Trade Policy: Institutional Vs. Economic Factors	<i>Stefan Lutz</i>
B24-02	The Effects of Quotas on Vertical Intra-industry Trade	<i>Stefan Lutz</i>
B23-02	Legal Aspects of European Economic and Monetary Union	<i>Martin Seidel</i>
B22-02	Der Staat als Lender of Last Resort - oder: Die Achillesverse des Eurosystems	<i>Otto Steiger</i>
B21-02	Nominal and Real Stochastic Convergence Within the Transition Economies and to the European Union: Evidence from Panel Data	<i>Ali M. Kutan, Taner M. Yigit</i>
B20-02	The Impact of News, Oil Prices, and International Spillovers on Russian Financial Markets	<i>Bernd Hayo, Ali M. Kutan</i>

B19-02	East Germany: Transition with Unification, Experiments and Experiences	<i>Jürgen von Hagen, Rolf R. Strauch, Guntram B. Wolff</i>
B18-02	Regional Specialization and Employment Dynamics in Transition Countries	<i>Iulia Traistaru, Guntram B. Wolff</i>
B17-02	Specialization and Growth Patterns in Border Regions of Accession Countries	<i>Laura Resmini</i>
B16-02	Regional Specialization and Concentration of Industrial Activity in Accession Countries	<i>Iulia Traistaru, Peter Nijkamp, Simonetta Longhi</i>
B15-02	Does Broad Money Matter for Interest Rate Policy?	<i>Matthias Brückner, Andreas Schaber</i>
B14-02	The Long and Short of It: Global Liberalization, Poverty and Inequality	<i>Christian E. Weller, Adam Hersch</i>
B13-02	De Facto and Official Exchange Rate Regimes in Transition Economies	<i>Jürgen von Hagen, Jizhong Zhou</i>
B12-02	Argentina: The Anatomy of A Crisis	<i>Jiri Jonas</i>
B11-02	The Eurosystem and the Art of Central Banking	<i>Gunnar Heinsohn, Otto Steiger</i>
B10-02	National Origins of European Law: Towards an Autonomous System of European Law?	<i>Martin Seidel</i>
B09-02	Monetary Policy in the Euro Area - Lessons from the First Years	<i>Volker Clausen, Bernd Hayo</i>
B08-02	Has the Link Between the Spot and Forward Exchange Rates Broken Down? Evidence From Rolling Cointegration Tests	<i>Ali M. Kutan, Su Zhou</i>
B07-02	Perspektiven der Erweiterung der Europäischen Union	<i>Martin Seidel</i>
B06-02	Is There Asymmetry in Forward Exchange Rate Bias? Multi-Country Evidence	<i>Su Zhou, Ali M. Kutan</i>
B05-02	Real and Monetary Convergence Within the European Union and Between the European Union and Candidate Countries: A Rolling Cointegration Approach	<i>Josef C. Brada, Ali M. Kutan, Su Zhou</i>
B04-02	Asymmetric Monetary Policy Effects in EMU	<i>Volker Clausen, Bernd Hayo</i>
B03-02	The Choice of Exchange Rate Regimes: An Empirical Analysis for Transition Economies	<i>Jürgen von Hagen, Jizhong Zhou</i>
B02-02	The Euro System and the Federal Reserve System Compared: Facts and Challenges	<i>Karlheinz Ruckriegel, Franz Seitz</i>
B01-02	Does Inflation Targeting Matter?	<i>Manfred J. M. Neumann, Jürgen von Hagen</i>
2001		
B29-01	Is Kazakhstan Vulnerable to the Dutch Disease?	<i>Karlygash Kuralbayeva, Ali M. Kutan, Michael L. Wyzan</i>
B28-01	Political Economy of the Nice Treaty: Rebalancing the EU Council. The Future of European Agricultural Policies	<i>Deutsch-Französisches Wirtschaftspolitisches Forum</i>
B27-01	Investor Panic, IMF Actions, and Emerging Stock Market Returns and Volatility: A Panel Investigation	<i>Bernd Hayo, Ali M. Kutan</i>
B26-01	Regional Effects of Terrorism on Tourism: Evidence from Three Mediterranean Countries	<i>Konstantinos Drakos, Ali M. Kutan</i>
B25-01	Monetary Convergence of the EU Candidates to the Euro: A Theoretical Framework and Policy Implications	<i>Lucjan T. Orłowski</i>
B24-01	Disintegration and Trade	<i>Jarko and Jan Fidrmuc</i>
B23-01	Migration and Adjustment to Shocks in Transition Economies	<i>Jan Fidrmuc</i>
B22-01	Strategic Delegation and International Capital Taxation	<i>Matthias Brückner</i>
B21-01	Balkan and Mediterranean Candidates for European Union Membership: The Convergence of Their Monetary Policy With That of the European Central Bank	<i>Josef C. Brada, Ali M. Kutan</i>
B20-01	An Empirical Inquiry of the Efficiency of Intergovernmental Transfers for Water Projects Based on the WRDA Data	<i>Anna Rubinchik-Pessach</i>
B19-01	Detrending and the Money-Output Link: International Evidence	<i>R.W. Hafer, Ali M. Kutan</i>

B18-01	Monetary Policy in Unknown Territory. The European Central Bank in the Early Years	<i>Jürgen von Hagen, Matthias Brückner</i>
B17-01	Executive Authority, the Personal Vote, and Budget Discipline in Latin American and Caribbean Countries	<i>Mark Hallerberg, Patrick Marier</i>
B16-01	Sources of Inflation and Output Fluctuations in Poland and Hungary: Implications for Full Membership in the European Union	<i>Selahattin Dibooglu, Ali M. Kutan</i>
B15-01	Programs Without Alternative: Public Pensions in the OECD	<i>Christian E. Weller</i>
B14-01	Formal Fiscal Restraints and Budget Processes As Solutions to a Deficit and Spending Bias in Public Finances - U.S. Experience and Possible Lessons for EMU	<i>Rolf R. Strauch, Jürgen von Hagen</i>
B13-01	German Public Finances: Recent Experiences and Future Challenges	<i>Jürgen von Hagen, Rolf R. Strauch</i>
B12-01	The Impact of Eastern Enlargement On EU-Labour Markets. Pensions Reform Between Economic and Political Problems	<i>Deutsch-Französisches Wirtschaftspolitisches Forum</i>
B11-01	Inflationary Performance in a Monetary Union With Large Wage Setters	<i>Lilia Cavallar</i>
B10-01	Integration of the Baltic States into the EU and Institutions of Fiscal Convergence: A Critical Evaluation of Key Issues and Empirical Evidence	<i>Ali M. Kutan, Niina Pautola-Mol</i>
B09-01	Democracy in Transition Economies: Grease or Sand in the Wheels of Growth?	<i>Jan Fidrmuc</i>
B08-01	The Functioning of Economic Policy Coordination	<i>Jürgen von Hagen, Susanne Mundschenk</i>
B07-01	The Convergence of Monetary Policy Between Candidate Countries and the European Union	<i>Josef C. Brada, Ali M. Kutan</i>
B06-01	Opposites Attract: The Case of Greek and Turkish Financial Markets	<i>Konstantinos Drakos, Ali M. Kutan</i>
B05-01	Trade Rules and Global Governance: A Long Term Agenda. The Future of Banking.	<i>Deutsch-Französisches Wirtschaftspolitisches Forum</i>
B04-01	The Determination of Unemployment Benefits	<i>Rafael di Tella, Robert J. McCulloch</i>
B03-01	Preferences Over Inflation and Unemployment: Evidence from Surveys of Happiness	<i>Rafael di Tella, Robert J. McCulloch, Andrew J. Oswald</i>
B02-01	The Konstanz Seminar on Monetary Theory and Policy at Thirty	<i>Michele Fratianni, Jürgen von Hagen</i>
B01-01	Divided Boards: Partisanship Through Delegated Monetary Policy	<i>Etienne Farvaque, Gael Lagadec</i>
2000		
B20-00	Breakin-up a Nation, From the Inside	<i>Etienne Farvaque</i>
B19-00	Income Dynamics and Stability in the Transition Process, general Reflections applied to the Czech Republic	<i>Jens Hölscher</i>
B18-00	Budget Processes: Theory and Experimental Evidence	<i>Karl-Martin Ehrhart, Roy Gardner, Jürgen von Hagen, Claudia Keser</i>
B17-00	Rückführung der Landwirtschaftspolitik in die Verantwortung der Mitgliedsstaaten? - Rechts- und Verfassungsfragen des Gemeinschaftsrechts	<i>Martin Seidel</i>
B16-00	The European Central Bank: Independence and Accountability	<i>Christa Randzio-Plath, Tomasso Padoa-Schioppa</i>
B15-00	Regional Risk Sharing and Redistribution in the German Federation	<i>Jürgen von Hagen, Ralf Hepp</i>
B14-00	Sources of Real Exchange Rate Fluctuations in Transition Economies: The Case of Poland and Hungary	<i>Selahattin Dibooglu, Ali M. Kutan</i>
B13-00	Back to the Future: The Growth Prospects of Transition Economies Reconsidered	<i>Nauro F. Campos</i>

B12-00	Rechtsetzung und Rechtsangleichung als Folge der Einheitlichen Europäischen Wahrung	<i>Martin Seidel</i>
B11-00	A Dynamic Approach to Inflation Targeting in Transition Economies	<i>Lucjan T. Orłowski</i>
B10-00	The Importance of Domestic Political Institutions: Why and How Belgium Qualified for EMU	<i>Marc Hallerberg</i>
B09-00	Rational Institutions Yield Hysteresis	<i>Rafael Di Tella, Robert MacCulloch</i>
B08-00	The Effectiveness of Self-Protection Policies for Safeguarding Emerging Market Economies from Crises	<i>Kenneth Kletzer</i>
B07-00	Financial Supervision and Policy Coordination in The EMU	<i>Deutsch-Franzosisches Wirtschaftspolitisches Forum</i>
B06-00	The Demand for Money in Austria	<i>Bernd Hayo</i>
B05-00	Liberalization, Democracy and Economic Performance during Transition	<i>Jan Fidrmuc</i>
B04-00	A New Political Culture in The EU - Democratic Accountability of the ECB	<i>Christa Randzio-Plath</i>
B03-00	Integration, Disintegration and Trade in Europe: Evolution of Trade Relations during the 1990's	<i>Jarko Fidrmuc, Jan Fidrmuc</i>
B02-00	Inflation Bias and Productivity Shocks in Transition Economies: The Case of the Czech Republic	<i>Josef C. Brada, Arthur E. King, Ali M. Kutan</i>
B01-00	Monetary Union and Fiscal Federalism	<i>Kenneth Kletzer, Jurgen von Hagen</i>
1999		
B26-99	Skills, Labour Costs, and Vertically Differentiated Industries: A General Equilibrium Analysis	<i>Stefan Lutz, Alessandro Turrini</i>
B25-99	Micro and Macro Determinants of Public Support for Market Reforms in Eastern Europe	<i>Bernd Hayo</i>
B24-99	What Makes a Revolution?	<i>Robert MacCulloch</i>
B23-99	Informal Family Insurance and the Design of the Welfare State	<i>Rafael Di Tella, Robert MacCulloch</i>
B22-99	Partisan Social Happiness	<i>Rafael Di Tella, Robert MacCulloch</i>
B21-99	The End of Moderate Inflation in Three Transition Economies?	<i>Josef C. Brada, Ali M. Kutan</i>
B20-99	Subnational Government Bailouts in Germany	<i>Helmut Seitz</i>
B19-99	The Evolution of Monetary Policy in Transition Economies	<i>Ali M. Kutan, Josef C. Brada</i>
B18-99	Why are Eastern Europe's Banks not failing when everybody else's are?	<i>Christian E. Weller, Bernard Morzuch</i>
B17-99	Stability of Monetary Unions: Lessons from the Break-Up of Czechoslovakia	<i>Jan Fidrmuc, Julius Horvath and Jarko Fidrmuc</i>
B16-99	Multinational Banks and Development Finance	<i>Christian E. Weller and Mark J. Scher</i>
B15-99	Financial Crises after Financial Liberalization: Exceptional Circumstances or Structural Weakness?	<i>Christian E. Weller</i>
B14-99	Industry Effects of Monetary Policy in Germany	<i>Bernd Hayo and Birgit Uhlenbrock</i>
B13-99	Financial Fragility or What Went Right and What Could Go Wrong in Central European Banking?	<i>Christian E. Weller and Jurgen von Hagen</i>
B12-99	Size Distortions of Tests of the Null Hypothesis of Stationarity: Evidence and Implications for Applied Work	<i>Mehmet Caner and Lutz Kilian</i>
B11-99	Financial Supervision and Policy Coordination in the EMU	<i>Deutsch-Franzosisches Wirtschaftspolitisches Forum</i>
B10-99	Financial Liberalization, Multinational Banks and Credit Supply: The Case of Poland	<i>Christian Weller</i>
B09-99	Monetary Policy, Parameter Uncertainty and Optimal Learning	<i>Volker Wieland</i>
B08-99	The Connection between more Multinational Banks and less Real Credit in Transition Economies	<i>Christian Weller</i>

- B07-99 **Comovement and Catch-up in Productivity across Sectors: Evidence from the OECD** *Christopher M. Cornwell and Jens-Uwe Wächter*
- B06-99 **Productivity Convergence and Economic Growth: A Frontier Production Function Approach** *Christopher M. Cornwell and Jens-Uwe Wächter*
- B05-99 **Tumbling Giant: Germany's Experience with the Maastricht Fiscal Criteria** *Jürgen von Hagen and Rolf Strauch*
- B04-99 **The Finance-Investment Link in a Transition Economy: Evidence for Poland from Panel Data** *Christian Weller*
- B03-99 **The Macroeconomics of Happiness** *Rafael Di Tella, Robert McCulloch and Andrew J. Oswald*
- B02-99 **The Consequences of Labour Market Flexibility: Panel Evidence Based on Survey Data** *Rafael Di Tella and Robert McCulloch*
- B01-99 **The Excess Volatility of Foreign Exchange Rates: Statistical Puzzle or Theoretical Artifact?** *Robert B.H. Hauswald*
- 1998**
- B16-98 **Labour Market + Tax Policy in the EMU** *Deutsch-Französisches Wirtschaftspolitisches Forum*
- B15-98 **Can Taxing Foreign Competition Harm the Domestic Industry?** *Stefan Lutz*
- B14-98 **Free Trade and Arms Races: Some Thoughts Regarding EU-Russian Trade** *Rafael Reuveny and John Maxwell*
- B13-98 **Fiscal Policy and Intranational Risk-Sharing** *Jürgen von Hagen*
- B12-98 **Price Stability and Monetary Policy Effectiveness when Nominal Interest Rates are Bounded at Zero** *Athanasios Orphanides and Volker Wieland*
- B11A-98 **Die Bewertung der "dauerhaft tragbaren öffentlichen Finanzlage" der EU Mitgliedstaaten beim Übergang zur dritten Stufe der EWWU** *Rolf Strauch*
- B11-98 **Exchange Rate Regimes in the Transition Economies: Case Study of the Czech Republic: 1990-1997** *Julius Horvath and Jiri Jonas*
- B10-98 **Der Wettbewerb der Rechts- und politischen Systeme in der Europäischen Union** *Martin Seidel*
- B09-98 **U.S. Monetary Policy and Monetary Policy and the ESCB** *Robert L. Hetzel*
- B08-98 **Money-Output Granger Causality Revisited: An Empirical Analysis of EU Countries (überarbeitete Version zum Herunterladen)** *Bernd Hayo*
- B07-98 **Designing Voluntary Environmental Agreements in Europe: Some Lessons from the U.S. EPA's 33/50 Program** *John W. Maxwell*
- B06-98 **Monetary Union, Asymmetric Productivity Shocks and Fiscal Insurance: an Analytical Discussion of Welfare Issues** *Kenneth Kletzer*
- B05-98 **Estimating a European Demand for Money (überarbeitete Version zum Herunterladen)** *Bernd Hayo*
- B04-98 **The EMU's Exchange Rate Policy** *Deutsch-Französisches Wirtschaftspolitisches Forum*
- B03-98 **Central Bank Policy in a More Perfect Financial System** *Jürgen von Hagen / Ingo Fender*
- B02-98 **Trade with Low-Wage Countries and Wage Inequality** *Jaleel Ahmad*
- B01-98 **Budgeting Institutions for Aggregate Fiscal Discipline** *Jürgen von Hagen*
- 1997**
- B04-97 **Macroeconomic Stabilization with a Common Currency: Does European Monetary Unification Create a Need for Fiscal Insurance or Federalism?** *Kenneth Kletzer*
- B-03-97 **Liberalising European Markets for Energy and Telecommunications: Some Lessons from the US Electric Utility Industry** *Tom Lyon / John Mayo*
- B02-97 **Employment and EMU** *Deutsch-Französisches Wirtschaftspolitisches Forum*
- B01-97 **A Stability Pact for Europe** *(a Forum organized by ZEI)*

ISSN 1436 - 6053

Zentrum für Europäische Integrationsforschung
Center for European Integration Studies
Rheinische Friedrich-Wilhelms-Universität Bonn

Walter-Flex-Strasse 3
D-53113 Bonn
Germany

Tel.: +49-228-73-1732
Fax: +49-228-73-1809
www.zei.de