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PETER HAISS / ELISABETH KICHLER

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Leasing, Credit and Economic Growth: Evidence for Central and South Eastern Europe

PETER HAISS / ELISABETH KICHLER¹

ABSTRACT

We investigate the role of leasing in the lending boom in Central and South Eastern Europe (CEE and SEE). We contribute by (1) providing a full picture of the financing situation in Eastern Europe, where leasing plays a more important role than elsewhere; (2) by investigating the finance-growth-nexus for ten Eastern European countries with a panel data approach over 1999-2006; (3) by extending the production function approach (credit, stock, bond) and the law-and-finance-view for leasing. We find that leasing and credit positively contributed to economic growth. However, leasing and credit are complements and not substitutes as suggested partly by previous research in other regions. We conclude that leasing cannot be used to circumvent proper regulation by policy makers or market participants, and that alternative forms of finance need to be included for a full picture of the finance-growth link.

Key words: Leasing, Credit, Central and South Eastern Europe, Transition Countries, Economic Growth

JEL codes: G21, O11, O16, 052

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1. INTRODUCTION

The lending boom in the transition economies of Central and Eastern Europe (CEE) and its impact on growth and stability is a burning issue for the whole of Europe (Arvai et al., 2009; Backé and Wójcik, 2008). Alternative forms of finance, like leasing, have also gained considerable importance in recent years for the functioning of financial systems,² particularly in emerging economies (Moutot et al., 2007).³ Several studies document the massive growth in credit volumes in transition countries (TCs) and the need to watch this development carefully (see e.g. Backé and Zumer, 2005; Cottarelli et al., 2005; Duenwald et al., 2005). However, despite the high importance of leasing in transition countries (EBRD, 2006), its impact on growth has, to our knowledge, so far not been analysed. How does leasing influence economic growth, does it worsen or stabilise the situation in transition economies? Can leasing be used to overcome a weak regulatory and institutional environment, i.e.

² Lasfer and Levis (1998) and Beck and Demirgüç-Kunt (2006), for example, argue that leasing is especially important for small and medium-sized enterprises.

³ A few recent studies go beyond the usual credit and stock focus: Fink et al. (2006a) and Fink et al. (2005a) check the impact of bond markets on growth; Pantel and Haiss (2008) investigate the impact of hedge funds on growth; Sammer and Haiss (2008) discuss the impact of derivatives; and Haiss and Sümegi (2008) of the insurance sector.

substitute credit and proper regulation? Answers to these questions are important for policy makers and market participants in emerging economies.

We contribute to the literature by delineating the role of leasing in emerging markets of European transition economies for the first time. So far leasing has attracted considerable research mainly in mature markets for small and medium-sized enterprises (SMEs; e.g. Beck and Demirgüç-Kunt, 2006; Berger and Udell, 2006; Berger et al., 2007; Cull et al., 2006; Schmit, 2004). Drawing on the finance-growth nexus (see Levine, 2005, or Rousseau and Wachtel, 2009, for a review) and the law-and-finance view (e.g. La Porta et al., 1997), we extend this research into CEE and SEE.⁴ Applying a panel data approach on a sample of ten Eastern European transition countries over the period 1999-2006, we provide further evidence on the relationship of the financial sector and economic growth with a focus on Eastern Europe and include leasing into this investigation, in addition to the conventional credit, stock and bond sector analyses. From the regression results, we draw the conclusion that leasing and credit positively contributed to economic growth in Eastern European transition countries, while stock and bond markets rather showed negative effects. Not unexpectedly, non-performing loans had a negative impact on growth. We confirm for this broader sectoral spectrum that macroeconomic stability and a sound legal system, which might be pushed by intended or already accomplished EU membership, are important preconditions in order to make a positive impact of the financial sector possible. While some research suggests that leasing and credit taking are substitutes (Lasfer and Levis, 1998; Marston and Harris, 1988; Yan, 2006), i.e. if the legal environment is not conducive for bank lending, leasing does not seem to be used as an alternative means of financing if legal and institutional conditions are weak. Leasing and credit taking rather seem to be complements and the use of leasing rather also seems to require a sound legal system.

The contributions of this study to existing literature are the following. We provide further evidence on the relationship of the financial sector and its segments on economic growth with a focus on Eastern Europe. We review and summarise empirical finance-growth studies

⁴ Drawing mainly on the conventional financial sectors, there has been extensive investigation of the nexus with King and Levine (1993a; 1993b) being among the first ones to empirically analyse the relationship between bank credit and economic growth. Levine and Zervos (1998) and Beck and Levine (2001), for example, show significantly positive effects of the banking sector and the stock market on economic growth on a broad variety of countries at different stages of development. By paying attention at the important role of legal institutions, legal origin, institutional development and the protection of creditor and property rights, the finance-growth nexus was broadened to the law-and-finance view e.g. by La Porta et al. (1997), Levine et al. (2000), Graff (2005) or Beck et al. (2000a; 2000b) who find evidence that the level of financial development and the quality of the legal environment have an influence on economic growth.

focusing on transition economies. We collected leasing data for the period 1999-2006 for ten Eastern European countries, which as a dataset so far did not exist. And we include this leasing data into the investigation of the finance-growth nexus, which is, to our knowledge, done for the first time. We also show that foreign-owned providers from the banking industry make up the largest part of the leasing suppliers in almost all countries. In addition, we provide further evidence on the complementary relationship between leasing and credit, which is a controversial topic in literature.⁵ From our study, regulators and policymakers might recognise the importance of leasing for their financial sectors and that beneficial regulations concerning leasing can boost the performance of their economies. They might also become aware that well-developed legal and institutional frameworks are important preconditions for the financial sector to exert an influence on real economy. For researchers, the contribution to the investigation of the finance-growth nexus in transition countries, the novel data set on leasing data and the inclusion of this data into the finance-growth nexus might be of relevance.

The remainder of this paper is organised as follows: Section 2 provides descriptive evidence on the development of the leasing sector as well as on leasing suppliers in Central and South Eastern Europe (CEE and SEE). Section 3 presents earlier findings for the finance-growth nexus in this region, Section 4 discusses methodology and the econometric model, Section 5 presents the data in more detail and Section 6 gives an overview of the empirical results. In the concluding sections, findings are discussed.

2. LEASING IN TRANSITION ECONOMIES

2.1. Development and role of leasing

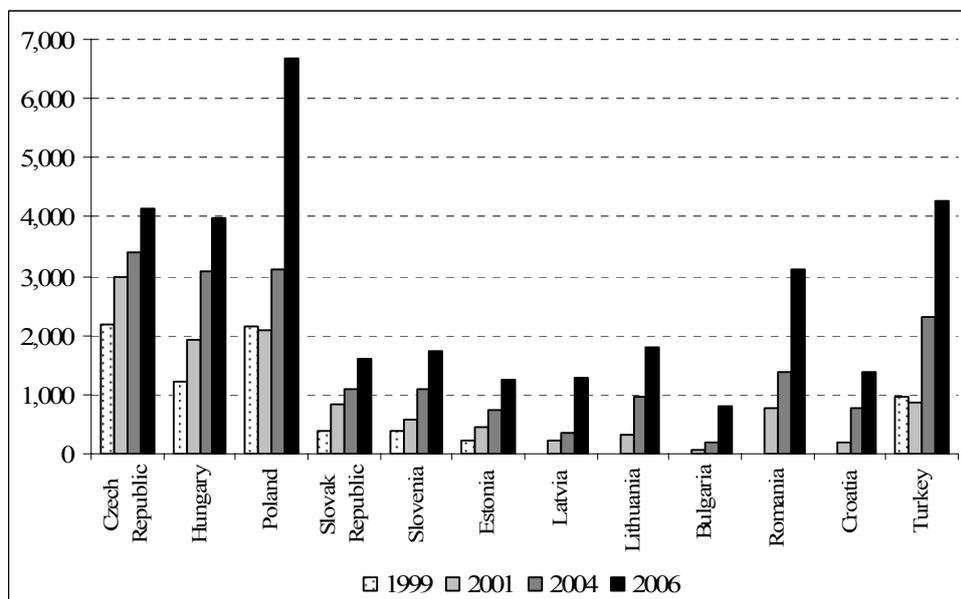
Extensive research investigates debt growth, lending booms and their impact on the transition economies (e.g. Cottarelli et al., 2005; Kraft and Jankov, 2005), however, so far mainly for bank credit, thus not considering the full magnitude of the financial markets. The current turmoil in CEE financial markets reinforces the need to know the various streams of debt in the region. The EBRD (2006) argues that leasing plays a major role in transition countries. Koh (2006) finds that the Eastern European leasing market experienced very high growth rates in recent years and argues that this can be partly explained by the higher demand for

⁵ Yan (2006), for example, finds that leasing and credit taking are substitutes, whereas Beattie et al. (2000) come to the conclusion that operating leasing needs less of a company's debt capacity than a comparable amount of nonlease debt, and Ang and Peterson (1984) and Finucane (1988) show that leases and debt are complements.

investment in this region. We thus argue that it is necessary to analyse the magnitude, rationale and impact of leasing in investigations of the impact of the financial sector in transition economies. In the following we provide novel data on these leasing markets.

Figure 1 gives an overview of new leasing volumes for twelve transition countries⁶ from 1999 until 2006. Table 1 shows the respective relative growth rates. Despite some minor short-term decreasing trends, all countries showed high growth rates of leasing volumes. Turkey experienced a decline in leasing volumes from 2000 until 2001 due to the country's economic downturn, but leasing volumes picked up in the following years (World Bank, 2007). The Czech Republic, the Slovak Republic, Slovenia and Estonia saw weak growth rates or declines in a one- to two-year period prior to EU membership which is due to the necessary implementation of new EU legislation concerning leasing. In the Slovak Republic some misunderstandings with VAT deductions appeared and for the Estonian leasing market, changes in real estate taxation had negative implications. The prospect of EU membership, however, led to high growth rates in Poland, the Slovak Republic, Slovenia, Estonia and especially Latvia and Bulgaria from 2004 onwards (ČSOB Leasing, 2005; ALS, 2005; ELL, 2005).

Figure 1: New leasing volumes in million € in 12 transition countries 1999-2006



Source: compiled by the authors from: Leaseurope; national leasing associations; HANFA, 2007; Data press, 2006

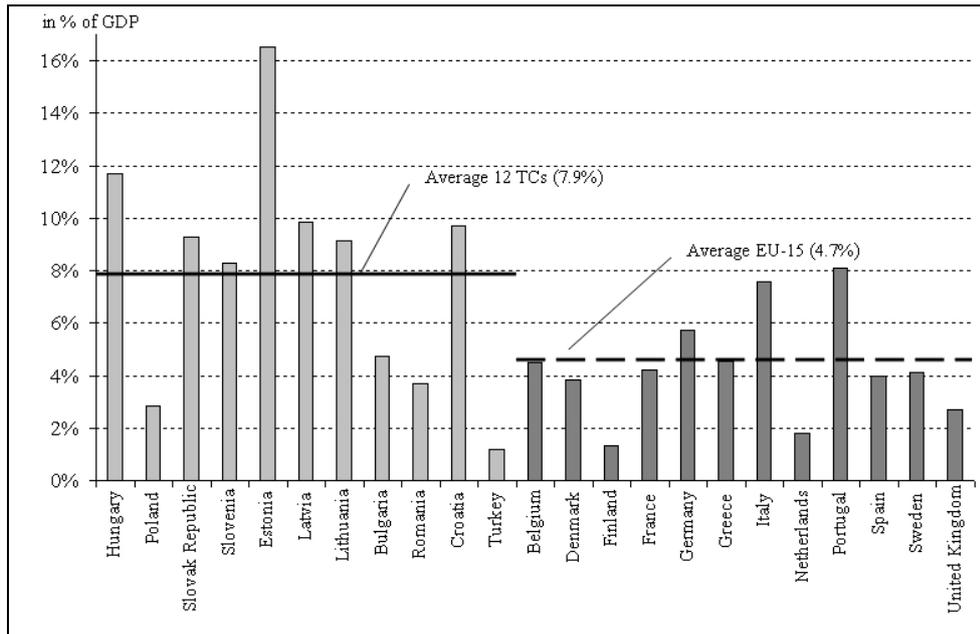
⁶ While most of these joined the European Union in 2004/2007, Turkey and Croatia are still in the process of accession to the European Union.

Table 1: Growth of new leasing volumes in 12 transition countries 2000-2006

	2000	2001	2002	2003	2004	2005	2006
Czech Republic	14.5%	19.7%	15.1%	-0.9%	-0.4%	11.8%	9.2%
Hungary	9.6%	44.0%	16.2%	24.1%	11.0%	19.4%	8.5%
Poland	-5.2%	1.5%	0.6%	21.5%	22.6%	29.9%	65.0%
Slovak Republic	41.8%	49.7%	14.3%	10.1%	4.4%	19.0%	23.0%
Slovenia	28.7%	19.4%	18.2%	47.1%	9.8%	35.1%	16.5%
Estonia	83.7%	14.3%	50.6%	11.0%	-0.4%	31.7%	31.2%
Latvia	n.a	52.6%	20.6%	2.1%	19.9%	90.6%	98.1%
Lithuania	n.a	61.6%	61.0%	34.5%	39.2%	38.0%	36.0%
Bulgaria	n.a	n.a	98.1%	30.5%	47.4%	139.9%	68.8%
Romania	n.a	n.a	14.2%	14.2%	39.4%	48.7%	51.8%
Croatia	n.a	n.a	111.0%	59.0%	23.7%	28.9%	35.8%
Turkey	88.1%	-53.6%	69.6%	28.3%	25.5%	46.4%	25.2%

Sources: compiled by the authors from: Leaseurope; national leasing associations; HANFA, 2007; Data press, 2006

In figure 2, the importance of leasing in the twelve transition countries and thirteen countries of the EU-15 for the year 2006 is depicted. All figures represent outstanding amounts at year-end, expressed in percent of GDP. With an average of 7.9% of GDP, the importance of leasing is significantly higher in the transition countries than in the EU-15, where the average amounts to 4.7% of GDP. Looking at the percentage of customer loans granted by means of leasing, Naaborg (2007) states that the sizes of the Central and Eastern European (CEE) leasing markets exceeded those of the EU-15 already in 1997. Bakker and Gross (2004) find that the Eastern European EU member states overtook the EU-15 in 2001 as regards leasing as a percentage of GDP. Leasing volumes vary substantially among countries. In transition economies, the highest ratios can be found in Estonia, Hungary, Latvia and Croatia, i.e. countries with a relatively high level of foreign banks. The lowest ratios occur in Turkey, Poland and Romania. For Eastern Europe, leasing thus seems to have a lower importance in bigger countries, whereas this relation cannot be found for the EU-15. Here, Portugal and Italy show the highest leasing to GDP ratios and the lowest ones can be found in Finland, the Netherlands and the United Kingdom.

Figure 2: Leasing in 12 transition countries and EU-15⁷ in 2006⁸

Sources: compiled by the authors from: Leaseurope; national leasing associations; IFS

According to the IFC (1996) and Beck et al. (2004), leasing has become prominent in transition countries, because most companies have restricted track records and not enough collateral which can be used, and because many banks are in a restructuring process. The authors find that due to the difficulties in obtaining debt and equity financing, companies in countries with less developed legal institutions like the transition economies rely more on leasing and other forms of operations finance. Bakker and Gross (2004) similarly attribute the high importance of leasing in Eastern Europe to the underdeveloped creditor rights protection, which gives leasing higher security than secured lending, and its affordability compared to bank loans.

While we argue that leasing grew fast and to high levels in the transition economies, its influence has to be investigated in conjunction with other means of finance. Figure 3 shows the relative importance of leases, bonds, shares and loans in the twelve transition countries for the year 2006. All figures represent outstanding amounts at year-end, expressed in percent of GDP. Although leasing ranks last in all twelve transition countries, it nevertheless represents an important means of financing that should not be disregarded. Relative to the size of the financial market, measured by taking the other three forms of financing together, the importance of leasing is highest in Estonia, the Slovak Republic, Latvia and Lithuania.

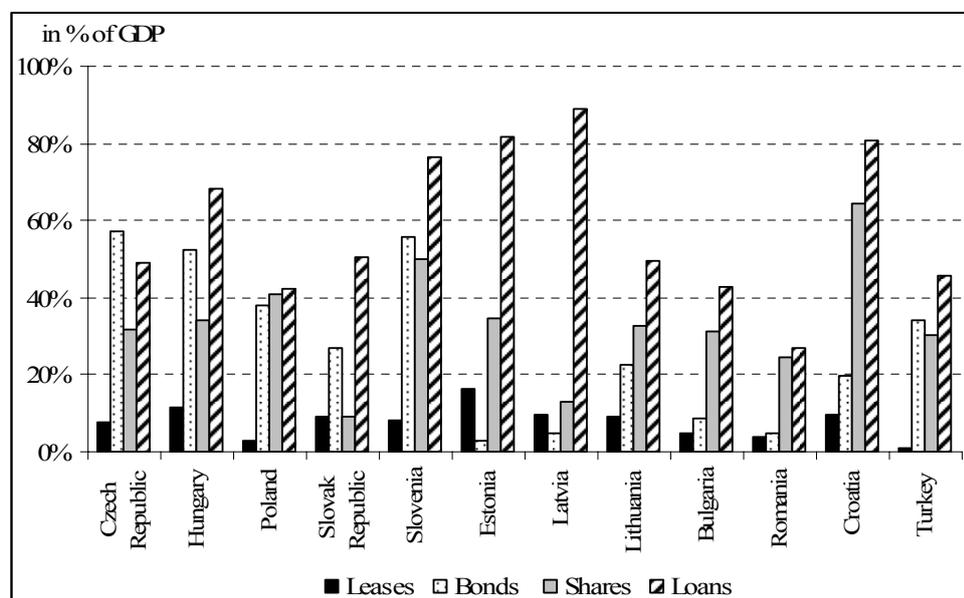
⁷ The EU-15 average only includes 13 countries since data on outstanding leasing volumes is not available for Ireland and Luxembourg. For means of comparability, the term EU-15 is nevertheless used.

⁸ Data for Greece in 2005.

Concerning the relevance of leasing financing, Estonia is thus front-runner within the twelve Central and South Eastern European countries. According to the World Leasing Yearbooks, Estonia also took the first place of a world-wide equipment leasing / GDP ratio from 2000 until 2005 (Porter and Fumagalli, 2007). In Turkey and Poland, leasing is least important as regards its relation to GDP as well as to the size of the financial market.

Loans dominate in all transition countries with the exception of the Czech Republic, but they also represent a very important form of financing in this country. This confirms that the transition countries are all bank-centered, implying that the banking sector is more important than the stock and bond markets (Peev and Yurtoglu, 2007; Sirtaine and Skamnelos, 2007). Credit is predominant in Estonia and Latvia with the next important means of financing being 47 and 76 percentage points less important. With 27% and 33% of GDP, the average importance of bonds and shares is very close in the transition countries. Bonds represent the most important form of financing in the Czech Republic and are essential in Hungary and Slovenia. Shares have a high importance in Croatia and Slovenia. Investigations of the impact of finance on growth in transition economies, however, so far mainly concerned with single financial segments (mainly bank credit), whereas we provide a broader analysis for both credit, leasing, bond and stock segments in the following.

Figure 3: Importance of different forms of financing in 2006



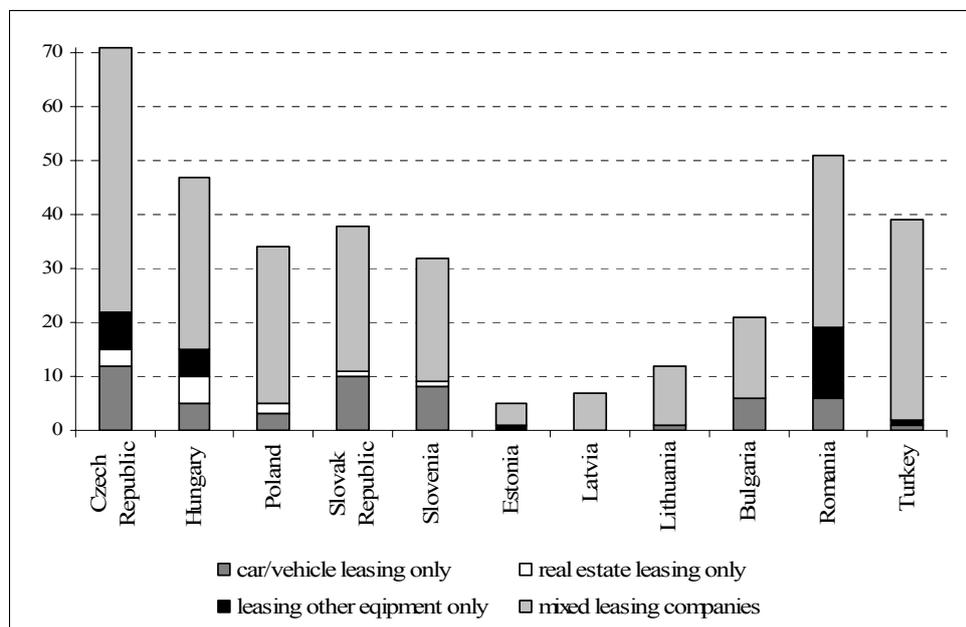
Sources: compiled by the authors from: Leaseurope; national leasing associations; BIS; Bank of Slovenia; Bulgarian National Bank; ECB; Bank of Estonia; Bank of Latvia; Bank of Lithuania; EBRD; WFE; IFS

2.2. Leasing suppliers

Looking at leasing suppliers in transition countries, figure 4 depicts leasing companies by type of activity.⁹ Mixed leasing companies clearly dominate in all of the CEE and SEE countries, suppliers offering only car/vehicle leasing make up a small part of the market in almost all countries. A small number of leasing companies provide leasing of other equipment than cars/vehicles in some countries, and real estate leasing companies are not very common in either of these markets.

Figure 5 shows an overview of leasing suppliers by profile.¹⁰ The Czech Republic, Hungary, the Slovak Republic, Slovenia and Romania are characterised by a high number of independent leasing companies, leasing companies owned by banks dominate in Latvia, Hungary, Poland, Slovenia, Estonia, Lithuania and Turkey. There is only a small number of banks operating as leasing providers and suppliers with banking status, and captive leasing companies are not very common in either of the CEE and SEE markets.

Figure 4: Leasing suppliers by type of activity in 2006¹¹

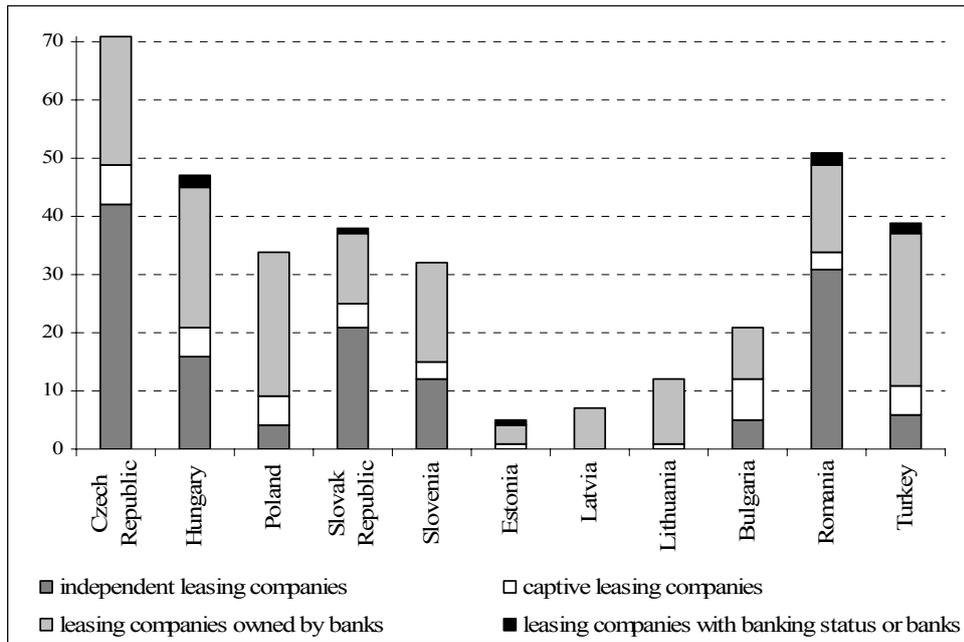


Sources: compiled by the authors from: Leaseurope; Latvian Leasing and Factoring Association; Lithuanian Leasing Association

⁹ According to this breakdown, leasing suppliers can either only provide car/vehicle leasing, leasing of other equipment or real estate leasing, or they offer a mixture of these leasing services.

¹⁰ In this classification, leasing companies can either be independent, captive or belong to the banking industry (banks, companies with banking status, companies owned by banks).

¹¹ Data for Turkey in 2003.

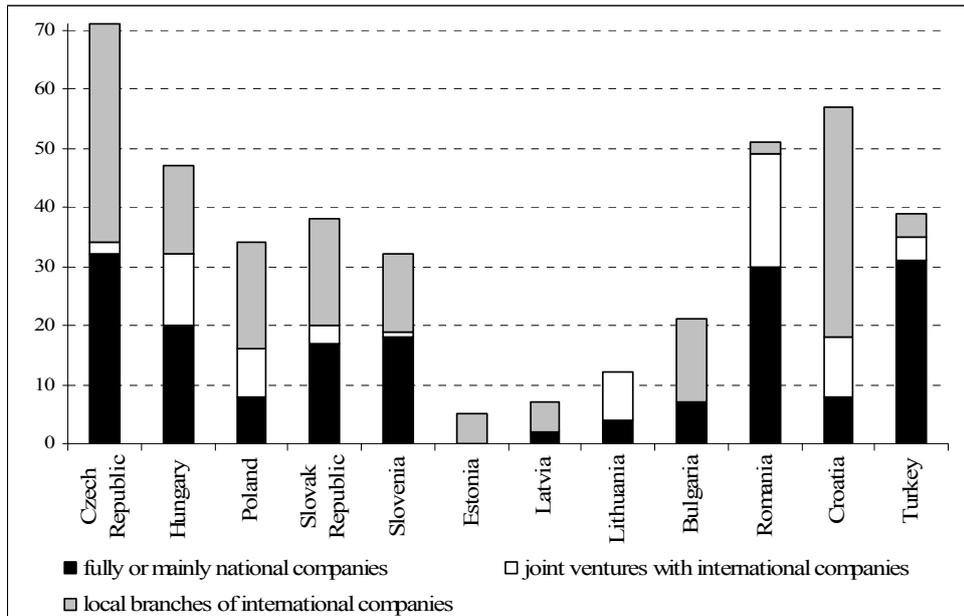
Figure 5: Leasing suppliers by profile in 2006¹²

Sources: compiled by the authors from: Leaseurope; Latvian Leasing and Factoring Association; Lithuanian Leasing Association

Figure 6 gives an overview of leasing suppliers by origin.¹³ It can be seen that the involvement of international companies in the provision of leasing services is generally very high in Central and South Eastern Europe. Slovenia, Romania and Turkey are the only countries where fully or mainly national companies dominate.

¹² Data for Turkey in 2003.

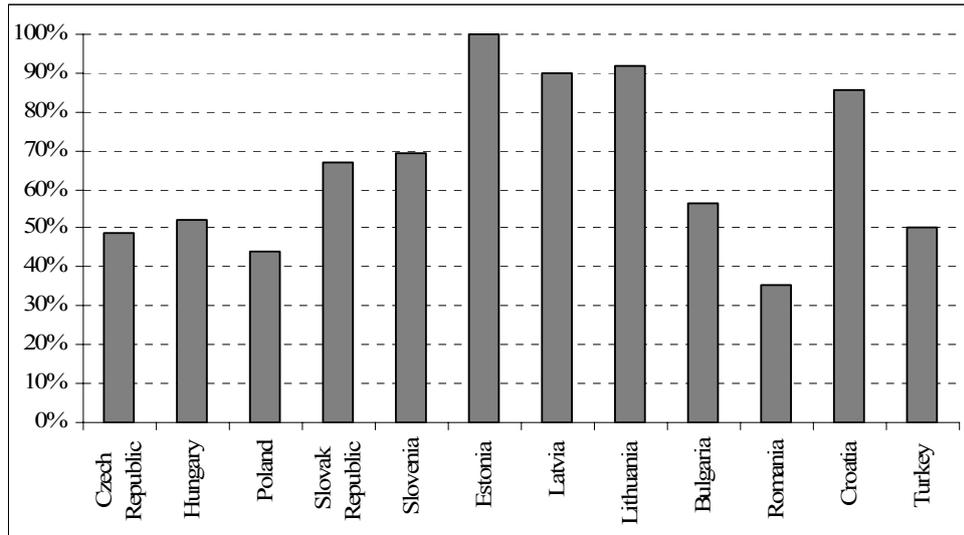
¹³ According to this breakdown, leasing companies can either be national, joint ventures with or local branches of international companies.

Figure 6: Leasing suppliers by origin in 2006¹⁴

Sources: compiled by the authors from: Leaseurope, various issues; Latvian Leasing and Factoring Association; Lithuanian Leasing Association; HANFA, 2007

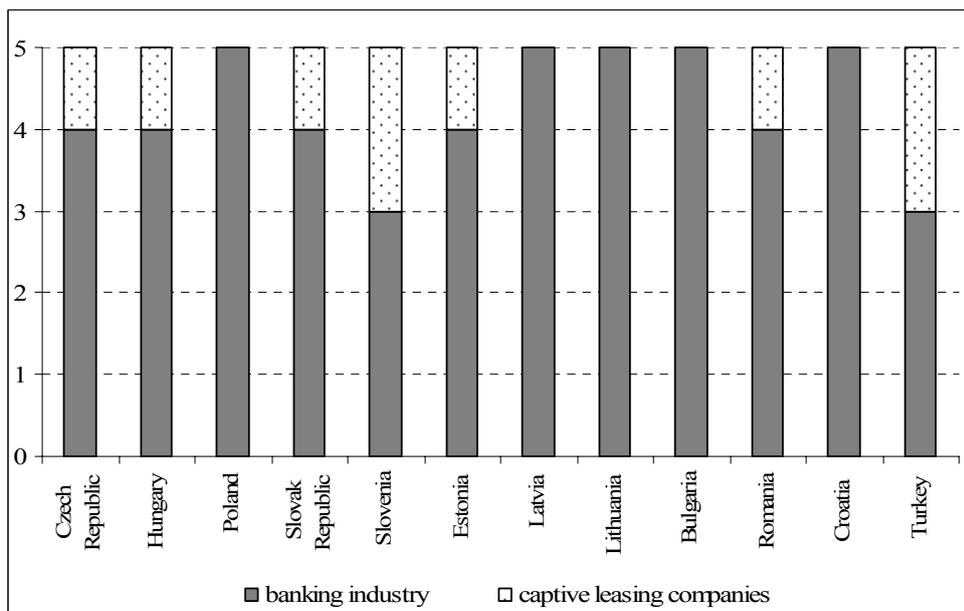
Considering market concentration, figure 7 shows the market shares of the five biggest providers. A small number of providers hold a large part of the market in the Baltic countries and Croatia, which might be connected to the relative small size of these markets. Estonia shows the highest concentration with only five companies providing leasing services in the market and thus holding 100%, followed by Lithuania with 92% and Latvia with 90%. Market concentration is lowest in Romania and Poland with the five biggest providers holding 35% and 44%, respectively.

¹⁴ Data for Turkey in 2003.

Figure 7: Market shares of the five biggest leasing providers

Sources: compiled by the authors from: DailyBusiness.ro; ICEX, 2006; Jakin, 2005; Kroatiska Wirtshaftskammer, 2006; national leasing associations

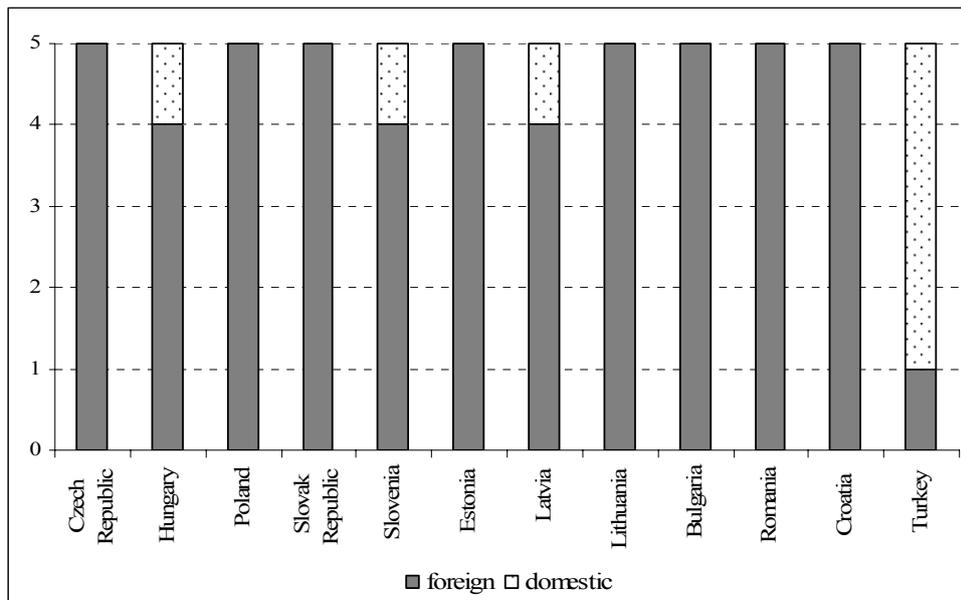
Considering the industry affiliations of the five largest leasing companies, figure 8 shows that banks dominate in all markets. The dominance of banks among the five largest providers in Bulgaria is interesting since they make up less than half of the existing companies. On the other hand, although the majority of leasing providers in Slovenia and Turkey are banks, they only account for three of the five largest companies.

Figure 8: Industry affiliations of the five biggest leasing providers

Sources: compiled by the authors from: DailyBusiness.ro; ICEX, 2006; Jakin, 2005; Kroatiska Wirtshaftskammer, 2006; national leasing associations

Looking at the origin of the five largest leasing providers (see figure 9), we find that foreign companies clearly dominate. The only exception is Turkey where the high number of domestic companies also manages to hold a majority of the leasing market. Although the Czech Republic, the Slovak Republic and Romania also show a high percentage of national leasing companies, the five biggest leasing providers are foreign institutions.

Figure 9: Origin of the five biggest leasing providers



Sources: compiled by the authors from: DailyBusiness.ro; ICEX, 2006; Jakin, 2005; Kroatiska Wirtshaftskammer, 2006; national leasing associations

3. EARLIER FINDINGS FOR FINANCE AND GROWTH IN EASTERN EUROPE

In addition to global and sectoral studies on the finance growth-nexus (see e.g. Levine, 2005, for a review),¹⁵ regional studies have flourished. Table 2 presents an overview of selected empirical findings of the relationship between financial sector development and economic growth for transition countries. Most studies find a positive impact of bank sector development and bank efficiency on economic growth, especially for Central Eastern Europe.

¹⁵ These earlier studies, mostly finding a positive relation between finance and growth, use broad samples of industrial and developing countries. By differentiating between countries and periods, Rousseau and Wachtel (2009) find that the finance-growth link has weakened since the 90ies and that countries with different levels of development show differing impacts of finance on growth. This confirms the finding of Ahmed (1998) who points at the possible different effects of bank development on growth in emerging and mature economies. Rajan (2006) argues that the last decade witnessed quite a number of systemic, institutional and product-related innovations and changes. Thus research should differentiate stronger between different countries and their levels of development, different periods and different sources of finance.

For South Eastern Europe, Mehl et al. (2006) find that financial deepening did not have a significant impact on the growth performance of these countries during the first decade of transition. The authors relate this to the environment of high inflation and banking crises which impeded a contribution of the banking sector to economic growth.

Studying South Eastern European countries, Fink, Haiss and von Varendorff (2007) and Hagmayr and Haiss (2007) argue that financial market segments can only contribute to growth in a positive way if legal and supervisory frameworks work properly.¹⁶ The inclusion of stock market development into the investigation of the finance-growth nexus in transition countries mainly turned out to be insignificant.¹⁷ Bond markets, which are mostly small and dominated by governments and few large companies as issuers in transition countries (Haiss and Marin, 2003; Haiss and Chou, 2008), showed a positive impact on economic growth. Eller et al. (2006) find a hump-shaped impact of foreign banks in the New EU Member States. Roessler and Haiss (2008) find that foreign banks only mildly influence portfolio investment and stock markets. Although various authors find that the weak legal situation and low availability of collateral in transition countries can contribute to limit the loan supply by banks (Bonin and Wachtel, 2002; Wagner and Iakova, 2001) and point at the importance of sound legal frameworks and institutions in these countries (Mehl and Winkler, 2003; Hagmayr and Haiss, 2007), previous studies investigating the finance-growth nexus hardly took into consideration alternative sources of finance other than stock and bond markets. Coricelli et al. (2005), Delanny and Weill (2004) and Fisman and Love (2003) are notable exceptions with regard to trade credit.¹⁸

The findings of the studies investigating the finance-growth nexus in transition countries need to be treated as rather preliminary due to the relatively short time series available and the difficulties in modelling output growth (Mehl and Winkler, 2003). Mamatzakis et al. (2005), Cottarelli et al. (2005) and Fink et al. (2005) suggest including inflation and bad loans into the investigation to control for macroeconomic stability, especially during the early years of transition.

¹⁶ Fink et al. (2007) discuss ongoing reforms in SEE with a special focus on Serbia and find that Serbia is following the successful path of CEE countries which might lead to a positive impact of financial development on growth.

¹⁷ The EBRD (2006) finds a positive influence of two different measure of financial sector development, private credit and a broader measure including private credit and stock market capitalisation, on growth.

¹⁸ For related research on the impact of financial sector foreign direct investment see Eller et al. (2006), for research on the impact of the insurance sector see Haiss and Sümegi (2008).

Table 2: Selected empirical evidence on the finance-growth nexus in transition countries

Author (year)	Sample	Theoretical framework	Research method	Financial segments included	Growth effect	Key findings
Fink and Haiss (1999)	10 transition countries	production function style regression	cross-section analysis	bank sector stock market bond market	+ 0 0	Positive link between bank sector development and economic growth.
Kar and Pentecost (2000)	Turkey	Granger causality test	vector error correction methodology (VECM)	bank sector	+	When financial development is measured by the money to income ratio the direction of causality runs from financial development to economic growth. When the bank deposits, private credit and domestic credit ratios are alternatively used to proxy financial development, growth is found to lead financial development.
Jaffee and Levonian (2000)	23 transition economies	"Barro"-regression	cross-section analysis	bank sector	+	Significant and positive relationship between bank sector development, bank sector reforms and economic growth.
Koivu (2002)	25 transition economies (CEE + CIS)	"Barro"-regression	panel analysis	bank sector	+	Results indicate that the interest rate margin is significantly and negatively related to economic growth. On the other hand, a rise in the amount of credit does not seem to accelerate economic growth.
Drakos (2003)	21 transition economies	"Barro"-regression	cross-section analysis and panel analysis	bank sector	+	A positive effect of banking sector competition on economic growth is documented. The lower the imperfections in market structure the higher real GDP growth.
Platek (2002)	26 transition economies (CEE + CIS)	"Barro"-regression	cross-section analysis	bank sector stock market	+ +	Bank sector development and stock market development is significantly and positively correlated with economic growth.
Ünalmiş (2002)	Turkey	Granger causality test	vector auto regression (VAR), VECM	bank sector	+	Financial development significantly causes economic growth in the short run. In the long run, there is a bidirectional relationship between financial development and economic growth.
Fink et al. (2005b)	22 market economies + 11 transition countries (CEE)	growth accounting regression	panel analysis	bank sector stock market bond market	+	The financial sector induces positive growth effects but not with the same strength across countries. It is weaker in market economies comparing to transition countries. Financial sector development supports economic growth in the short run rather than in the long run. Financial structure plays an important role in the measurement of this impact.

Table 2 continued: Selected empirical evidence on the finance-growth nexus in transition countries

Author (year)	Sample	Theoretical framework	Research method	Financial segments included	Growth effect	Key findings
Fink et al. (2006b)	9 transition countries (CEE and SEE)	growth accounting regression	cross-section analysis and panel analysis	aggregate indicator (bank sector, stock market, bond market) bank sector stock market bond market	+ +/- 0 +	Aggregate financial sector development, domestic credit and bond markets stimulated growth in transition countries over 1996-2000, while private credit and stock markets had no significant influence on growth.
Mehl et al. (2006)	7 transition economies (SEE)	growth accounting regression	panel analysis	bank sector money supply	- -	Financial deepening did not have a significant impact on the growth performance of SEE countries in the period 1993-2003. The authors conclude that financial deepening only accelerates growth if the quality of the financial sector and its legal environment is high and when macroeconomic stability is secured.
Akimov et al. (2006)	27 transition countries	growth accounting regression	panel analysis	bank sector money supply	+ +/-	Financial development is positively and significantly related to economic growth in transition countries over the period 1989-2004. The choice of a proxy for financial development is a crucial issue; money supply is not a good proxy for transition economies.
Hagmayr and Haiss (2007)	4 transition countries (SEE)	growth accounting regression	panel analysis	aggregate indicator (bank sector, stock market, bond market) bank sector stock market bond market	-/+ 0/+/- 0 +	Over 1995-2005, capital stock had the strongest positive effect on growth. Aggregate financial sector development had a negative impact with no lag, but turned positive with one-year and two-year lags. Domestic credit turned positive with one-year and two-year lags (though insignificant) with lags from negative with no lags. Private credit had a significant and negative effect on growth. The authors conclude with respect to the law-and-finance view that financial market segments can only contribute to growth in a positive way if legal and supervisory frameworks work properly.

Notes: The production function style is based on a neoclassical production function substituting physical capital for financial capital. The “Barro”-regression is a specification following Barro (1991). The growth accounting regression is a specification following Benhabib and Spiegel (1994).

4. METHODOLOGY AND THE MODEL

Two of the most popular methods for investigating the impact of financial development on growth are cross-section analyses and panel analyses (see table 2). Due to the restricted number of observations caused by the rather small sample size (ten countries)¹⁹ and the short period of investigation (annual data for eight years), we rely on a panel data approach in order to enhance the quality and quantity of data (Gujarati, 2003). According to Temple (1999), panel data analyses have some advantages. They allow controlling for omitted variables and unobserved heterogeneity of the initial conditions, and lags of regressors may be used to mitigate possible problems of measurement error and endogeneity.

The basic structure of this study follows the work of Fink et al. (2006b) and Hagmayr and Haiss (2007) who use an enhanced version of the production function model developed by Mankiw et al. (1992). Mankiw et al. (1992) used stock of physical capital, labour and human capital as inputs in the production function, which Fink et al. (2006b) and Hagmayr and Haiss (2007) augmented by different financial variables. Drawing on King and Levine (1993a), La Porta et al. (1997) and Mehl et al. (2006), we extend this approach by further financial as well as standard explanatory variables.

For the regressions, we use the following model specifications:

$$\begin{aligned} \frac{\Delta rgdpg_{i,t}}{rgdpg_{i,t-1}} = & \alpha + \beta_1 FV_{i,t} + \beta_2 \frac{\Delta capstockg_{i,t}}{capstockg_{i,t-1}} + \beta_3 \frac{\Delta labch_{i,t}}{labch_{i,t-1}} + \beta_4 \frac{\Delta educh_{i,t}}{educh_{i,t-1}} + \beta_5 lifeexp_{i,t} + \\ & \beta_6 prop_{i,t} + \beta_7 gov_{i,t} + \beta_8 foreign_{i,t} + \beta_9 lend_{i,t} + \beta_{10} \sqrt{npl_{i,t}} + \beta_{11} \frac{\Delta inflch_{i,t}}{inflch_{i,t-1}} + \beta_{12} industry_{i,t} + \\ & \beta_{13} invest_{i,t} + \beta_{14} eu_{i,t} + \beta_{15} cris_{i,t} \end{aligned} \quad (1)$$

The dependent variable $\Delta rgdpg_{i,t}/rgdpg_{i,t-1}$ is the growth rate of real output per capita in percent. FV stands for the different financial variables expressed as a percentage of GDP (leasing, domestic credit, private credit, stock market capitalisation, bonds outstanding, liquid liabilities, total financial intermediation I and total financial intermediation II). We use the two measures of total financial intermediation to test for the impact of the aggregated financial market on economic growth. The financial variables are, however, also used

¹⁹ Abiad et al. (2007) argue that using a broad range of countries with different characteristics is suitable for some analyses, but that for many studies a broad sample is not appropriate. With a focus on Europe, the authors refer to the existing differences between European countries, especially concerning the countries of Eastern Europe, which differ substantially from Western Europe as well as other emerging markets. We therefore rely on the rather small sample size focusing on Eastern European transition countries.

separately in the regressions to test for their specific effects.²⁰ $\Delta capstock_{i,t}/capstock_{i,t-1}$ stands for the growth rate of real physical capital stock per employee, $\Delta labch_{i,t}/labch_{i,t-1}$ for the change of the ratio of the number of employed people to total population and $\Delta educh_{i,t}/educh_{i,t-1}$ for the change in educational attainment. $lifeexp_{i,t}$ is defined as life expectancy in years, $prop_{i,t}$ as a property rights index, $gov_{i,t}$ as a governance indicator,²¹ $foreign_{i,t}$ as the share of foreign banks in total bank assets and $lend_{i,t}$ as the average interest rate on loans. The root of $npl_{i,t}$ describes the ratio of non-performing loans to total loans, $\Delta inflch_{i,t}/inflch_{i,t-1}$ the change rate of the GDP deflator, $industry_{i,t}$ the value added of the industry sector as a percentage of GDP and $invest_{i,t}$ gross domestic investments in percent of GDP. $eu_{i,t}$ and $cris_{i,t}$ are dummy variables for years of EU membership and banking crises.

(2)

$$\begin{aligned} \frac{\Delta rgdpg_{i,t}}{rgdpg_{i,t-1}} = & \alpha + \beta_1 FV_{i,t-1} + \beta_2 \frac{\Delta capstock_{i,t}}{capstock_{i,t-1}} + \beta_3 \frac{\Delta labch_{i,t}}{labch_{i,t-1}} + \beta_4 \frac{\Delta educh_{i,t}}{educh_{i,t-1}} + \beta_5 lifeexp_{i,t} + \\ & \beta_6 prop_{i,t} + \beta_7 gov_{i,t} + \beta_8 foreign_{i,t} + \beta_9 lend_{i,t} + \beta_{10} \sqrt{npl_{i,t}} + \beta_{11} \frac{\Delta inflch_{i,t}}{inflch_{i,t-1}} + \beta_{12} industry_{i,t} + \\ & \beta_{13} invest_{i,t} + \beta_{14} eu_{i,t} + \beta_{15} cris_{i,t} \end{aligned}$$

(3)

$$\begin{aligned} \frac{\Delta rgdpg_{i,t}}{rgdpg_{i,t-1}} = & \alpha + \beta_1 FV_{i,t-2} + \beta_2 \frac{\Delta capstock_{i,t}}{capstock_{i,t-1}} + \beta_3 \frac{\Delta labch_{i,t}}{labch_{i,t-1}} + \beta_4 \frac{\Delta educh_{i,t}}{educh_{i,t-1}} + \beta_5 lifeexp_{i,t} + \\ & \beta_6 prop_{i,t} + \beta_7 gov_{i,t} + \beta_8 foreign_{i,t} + \beta_9 lend_{i,t} + \beta_{10} \sqrt{npl_{i,t}} + \beta_{11} \frac{\Delta inflch_{i,t}}{inflch_{i,t-1}} + \beta_{12} industry_{i,t} + \\ & \beta_{13} invest_{i,t} + \beta_{14} eu_{i,t} + \beta_{15} cris_{i,t} \end{aligned}$$

In the second and third regressions, the different financial variables are used with one-year and two-year lags in order to mitigate potential simultaneity problems between financial development and output growth and to check for the direction of the relationship between these two variables (Levine and Zervos, 1998; Wachtel, 2001). According to Temple (1999), it is either possible to employ instrumental variables, which are rarely used by some authors,

²⁰ As can be seen in table 4, leasing is positively correlated with all other financial variables except bonds outstanding where the correlation coefficient is close to zero. Due to this observed complementary relationship between leasing and the other financial variables, we do not use the different financial variables in one regression. We use them separately in order to be able to test for their specific effects. The two measures of total financial intermediation are used to test for the effect of the aggregated financial market. Since leasing and bonds outstanding seem to be substitutes, we tried to use them together in some regressions, but one of the two financial indicators always turned out to be insignificant.

²¹ We only use the different financial variables separately in the regressions to test for their specific effects on economic growth. We do not use the legal variables (property rights and governance) separately since this investigation focuses more on financial intermediation than on the legal environment. A closer investigation of the effects of different legal and institutional indicators is an issue for further research.

or to use a panel with lags of the endogenous variables as instruments. The author argues that lagged variables might be a good solution to avoid endogeneity problems. Rousseau and Wachtel (2009) state that lagged values for financial variables and instrumental variables produce remarkably similar results. Because of these results, we decided to use the different financial variables with one-year and two-year lags in order to avoid endogeneity problems. Because of positive tests for heteroskedasticity²² and autocorrelation²³, we use a cross-sectional time-series linear model using feasible generalised least squares which accounts for heteroskedasticity and allows estimation in the presence of autocorrelation.²⁴ We use tests for normality to check for normal distribution of residuals.

5. DATA

The analysed sample consists of ten Eastern European transition countries²⁵ for the period 1999 to 2006. We use real per capita output growth (rgdpg) as dependent variable. To investigate the impact of leasing, we use outstanding leasing volumes (leas). Concerning the other financial development indicators, we follow Fink et al. (2006b) by using domestic credit (domcr), private credit (privcr)²⁶, stock market capitalisation (stock), bonds outstanding (bond) and two measures of total financial intermediation. The first measure of total financial intermediation (tfi_i) is a sum of leasing, domestic credit, stock market capitalisation and bonds outstanding. The second measure of total financial intermediation (tfi_ii) includes private credit instead of domestic credit. We also add liquid liabilities (m3) as an alternative measure of financial intermediation as this measure is typically used by the studies building onto King and Levine (1993a).²⁷ The set of conditioning variables includes real growth of

²² To test for heteroskedasticity, we used a likelihood-ratio test to check the variances of the residuals. The null hypothesis, which states that the residuals have the same finite variance, was rejected.

²³ To test for autocorrelation, we created two-way scatter plots with the residuals of a regression at a given time on one axis and the lagged residuals on the other axis. Most results clearly indicated a positive correlation of consecutive residuals.

²⁴ Although heteroskedasticity and autocorrelation cannot be accounted for in these models, ordinary least squares and random effects regressions produced similar results with normal residual distribution and high R^2 values. Fixed effects regressions turned out to be inappropriate because of unnormal residual distribution and low R^2 values.

²⁵ The sample includes the Czech Republic, Hungary, Poland, the Slovak Republic, Slovenia, Estonia, Latvia, Lithuania, Bulgaria and Turkey. In some regressions, we tried to use smaller samples, e.g. excluding countries with high macroeconomic instability, only referring to smaller countries or to countries with a minimum leasing ratio, but this did not produce different results. Since especially data for Turkey differs from the other countries in some respects, we tried to run the regressions excluding Turkey, but the results did not change significantly. The main difference is that inflation turns insignificant for this sample. We therefore kept Turkey within the sample in order to have a broader sample.

²⁶ We also tried to subtract non-performing loans and thus only used the performing loans of domestic credit and private credit, but this did not produce different results.

²⁷ Although liquid liabilities (m3) rather represent a political variable, we nevertheless use it as an alternative financial variable in our regressions in order to ensure comparability with earlier studies (e.g. King and Levine, 1993a).

capital stock per employee (*capstockg*), change in labour participation rate (*labch*), change in educational attainment as a proxy for the change in the quality of human capital (*educch*) and life expectancy in years (*lifeexp*). Following La Porta et al. (1997), we use a property rights index (*prop*) and a governance indicator (*gov*) to capture the importance of the legal situation and institutional framework. To measure competition and efficiency in the banking sector, we follow Mehl et al. (2006) by using the share of foreign banks in total assets (*foreign*) and add the average interest rate on loans (*lend*). To capture macroeconomic stability, we use the percentage of non-performing loans (*npl*) and change in the GDP deflator for measuring the inflation rate (*inflch*). The share of value added by the industry (*industry*) and the share of gross domestic investments (*invest*) are used to check whether the positive effect on growth runs through the industrial sector and through investments. As dummy variables, we use banking crises (*cris*), as these may have an impact on the relative importance of credit and leasing financing, and EU membership (*eu*) as a structural variable with “front-running” effects. Exact definitions and sources of variables can be found in the Appendix.

Table 3 presents summary statistics for all variables. The different financial intermediation variables show in general highest volatility with the total financial intermediation variables showing the highest standard deviations. Despite for the dummy variables, standard deviation is lowest for governance and change in educational attainment.

Table 4 depicts the simple Pearson correlation coefficients of all variables used in the estimations. Output growth is positively correlated with all financial variables except bonds outstanding, the first measure of total financial intermediation and liquid liabilities. The relatively strong negative correlation with bonds outstanding (-0.35) might be explained by the relatively low importance of bonds as financing instruments in transition countries and by the fact that most bonds are issued by governments and few large companies (Haiss and Marin, 2003). The strongest positive correlation between output growth and a financial variable is found with leasing as a percentage of GDP (0.40). The correlation coefficients between output growth and change in labour participation rate (0.64), investment (0.51) as well as share of foreign banks (0.47) are also strongly positive. Output growth and non-performing loans (-0.72), lending rate (-0.51), change in inflation (-0.45) as well as crises (-0.44) show strong negative correlations. The unexpected negative correlation between output growth and change in inflation might mainly be due to transition effects in Turkey, which

experienced an extremely high inflation rate until 2003/2004.²⁸ Output growth and governance show the expected positive correlation (0.34), whereas the negative correlation between output growth and property rights (-0.26) runs against expectations. This may be driven by the recovery of growth from the initial transition-induced slump.

Table 3: Summary statistics, annual data 1999-2006

Variable	Obs	Mean	Std. Dev.	Min	Max	Definition of variable
rgdpg	80	5.24	3.26	-7.30	12.50	Output growth
leas	80	5.42	4.23	0.00	16.50	Leasing (% of GDP)
domcr	80	44.01	15.20	15.20	89.00	Domestic credit (% of GDP)
priver	80	34.40	15.59	10.50	86.80	Private credit (% of GDP)
stock	80	20.42	11.24	3.70	49.90	Stock market capitalisation (% of GDP)
bond	80	28.41	17.93	2.30	64.90	Bonds outstanding (% of GDP)
tfi_i	80	98.25	33.66	28.80	190.10	Total financial intermediation I (% of GDP)
tfi_ii	80	88.65	31.87	26.70	182.60	Total financial intermediation II (% of GDP)
m3	80	47.78	12.47	20.70	71.60	M3 (% of GDP)
capstockg	80	3.02	3.25	-3.30	11.90	Capital stock growth
labch	80	0.84	2.62	-4.80	5.60	Change in labour participation rate
educh	80	0.44	0.58	-1.20	2.10	Change in educational attainment
prop	80	58.00	11.30	30.00	70.00	Property rights (Heritage Foundation)
gov	80	0.61	0.35	-0.30	1.06	Governance (WGI Worldwide Governance Indicator)
foreign	80	63.28	30.42	2.80	99.40	Share of foreign banks (% of total assets)
lifeexp	80	72.88	2.04	69.40	78.00	Life expectancy
inflch	80	6.80	10.38	-0.90	54.20	Inflation change
npl	80	2.58	1.34	0.40	6.10	Non-performing loans (% of total loans)
industry	80	30.15	4.45	21.80	38.80	Industry, value added
lend	80	13.58	13.91	5.10	74.30	Lending rate (average %)
invest	80	25.58	4.56	16.80	38.20	Investment (% of GDP)
eu	80	0.30	0.46	0.00	1.00	Year of EU accession
cris	80	0.08	0.27	0.00	1.00	Years of banking crises

Source: authors' calculations

Notes: Total financial intermediation I (% of GDP) = sum of leasing, domestic credit, stock market capitalisation, bonds outstanding; Total financial intermediation II (% of GDP) = sum of leasing, private credit, stock market capitalisation and bonds outstanding; exact definitions and sources of variables can be found in the Appendix.

²⁸ If Turkey is excluded from the country sample, the correlation coefficient between output growth and leasing turns positive (0.16).

Table 4: Correlations of all variables

	rgdpg	leas	domcr	privcr	stock	bond	tfi_i	tfi_ii	m3	capstockg	labch	educh	prop	gov	foreign	lifeexp	inflch	npl	industry	lend	invest	eu	cris
rgdpg	1.00																						
leas	0.40	1.00																					
domcr	0.19	0.63	1.00																				
privcr	0.31	0.58	0.87	1.00																			
stock	0.06	0.45	0.41	0.26	1.00																		
bond	-0.35	-0.03	0.18	0.05	0.19	1.00																	
tfi_i	-0.03	0.54	0.77	0.58	0.68	0.67	1.00																
tfi_ii	0.03	0.56	0.76	0.68	0.65	0.65	0.97	1.00															
m3	-0.23	0.21	0.54	0.46	0.12	0.48	0.57	0.56	1.00														
capstockg	-0.15	0.12	0.12	-0.03	0.03	-0.18	-0.02	-0.09	0.08	1.00													
labch	0.64	0.19	0.26	0.31	0.17	-0.15	0.12	0.15	0.00	-0.43	1.00												
educh	-0.18	-0.08	0.09	-0.01	0.23	0.21	0.22	0.18	0.05	0.13	-0.09	1.00											
prop	-0.26	0.42	0.21	0.01	0.30	0.17	0.34	0.26	0.09	0.31	-0.29	-0.03	1.00										
gov	0.34	0.71	0.38	0.49	0.23	0.08	0.38	0.46	0.03	-0.09	0.09	-0.10	0.37	1.00									
foreign	0.47	0.52	-0.03	0.10	-0.04	-0.23	-0.08	-0.02	0.00	0.01	0.20	-0.28	0.08	0.49	1.00								
lifeexp	-0.17	0.11	0.32	0.40	0.17	0.64	0.56	0.63	0.55	-0.12	-0.08	0.12	0.10	0.42	-0.06	1.00							
inflch	-0.45	-0.27	0.01	-0.25	0.10	-0.07	-0.03	-0.16	0.09	0.17	-0.11	0.15	0.13	-0.65	-0.48	-0.41	1.00						
npl	-0.72	-0.54	-0.23	-0.23	-0.35	0.29	-0.13	-0.14	0.20	0.17	-0.59	0.16	0.06	-0.34	-0.38	0.32	0.16	1.00					
industry	-0.21	0.17	0.09	0.23	0.18	0.52	0.40	0.49	0.46	-0.12	-0.09	0.04	0.26	0.45	0.15	0.73	-0.39	0.27	1.00				
lend	-0.51	-0.42	-0.12	-0.41	0.07	0.04	-0.06	-0.21	0.02	0.18	-0.18	0.20	0.15	-0.71	-0.63	-0.33	0.93	0.28	-0.35	1.00			
invest	0.51	0.64	0.64	0.67	0.24	-0.34	0.27	0.31	0.31	0.13	0.30	-0.10	0.05	0.40	0.20	0.08	-0.15	-0.47	-0.04	-0.29	1.00		
eu	0.35	0.48	0.51	0.55	0.41	0.15	0.50	0.56	0.18	-0.17	0.31	0.16	-0.03	0.35	0.26	0.30	-0.17	-0.38	0.13	-0.29	0.32	1.00	
cris	-0.44	-0.11	0.09	0.10	-0.13	-0.04	-0.04	-0.04	0.27	0.20	-0.30	0.05	0.14	-0.29	-0.32	-0.02	0.38	0.56	0.09	0.37	-0.03	-0.19	1.00

Source: authors' calculations

Notes: rgdpg = Output growth; leas = Leasing (% of GDP); domcr = Domestic credit (% of GDP); privcr = Private credit (% of GDP); stock = Stock market capitalisation (% of GDP); bond = Bonds outstanding (% of GDP); tfi_i = Total financial intermediation I (% of GDP); tfi_ii = Total financial intermediation II (% of GDP); m3 = M3 (% of GDP); capstockg = Capital stock growth; labch = Change in labour participation rate; educh = Change in educational attainment; prop = Property rights; gov = Governance; foreign = Share of foreign banks (% of total assets); lifeexp = Life expectancy; inflch = Inflation change; npl = Non-performing loans (% of total loans); industry = Industry, value added; lend = Lending rate (average %); invest = Investment (% of GDP); eu = Year of EU accession; cris = Years of banking crises; exact definitions can be found in the Appendix.

Leasing is positively correlated with all other financial variables except a slight negative correlation with bonds outstanding (-0.03). The high positive correlation values with domestic credit (0.63) and private credit (0.58) support the strand of literature that argues in favour of a complementary relationship between leasing and credit taking (Ang and Peterson, 1984; Finucane, 1988). Against expectations, leasing shows high positive correlations with property rights (0.42) and governance (0.71). From earlier literature, we derived the assumption that companies in Eastern Europe face high financing obstacles due to the weak legal and institutional environment and that leasing represents an alternative means of financing for those companies (Beck et al., 2004). We assumed that a weak legal setting would lead to increased volumes of leasing and therefore expected a negative correlation between leasing and the legal and institutional indicators. The finding of a positive correlation leads to the suggestion that leasing is not used as an alternative means of financing if legal and institutional conditions are weak, but that the use of leasing also requires a sound legal system. This bears an important implication for policy makers: leasing can not be used as an escape from regulatory reforms. We also find that leasing and non-performing loans (-0.54) are strongly negatively correlated, which reveals the high importance of macroeconomic stability and legal security for making banks provide leasing services. These findings also support the complementary relationship between leasing and credit taking. The high involvement of foreign banks in the provision of leasing services in Eastern Europe is strengthened by the high positive correlation between leasing and share of foreign banks (0.52).

6. RESULTS

This section presents an overview of the results of the regression analysis. In tables 5 and 6, the results with the different financial variables and the outcomes for the other significant variables are displayed. Concerning the influence of the different financial variables on economic growth, leasing showed a positive effect which was insignificant with no lag, but turned significant with one-year and two-year lags. Domestic credit and private credit had a slightly positive impact on growth, but were only significant entering the regressions with two-year lags. Stock market capitalisation showed a slightly negative effect which was only significant entering the regressions without lag. Bonds outstanding and liquid liabilities were significant in all models and slightly negatively influenced economic growth. Both measures of total financial intermediation had a slightly negative influence on economic growth which was significant under all conditions.

Table 5: Regression results for leasing, credit and stock market capitalisation

Leasing			
rgdpg	FV with two-year lag	FV with one-year lag	FV with no lag
leas	0.129* (0.076)	0.105* (0.060)	0.031 (0.063)
labch	0.315*** (0.074)	0.312*** (0.075)	0.409*** (0.079)
educ	-0.366* (0.205)	-0.150 (0.213)	-0.088 (0.227)
prop	-0.068*** (0.021)	-0.035** (0.016)	-0.027* (0.016)
npl	-0.961*** (0.212)	-0.788*** (0.174)	-0.764*** (0.182)
lifeexp	-0.419*** (0.119)	-0.528*** (0.092)	-0.399*** (0.102)
eu	0.912** (0.369)	0.934** (0.379)	1.217*** (0.433)
inflch	-0.124*** (0.036)	-0.132*** (0.028)	-0.130*** (0.026)
Constant	42.049*** (8.538)	47.993*** (6.524)	37.837*** (7.261)
Obs.	60	70	80
Domestic credit			
rgdpg	FV with two-year lag	FV with one-year lag	FV with no lag
domcr	0.042*** (0.0155)	0.0181 (0.013)	0.016 (0.015)
labch	0.324*** (0.072)	0.299*** (0.078)	0.407*** (0.082)
educ	-0.337* (0.195)	-0.113 (0.211)	-0.061 (0.228)
prop	-0.049*** (0.015)	-0.023 (0.015)	-0.0212 (0.016)
npl	-1.092*** (0.184)	-0.874*** (0.174)	-0.760*** (0.190)
lifeexp	-0.552*** (0.109)	-0.591*** (0.096)	-0.467*** (0.111)
eu	1.183*** (0.329)	1.151*** (0.351)	1.186*** (0.441)
inflch	-0.139*** (0.033)	-0.144*** (0.028)	-0.141*** (0.025)
Constant	49.828*** (7.718)	51.844*** (6.665)	42.034*** (7.676)
Obs.	60	70	80
Private credit			
rgdpg	FV with two-year lag	FV with one-year lag	FV with no lag
privcr	0.032* (0.018)	0.0146 (0.015)	0.0159 (0.014)
labch	0.332*** (0.073)	0.296*** (0.078)	0.402*** (0.083)
prop	-0.042** (0.012)	-0.020 (0.015)	-0.019 (0.016)
npl	-1.178*** (0.208)	-0.900*** (0.184)	-0.754*** (0.193)
lifeexp	-0.502*** (0.129)	-0.584*** (0.097)	-0.462*** (0.110)
eu	1.087*** (0.354)	1.166*** (0.359)	1.182*** (0.439)
inflch	-0.131*** (0.036)	-0.139*** (0.029)	-0.136*** (0.026)
Constant	46.623*** (9.176)	51.464*** (6.851)	41.641*** (7.655)
Obs.	60	70	80
Stock market capitalisation			
rgdpg	FV with two-year lag	FV with one-year lag	FV with no lag
stock	-0.001 (0.024)	-0.018 (0.018)	-0.031* (0.017)
capstockg	0.102 (0.068)	0.100* (0.060)	0.126** (0.054)
labch	0.427*** (0.093)	0.384*** (0.083)	0.479*** (0.079)
prop	-0.042** (0.021)	-0.014 (0.016)	-0.021 (0.012)
npl	-1.022*** (0.207)	-0.956*** (0.166)	-1.000*** (0.181)
lifeexp	-0.374** (0.144)	-0.447*** (0.109)	-0.242** (0.118)
eu	1.0361*** (0.356)	1.055*** (0.332)	1.092*** (0.397)
inflch	-0.134*** (0.038)	-0.136*** (0.024)	-0.118*** (0.021)
Constant	37.644*** (10.608)	41.704*** (7.860)	26.947*** (8.313)
Obs.	60	70	80

Source: authors' calculations

Notes: GLS method; standard errors (t-values) in parentheses; * significant at 10% level, ** significant at 5% level, *** significant at 1% level;

rgdpg = Output growth; leas = Leasing (% of GDP); domcr = Domestic credit (% of GDP); privcr = Private credit (% of GDP); stock = Stock market capitalisation (% of GDP); capstockg = Capital stock growth; labch = Change in labour participation rate; educ = Change in educational attainment; prop = Property rights; lifeexp = Life expectancy; inflch = Inflation change; npl = Non-performing loans (% of total loans); eu = Year of EU accession; exact definitions can be found in the Appendix.

Table 6: Regression results for bonds outstanding, liquid liabilities and total financial intermediation

Bonds outstanding			
rgdpg	FV with two-year lag	FV with one-year lag	FV with no lag
bond	-0.053*** (0.012)	-0.048*** (0.0115)	-0.028** (0.0113)
capstockg	0.022 (0.068)	0.0696 (0.0714)	0.0949* (0.0536)
labch	0.337*** (0.083)	0.276*** (0.088)	0.414*** (0.084)
prop	-0.046*** (0.016)	-0.037** (0.017)	-0.035** (0.016)
foreign	0.007 (0.008)	0.007 (0.007)	0.010* (0.006)
npl	-1.185*** (0.171)	-1.240*** (0.157)	-0.992*** (0.173)
eu	1.164*** (0.297)	0.622* (0.346)	0.687* (0.376)
inflch	-0.105*** (0.033)	-0.097*** (0.030)	-0.096*** (0.022)
Constant	11.758*** (1.369)	11.554*** (1.340)	9.711*** (1.313)
Obs.	60	70	80
Liquid liabilities			
rgdpg	FV with two-year lag	FV with one-year lag	FV with no lag
m3	-0.044** (0.019)	-0.0420** (0.012)	-0.040** (0.017)
capstockg	0.099 (0.072)	0.178** (0.072)	0.145*** (0.050)
labch	0.381*** (0.093)	0.396*** (0.089)	0.465*** (0.076)
prop	-0.051*** (0.019)	-0.048** (0.019)	-0.047*** (0.017)
foreign	0.015 (0.010)	0.014* (0.008)	0.016*** (0.006)
npl	-1.184*** (0.229)	-1.017*** (0.192)	-0.850*** (0.179)
eu	0.777** (0.349)	0.483 (0.369)	0.702* (0.363)
inflch	-0.094*** (0.034)	-0.085*** (0.031)	-0.082*** (0.021)
Constant	11.981*** (1.661)	11.550*** (1.601)	10.562*** (1.476)
Obs.	60	70	80
Total financial intermediation I			
rgdpg	FV with two-year lag	FV with one-year lag	FV with no lag
tfi_i	-0.023*** (0.008)	-0.026*** (0.007)	-0.0166** (0.006)
capstockg	0.153** (0.067)	0.175*** (0.062)	0.132** (0.056)
labch	0.474*** (0.089)	0.417*** (0.078)	0.475*** (0.080)
prop	-0.027 (0.019)	-0.024 (0.017)	-0.032* (0.017)
npl	-1.223*** (0.182)	-1.262*** (0.142)	-1.071*** (0.162)
eu	1.011*** (0.365)	0.673** (0.318)	0.957** (0.392)
inflch	-0.091*** (0.030)	-0.101*** (0.024)	-0.103*** (0.019)
Constant	11.433*** (1.284)	12.178*** (1.149)	10.985*** (1.192)
Obs.	60	70	80
Total financial intermediation II			
rgdpg	FV with two-year lag	FV with one-year lag	FV with no lag
tfi_ii	-0.0290*** (0.008)	-0.029*** (0.007)	-0.019*** (0.007)
capstockg	0.149** (0.065)	0.152** (0.062)	0.125** (0.054)
labch	0.478*** (0.086)	0.419*** (0.077)	0.468*** (0.078)
prop	-0.023 (0.018)	-0.025 (0.017)	-0.034** (0.017)
npl	-1.141*** (0.175)	-1.181*** (0.143)	-1.081*** (0.157)
eu	1.131*** (0.357)	0.773** (0.324)	0.994*** (0.378)
inflch	-0.100*** (0.028)	-0.107*** (0.023)	-0.109*** (0.019)
Constant	11.303*** (1.208)	11.994*** (1.119)	11.178*** (1.166)
Obs.	60	70	80

Source: authors' calculations

Notes: GLS method; standard errors (t-values) in parentheses; * significant at 10% level, ** significant at 5% level, *** significant at 1% level;

rgdpg = Output growth; bond = Bonds outstanding (% of GDP); tfi_i = Total financial intermediation I (% of GDP); tfi_ii = Total financial intermediation II (% of GDP); m3 = M3 (% of GDP); capstockg = Capital stock growth; labch = Change in labour participation rate; prop = Property rights; foreign = Share of foreign banks (% of total assets); inflch = Inflation change; npl = Non-performing loans (% of total loans); eu = Year of EU accession; exact definitions can be found in the Appendix.

As for the findings of the other independent variables, non-performing loans were significant in all model specifications and always had the strongest negative impact on economic growth. EU membership showed a significant effect under almost all conditions, always having the strongest positive effect on growth. Change in labour participation rate was strongly positively significant in all model specifications. Inflation significantly affected economic development under all conditions with a modestly negative effect. Property rights were significant in the majority of models and always had a slightly negative impact on economic growth, while positively correlated with all financial sector indicators in simple regressions (table 3). Measurement and scaling of property rights and other legal indicators like governance deserve further attention in research. In line with the transition-induced reduction in life expectancy, this variable was negatively significant in the models including leasing, the credit variables and stock market capitalisation as financial variables. Education change showed a negative impact on economic growth in those models where leasing and domestic credit entered the regressions, indicating that where debt spurred growth, this also provided people with a stronger trigger to switch from study to work. Capital stock growth had a modestly positive implication on growth which was significant in some regressions. The share of foreign banks was very rarely significant, showing a very slightly positive implication on economic development. The variables governance indicator, value added of industry, lending rate, investments and banking crises never affected economic growth in a significant way.

7. DISCUSSION

From the regression results, we can draw the conclusion that leasing and credit contributed to economic growth in Eastern European transition countries. The positive effect of leasing is an essential finding since the relevance of this form of financing for economic development has, to our knowledge, not been tested so far. Leasing was insignificant with no lag, but turned significant with one-year and two-year lags. This leads to the assumption that the positive effects of leasing need some time to transfer to the real economy, but that the potential to influence economic growth in a positive way is high.²⁹ The same applies to domestic credit and private credit, which produced significantly positive outcomes entering the regressions with two-year lags. These findings partly disagree with earlier results for transition countries of Mehl et al. (2006), Fink et al. (2006b) and Hagmayr and Haiss (2007).³⁰ Mehl et al. (2006)

²⁹ The positive effects might be triggered to a high degree by equipment leasing since this form of leasing is much more widespread than real estate leasing.

³⁰ Mehl et al. (2006) investigate seven South Eastern European countries, Fink et al. (2006b) nine Central and South Eastern European countries and Hagmayr and Haiss (2007) four South Eastern European countries.

find partly significant and negative effects for private credit for a sample of on average lower developed South Eastern European countries. Fink et al. (2006b) find a positive influence of domestic credit, but no significant effect of private credit in their sample on earlier years of transition, which they relate to the high ratio of bad loans to the private sector. We also find a negative effect of non-performing loans, though the levels of non-performing loans went down over time in this sample of Central and South Eastern European countries. The results of Hagmayr and Haiss (2007) show a positive, but insignificant impact of domestic credit and a negative and significant effect of private credit. Since the time frame of these authors includes earlier years with higher ratios of non-performing loans, which could be strongly reduced during our more recent time frame, this might explain the disparity in findings. The positive findings for leasing and credit seem to support the complementary relationship between these two methods of financing as already shown by the positive correlations between leasing and credit taking above.

The negative and mostly insignificant outcomes of stock market capitalisation coincide with earlier studies of Fink et al. (2006b), Hagmayr and Haiss (2007) and Mileva (2008). According to Minier (2003), stock market development needs to reach a certain level before being able to exert an influence on economic growth. Since stock market capitalisation in transition countries is still low, this might explain its insignificance for affecting real economy. The significantly slightly negative results for bonds outstanding differ from earlier findings of Fink et al. (2006b) and Hagmayr and Haiss (2007). The bond market is still underdeveloped in most countries within the sample and – with the exception of the Czech Republic – mainly a government bond market financing public infrastructure investments with long payout ratios. Referring to the argument concerning stock markets, this might also explain the findings for bonds outstanding. Liquid liabilities (m3) exerted a slightly negative and significant influence on economic growth, which corresponds to the results of Mehl et al. (2006) for SEE. Investigating the finance-growth nexus for 27 transition countries, Akimov et al. (2006) find that money supply estimates are not robust and that the outcomes for this variable are inconclusive. The authors argue that money supply is not a good proxy for financial development in transition economies where financial markets are usually underdeveloped and which experienced high levels of inflation, which is confirmed by our data. The results for the total financial intermediation variables indicate a slightly negative and significant impact on output growth, which might be due to the negative impacts of stock market capitalisation and bonds outstanding. These findings partly agree with the results of Hagmayr and Haiss (2007).

As for the structural variables, non-performing loans had the strongest negative impact on economic growth. Although the governance indicator did not produce significant results and the negative outcomes of the property rights index are rather puzzling, this finding, together with the negative effect of inflation, reveals the high importance of macroeconomic stability and legal security. EU membership seems to be a very important positive indicator for economic growth. The rate of labour participation also exerted a strongly positive and significant effect on output growth, which seems to promote the high importance of a sound labour market for real economy. In contrast to Hagmayr and Haiss (2007) and Fink et al. (2006b), who find a strong influence of capital stock growth, this variable only exerted a significantly positive impact in some of our regression analyses. These authors relate their findings to the large capital scarcity in transition countries, especially after economic crises. The time frame of these authors includes rather the earlier years of transition and many crises years, while our data set starts in 1999. This might explain the different findings.³¹

8. SUMMARY AND CONCLUSIONS

We both provide descriptive evidence on the relatively strong importance of leasing across Central and South Eastern European transition economies (CEE and SEE) and empirical evidence that leasing contributes positively to economic growth. We also find that leasing is complementary to credit, not a substitute. For regulators and policy makers, this implies that (1) leasing needs to be taken into consideration to have a full picture on debt volumes in transition economies, and (2) that proper regulation cannot be circumvented by asset-based finance. For market participants (many of which are foreign in CEE and SEE), it provides evidence on the growth-enhancing aspects of leasing finance and also on the necessity of a mature regulatory environment.

Our empirical analysis is rooted in the finance-growth-nexus, which so far has attracted a lot of research on the conventional financial sectors, mainly bank intermediation and stock markets. While alternative sources of finance have generally grown in importance over time, leasing has gained particular relevance in the European transition economies. Research on the impact of fast and vast debt growth in these economies, however, so far only looks at credit. The novel data on leasing markets and their impact in Central and South Eastern Europe allows to draw a full-fledged picture of finance in these markets. Looking at credit volume only would underestimate the full extent of debt whereas in the current turmoil the need for a

³¹ Mehl et al. (2006) and Fink et al. (2008) provide evidence on the impact of different stages in economic transition in CEE and SEE.

clear picture of all financial obligations rises. We also show that foreign-owned providers from the banking industry make up the largest part of the leasing suppliers in almost all countries. Especially Western European banks are heavily involved in the Eastern European leasing industries.

Based upon a review of previous studies on the finance-growth nexus in transition economies, we apply a panel data approach on a sample of ten Eastern European transition countries over the period 1999-2006, thus broadening the evidence on the relationship of the financial segments (bank credit, stock, bonds) and economic growth with a focus on Eastern Europe and include leasing into this investigation, which is, to our knowledge, done for the first time. We conclude that leasing and credit contributed to economic growth in Eastern European transition countries during the period covered, while stock and bond markets did not. Non-performing loans had a negative impact on growth. Our findings reinforce on a broader basis that macroeconomic stability and a sound legal system, which might be pushed by EU membership, are important preconditions in order to make a positive impact of the financial sector possible. Leasing does not seem to be used as an alternative means of financing if legal and institutional conditions are weak, as often suggested by literature. Leasing and credit taking rather seem to be complements and the use of leasing also seems to require a sound legal system. This is an important finding, especially for regulators and policymakers, since a well-developed legal and institutional framework seems not only to positively influence loan supply, but also the provision of leasing, and both measures of financial intermediation seem to have the potential to influence economic growth in a positive way. Replications of the study could be undertaken in other emerging market regions.

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APPENDIX

Definition of variables

Variable	Code	Definition	Sources
Output growth	rgdpg	Real GDP per capita growth	IMF WEO (World Economic Outlook)
Leasing (% of GDP)	leas	Outstanding leasing volumes	Leaseurope, national leasing associations
Domestic credit (% of GDP)	domcr	Claims on central government, on state and local governments, on nonfinancial public enterprises, on private sector, on Other Banking Institutions, on Nonbank Financial Institutions	IFS line 32
Private credit (% of GDP)	priver	Claims on the private sector	IFS line 32d
Stock market capitalisation (% of GDP)	stock	EBRD: Market value of all shares listed on the stock market, calculated by multiplying the share price by the number of shares outstanding. WFE: The market capitalisation of a stock exchange is the total number of issued shares of domestic companies, including their several classes, multiplied by their respective prices at a given time.	EBRD Structural Funds Indicators; Turkey: WFE Domestic market capitalisation
Bonds outstanding (% of GDP)	bond	Outstanding amount of domestic debt securities	BIS table 16A, Bank of Slovenia, Bulgarian National Bank, Bank of Estonia, Bank of Latvia, Bank of Lithuania
M3 (% of GDP)	m3	Liquid liabilities are the sum of currency and deposits in the central bank (M0), plus transferable deposits and electronic currency (M1), plus time and savings deposits, foreign currency transferable deposits, certificates of deposit, and securities repurchase agreements (M2), plus travelers checks, foreign currency time deposits, commercial paper, and shares of mutual funds or market funds held by residents.	World Bank WDI (World Development Indicators)
Total financial intermediation I (% of GDP)	tfi_i	Sum of domestic credit, stock market capitalisation, bonds outstanding, leasing	see sources for domestic credit, stock market capitalisation, bonds outstanding, and leasing
Total financial intermediation II (% of GDP)	tfi_ii	Sum of private credit, stock market capitalisation, bonds outstanding, leasing	see sources for private credit, stock market capitalisation, bonds outstanding, and leasing
Capital stock growth	capstockg	Growth rate of real physical stock per employee	Eller et al. (2006); Turkey: AMECO database
Change in labour participation rate	labch	Change of the ratio of the number of employed people to total population	European Commission AMECO database
Change in educational attainment	educh	Change of weighted index of highest level of education attained by employees, age:15-64	Eller et al. (2006), based on Eurostat; Turkey: Hagmayr and Haiss (2007)

Definition of variables continued

Variable	Code	Definition	Sources
Life expectancy	lifeexp	Number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life	World Bank WDI (World Development Indicators)
Property rights	prop	This factor examines the extent to which the government protects private property by enforcing the laws, as well as the extent to which private property is safe from expropriation. The less protection private property receives, the lower a country's level of economic freedom and the lower its score (0%-100%).	Heritage Foundation
Governance	gov	Aggregate indicator of six dimensions of governance: Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, Control of Corruption (-2.5 to 2.5)	WGI (Worldwide Governance Indicators)
Share of foreign banks (% of total assets)	foreign	Share of total bank sector assets in banks with foreign ownership exceeding 50 per cent, end-of-year.	EBRD Structural Funds Indicators; Turkey: Hagmayr and Haiss (2007)
Lending rate (average %)	lend	Average interest rate on loans	EBRD Structural Funds Indicators; Turkey: Turkish Statistical Institute
Non-performing loans (% of total loans)	npl	Ratio of non-performing loans to total loans. Non-performing loans include sub-standard, doubtful and loss classification categories of loans, but excludes loans transferred to a state rehabilitation agency or consolidation bank, end-of-year.	EBRD Structural Funds Indicators; Turkey and SK 2006: IMF Global Financial Stability Reports
Inflation change	inflch	Change of GDP deflator: The GDP deflator is derived by dividing current price GDP by constant price GDP and is considered to be an alternate measure of inflation.	IMF WEO (World Economic Outlook)
Industry, value added (% of GDP)	industry	Net output of a sector after adding up all outputs and subtracting intermediate inputs.	World Bank WDI (World Development Indicators)
Investment (in % of GDP)	invest	Gross domestic investments	EBRD Structural Funds Indicators; Turkey: IMF
EU membership dummy	eu	Year of EU accession	EU (2007)
Banking crises dummy	cris	Years of banking crises	De Haas and van Leyveld (2006), Özatay and Sak (2002), Sherif (2003)

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