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PETER HAIS / GERHARD FINK

The Finance-Growth-Nexus Revisited:
New Evidence and the Need for Broadening the Approach

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New Evidence and the Need for Broadening the Approach

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Abstract
This report describes the aim, scope, underlying literature and results of the research project “The Nexus between the Financial and the Real Sector”. We studied the contribution of the financial sector as a whole and its individual segments (bank credits, the issuance of bonds and shares) to real economic growth in EU Member and Candidate Countries, the United States and Japan. We supplement existing approaches with the inclusion of the bond market and of foreign direct investment in the banking sector, wherein for the first time, we provide empirical evidence for slightly positive effects thereof. Methodically, we extend previous research by the production-function approach and document the importance of the market microstructure. We recommend to include liberalisation and integration effects, the bond and insurance sector, and effects of foreign bank entry and investment into future research on the Finance-Growth-Nexus.

Key Words: Finance-growth-nexus, financial sectors, bonds, FDI, EU, transition countries, production function

JEL Classifications: C23, E44, F33, F36, G10, G18, G21, G3, H74, O11, O16, O52, O40, P2

Finance-Growth-Nexus Homepage: http://fgr.wu-wien.ac.at/institut/ef/nexus.html

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1 Introduction

An abundance of theoretical and empirical research addresses the question, to what extent the financial sector influences economic development and economic growth. The clarification of this question is especially important with regard to the reform steps and priorities in former centrally planned economies, with which Austria maintains close commercial ties, as well as concerning the formulation of further economic policy and integration measures within the European Union and beyond. However, previous results have not always been unambiguous or have not incorporated all of the important financial sectors: As Mooslechner (2004) had put it “The Challenge of Economic Growth: What Are the Issues?” requires further scrutiny. The objective of the project “The Nexus between the Financial and the Real Sector” is the examination of possible links between the aggregate financial sector, its individual segments and real economic growth.

Extant literature on this research topic mostly argues that there is a positive correlation between the development of the financial sector and economic growth in real terms. However, there is disagreement about the underlying causality. Positive influence of financial sector development on real economic growth is found in country cross-sectional data analyses (King/Levine, 1993, p. 730). Studies, which draw on time series analyses, often obtain varying results: Cases, in which real economic growth fosters the development of the financial sector, and feedback relationships with reciprocal effects were identified (Arestis/Demetriades, 1997, p. 790).

Three segments of the financial sector are of particular significance: Banks, the equity market and bond market. Their relative importance varies by national economy. Capital allocation in Japan and Germany as bank-oriented systems is effected mainly via banks acting as financial intermediaries. The most important form of financing is bank credit. Relatively fewer securities are issued in the capital markets and the transaction volume is comparatively lower than in securities-oriented systems such as the United States and the United Kingdom. In these countries, shares and bond markets primarily serve to allocate capital. Aside from executing the issuance of securities as investment banks on behalf of companies or engaging as brokers in the trade of securities, banks act less as financial intermediaries.
Research in the context of the Nexus-Project employs both aggregated measures, containing the banking sector, shares and bond markets, as well as disaggregated measures which separately capture the individual segments of the financial sector, to measure the development of the financial sector. The advantage of aggregated measures lies in the fact that they are more robust relative to structural shifts within the financial sector of a country and relative to differences in the financial sector structure between different countries. The use of disaggregated measures for financial development on the other hand allows for the examination of connections between individual segments of the financial sector and real economic growth. A further innovative aspect of the research question deals with the issue, whether the correlations are stable over longer periods of time. Previous research in this area has negated this. Since only relatively short time series are available for the European Union’s New Member States and Accession Countries in Central and Eastern Europe (CEE), the Nexus-Project has applied a new method: the production function approach. In this way, the financial sector and its individual segments may be examined as to their effect on the real economy. This approach is also appropriate for analysing whether the segments of the financial sector are characterized by substituting or complementing relationships. Standard econometric methods are used for testing the hypotheses. We have applied the Granger-causality tests for the OECD countries and the production function approach for the CEE countries.

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2 EUR-12 = eurozone members; EU-15 = “old” EU members prior to the 2004 enlargement round; CEE-5 = Poland, Czech Republic, Slovakia, Hungary and Slovenia; ASIA-8 = Hong Kong SAR, Indonesia, South Korea, Malaysia, Philippines, Singapore, Taiwan, Thailand
2 Most Important Theoretical and Empirical Literature in the field

The connection between the financial sector of national economies and economic development in real terms is the subject of numerous studies. Schumpeter (1911) already stressed the importance of financial markets and intermediaries for economic development. Financial markets and intermediaries diversify both the liquidity and idiosyncratic risks (Greenwood/Smith 1997, Bencivenga/Smith 1991, Levine 1991, 1997, Greenwood/Jovanovic 1990, Saint-Paul 1992). They determine resource allocations. In addition to lowering the costs of ex ante acquisition and processing of information about investment projects, the financial sector and its institutions contribute ex post to an increase in efficiency relating to company supervision and the monitoring company management (Greenwood/Jovanovic 1990, King/Levine 1993).

Box 1: Financial Sector and Economic Growth

- Financial markets and intermediaries exist because they are able to alleviate market frictions:
  - information cost,
  - cost of reinforcing contracts
  - cost of exchanging goods and financial claims.

- Financial systems and intermediaries
  - facilitate risk management,
  - enable financing of riskier but more productive investments and innovations,
  - decide directly on the allocation of resources,
  - gather information and exert corporate governance.

Financial markets are important for the specialisation of economies and boost the efficiency of payment systems (Saint-Paul 1992, Greenwood/Smith 1997). A well developed financial sector and its individual institutions can promote real economic growth by means of efficiency increases in resource allocation and diversification of risks (Patrick 1966). Conversely, there is also the possibility that real sector growth creates demand for services of the financial sector and thereby contributes to its growth (Patrick 1966). Patrick (1966) assumes that the growth of the financial sector contributes significantly to real economic growth in “emerging market” countries whose economies are in development, while the growth of the real sector tends to stimulate demand for financial sector services in “mature market” countries with developed economies. This assumption is countered with the often observed phenomenon of poor real economic development which takes place parallel to the growth of the financial sector, as was the case particularly in Latin America during the 1990’s. The financial crises in Mexico, Argentina and Brazil were extreme features of this development.
Essentially two study designs are found in empirical research on the connection between financial and real economic development: country cross-sectional analyses and time series analyses. In country cross-sectional analyses, variables which describe the financial development are regressed in a relatively large number of countries on measurements of economic development and control variables. The approach is based on the assumption that the level of development of the financial sector has an impact on economic growth. Hence, financial variables (stock or flow data) are used at the beginning of the examined time period as explanatory variables for the subsequent economic growth.

King/Levine (1993) find a positive correlation between the development level of financial markets and the ensuing economic growth with this study design. They assume that forecasts for economic growth can be made based on the level of financial market development. However, the question remains unresolved, whether financial development really is causative for economic growth, or if economic growth may be forecast based on financial variables only because the financial sector develops in anticipation of economic growth (Levine 1997, p. 708). The use of instrumental variables is in theory a possible approach to solving this problem. These variables however are neither easy to identify nor to measure.

Box 2: Differences between Past and Recent Studies; Source: Fink (2006)

- Previous research on two channels of influence from finance to growth:
  - Sources of finance: stocks and private bank credit
  - have effects on:
    - private capital accumulation and
    - technological innovation.

- Recent research considers also:
  - More sources of finance: bonds, insurance, FDI
  - level of capital stock
  - quality of investment (expected return on investment).
  - human capital,
  - public infrastructure
  - efficiency enhancing reforms of public administration.

- Short term effects: increased consumption financed by credit expansion may lead to higher growth rates.

Vector autoregressive models (VAR models) and error correction models (VEC models) are mainly used in time series analyses. The connections between the development of the banking sector and GDP within developing market economies are examined by Demetriades/Hussein (1996). They conclude that there are causalities in both directions in most of the countries they examined.
Arestis/Demetriades (1997) apply a similar study design in order to examine the connections between the development of financial markets and economic growth in Germany and the United States. They find a causality running from the financial sector to economic growth in Germany, while the authors argue that the development of the financial sector was due to economic growth in the United States. It should be noted in this regard that bond markets were not considered, although they constitute the largest part of the U.S. financial sector. Neusser/Kugler (1998) arrive at a contrary conclusion: The causality runs from the development of the financial sector to economic growth in their study.

Shan/Morris/Sun (2001) and Al-Yousif (2002) examine the relationship between financial intermediation of banks and economic growth, and find for the most part, two-directional causalities. In an attempt to replicate earlier studies (see Table 3) Rousseau/Wachtel (2005) find that the previously demonstrated positive effects of the financial sector can no longer be shown with data after 1990 and for countries with the same level of development. Rajan (2005) argues that the correlation between savings and investment rates within most regions has fallen off in more recent periods, while banks increasingly account for a smaller and smaller fraction of expansion in financing. Favara (2003) and Wachtel (2001) argue that aside from bank credits and shares markets, it would be necessary to more rigorously incorporate additional sectors such as bond and insurance sectors as well as the market microstructure – e.g. the influence of foreign owners – into such examinations, since their growing importance could have changed previously robust correlations. This aspect is implemented in the Nexus-Project.

3 Research Scope of the Nexus-Project

The question at the core of our research is: Which connections exist between development of the entire financial sector and economic growth in real terms? Can capital which is made available via bank credit and the issue of shares and bonds cause GDP growth, or is the relationship reversed, that real economic growth promotes the development of the financial sector? To what degree do connections exist and to what extent do these connections depend on the level of economic development prevailing in a country (see Table 1)?

Blum/Federmair/Fink/Haiss (2002) provide a comprehensive introduction into existing theories pertaining to the research topic as well as a description of the fundamentals leading up to the

3 Prof. Paul Wachtel, who teaches at New York University, Leonard N. Stern School of Business, provided the Nexus-Team the opportunity to discuss current issues relating to Finance Growth Nexus during a visit to Vienna in July 2005. We thank Paul Wachtel for his valuable insight. After the meeting Paul Wachtel invited the Nexus-Team to submit selected research papers to the XIV Tor Vergata Conference in Rome. We thank Michele Bagella and the participants of the „Tor Vergata“ Conference for their constructive advice www.ceistorvergata.it/conferenze&convegni/banking&finance/XIV_conference
development of a pool of data for the three segments of the financial sector (shares, bonds and credits). They offer an overview of more than 50 empirical studies conducted since 1964 to the present and explain the methodological background for the link of the application of the production function across several countries (cross-country production function) and of time series analysis. Blum et al (2002) detected five different patterns of reciprocal interaction between the financial and real sectors: a leading role of the financial sector (supply-leading), a financial sector following the real sector (demand-following), a bi-directional relationship, a negative correlation of the financial sector to growth and no impact. Rousseau & Wachtel (2005) further add that the direction of the correlation could change in dependence on the level of economic development.

Box 3: Research Questions of the Nexus-Project

<table>
<thead>
<tr>
<th>Cross-country analysis using AK-Type Growth Equations</th>
<th>Production Function Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time series analysis concentrating on VAR &amp; VEC models</td>
<td>$y_t = AK_t, H_t = F_t + \epsilon_{t+1}$</td>
</tr>
<tr>
<td>for short-rund and/or long-rund types of causality</td>
<td>positive impact of financial markets modeled as a) direct input into production function and/or b) as influencing productivity parameter A</td>
</tr>
</tbody>
</table>

question: whether causal patterns are stable across countries

H1: bi-directional relationship b/n aggregate financial development & growth

H5: production function will differ across types of countries

question: check if stable over time & across countries

H2: causal links b/n individual fin mkt segments & the real sector

H6: causal links b/n individual fin mkt segments & the real sector

question: check if stable over time & across countries

H3: aggregate measures differ from individual segment findings

H7: there exist substitutional & complementary relations b/n fin mkt segments

question: analysis of residuals to detect substitutional & complementary patterns

H4: causal patterns are not stable over time

H8: substitution of credits by bonds and interaction between the credit/bond/stock-sectors

question: market microstructure aspects like financial sector FDI, interaction w/ insurance sector

bonds, stocks, credit

question: Impact of financial market liberalisation/integration/EMU

Building on the theoretical survey of causal links, empirical research came to the fore of the Nexus-Project. While there are already numerous studies for the bank and stock market segments in the empirical literature which analyse their relationships with economic growth, we explicitly included bond markets into detailed examinations for the first time. Rajan (2005) emphasizes the importance of broadening the view arguing that “one can no longer just examine the state of the banking system and its exposure to credit to reach conclusions about aggregate credit creation.”

Bond markets are an important segment of the financial sector. They counterbalance fluctuations in the supply of foreign capital, since financing via bond issues constitutes, in addition to bank credits, a source of funds which reacts less cyclically (Davis 2001). Bond markets can act as a transfer channel of monetary policy and also have an information function. Thus, the structure of
interest rates observed in bond markets provides a basis for developing derivative products to hedge financial risks (Davis/Fagan 1997, Herring/Chatusripitak 2000, De Bondt 2002). An efficient bond market offers economic agents a diversification opportunity, thereby increasing their incentive to invest savings. This capital is then made available to the real sector (Herring/Chatusripitak 2000).

Haiss/Marin (2003) discuss the importance of corporate bonds as a financing instrument in Central and Eastern European countries. They argue that the relatively low level of development of corporate bond markets could have a restraining effect on economic growth in these New EU Member States. As reasons for the lagging development of the corporate bond markets in these countries Haiss/Marin (2003) list the crowding out effects of foreign direct investment, lacking rating of companies, high costs of adjusting to international accounting and reporting standards, legal restrictions, and finance flows within international groups. Haiss/Marin (2005) examine the development of corporate bond markets in Southeast Asian countries. They discuss their positive effects on national economies, deriving policy recommendations for the Southeast Asian countries.

Table 2: The Structure of the Financial Sector in the CEE-5 Countries and ASIA-7 Countries;
Source: Haiss/Marin (2005)

<table>
<thead>
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</thead>
<tbody>
<tr>
<td></td>
<td>Mio. EUR</td>
<td>% of GDP</td>
</tr>
<tr>
<td>Share market capitalisation</td>
<td>71,042</td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td>166,006</td>
<td>42%</td>
</tr>
<tr>
<td></td>
<td>168,145</td>
<td>44%</td>
</tr>
<tr>
<td>Volume of outstanding bonds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic credit</td>
<td>405,193</td>
<td>105%</td>
</tr>
<tr>
<td>Total volume of financial intermediation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Asian financial crisis in the years 1997-98 hit countries with already developed bond markets to a lesser extent than those countries in which the bond markets were still in infant stages of development. Haiss/Marin (2005) primarily attribute this to the fact that the dependence on bank credits as a source of financing was lower in these cases. Bond markets offered additional possibilities for raising capital. They thereby provided an offsetting effect: The sensitivity of companies and banks to changes in the risk perception of global investors was reduced. Initiatives were therefore laid out on the part of responsible politicians which were geared toward promoting the development of bond markets, such as for example, the creation of Asian Bond Funds 1 and 2.

⁴ CEE-5 = Poland, Czech Republic, Slovakia, Hungary, Slovenia
⁵ ASIA-7 = Hong Kong, Indonesia, South Korea, Malaysia, Philippines, Singapore, Thailand
In order to be able to join the European Monetary Union the CEE countries have to meet criteria which directly or at least indirectly relate to further development of the bond markets (Haiss/Marin 2005): The Copenhagen Criteria stress the importance of adequately developed financial markets. These are necessary to feed savings into productive investments. Bond markets are an essential part of the financial markets. One of the Maastricht Criteria refers to long-term interest rates as an indicator for financial stability, building on the development of domestic national bond markets. While the required legal framework for the development of bond markets in Central and Eastern European countries can easily be set up with appropriate political decisions, the question is raised whether developing 25 separate and partly rather tiny bond markets within the EU makes sense under efficiency considerations. Regional cooperation between individual countries is suggested to attain the necessary critical size for efficient regional bond markets that are large enough to support economic growth efficiently (Haiss/Marin, 2005).

Box 4: Recommendations Concerning Bond Markets in CEE; Source: Haiss/Marin (2005)

- Central and Eastern Europe:
  - long term (bond) interest rate is a prerequisite for Economic and Monetary Union of the EU
  - but: are 25 single EU bond markets efficient?
- Developed bond markets can support financial stability and improve GDP growth
- Efforts to develop separate bond markets are "stranded investments"
- Go for intra-regional bond market linkups that follow links in trade, FDI and banking

Fink/Haiss/Hristoforova (2005a, 2004, 2003) examine long-term causal links between the development of bond markets and economic growth. They draw on a relatively long observation period spanning 1951 to 2001. They describe bond markets using the volume of outstanding bonds, wherein all types of bonds (public sector bonds, corporate bonds, financial institution bonds) are considered. VAR models are used to test Granger causalities, while VEC models check for long-term equilibria. Long-term equilibria are found for Japan, Finland and Italy. The authors find results which point to the “Supply Leading Hypothesis” according to which the financial sector provides services via its institutions which promote real economic growth for Austria, Germany, Switzerland, the United Kingdom and the United States. Evidence for the “Demand Following Hypothesis”, according to which real economic growth creates demand for services of the financial sector and thus contributes to
its growth, was not found by the authors. They therefore conclude that real economic growth is fostered by the development of bond markets.

In a further analysis Fink/Haiss/Hristoforova (2006) extend their bond-based examination by incorporating share market capitalisation and credit volume to the private sector. Generally this study supports the “Supply Leading Hypothesis” wherein a development of the financial sector or of its individual segments has positive effects on economic growth. The authors find feedback relationships in which long-term equilibria between financial variables and economic growth exist, in Japan between the credit volumes to the private sector and economic growth, and in the Netherlands and Japan between stock market capitalisation and economic growth.

Fig. 1: The Share of Domestic and International Issued Bonds at the End of 2002;
Source: Figure taken from Fink/Haiss/Kirchner (2005), p. 359

Fink/Haiss/Kirchner/Thorwartl (2005) and Fink/Haiss/Kirchner (2005) examine the short-term relationships between the development of bond markets and real economic growth. They use a higher data frequency (quarterly data) and a shorter period under review (1994-2003) than Fink/Haiss/Hristoforova (2006). The variable used to describe the development of bond markets is the net issue volume of bonds. Domestic and international bonds are pooled. Furthermore, not only the net
issue volumes aggregated over all bond sectors are being looked at, but also the nexus of the different bond sectors with economic growth is examined separately. In this study, VAR-models are used to identify Granger causalities between the development of net bond issue volumes and economic growth (represented by the real GDP). Co-integration and, as a result, the need to use VEC-models instead of VAR-models is not relevant in the context of this study, as net issue volumes are by definition the first differences of outstanding volumes and therefore these series are as a general rule stationary. Fink/Haiss/Kirchner/Thorwartl (2005) come to the following conclusions: Over the shorter period under review and when using quarterly data the “Supply Leading Hypothesis” cannot be clearly confirmed. There are hardly any significant Granger causalities on the aggregate level (including the net issue volumes of all bond sectors). On the sectoral level, however, there are significant Granger causalities which show the following tendency: the “Demand Following Hypothesis” holds true for the public sector. Economic growth is Granger causal for net issue volumes of public sector bonds. That could mean that the issuance of public sector bonds in these countries depends on the ability of the public sector to incur debts. In contrast to that, net issue volumes of corporate bonds and financial institution bonds are causal for economic growth. To a certain extent, there are also opposite tendencies between the development of net issue volumes and economic growth, however. Fink/Haiss/Kirchner/Thorwartl (2005) mention structural and substitution effects as possible explanations for this phenomenon.

**Box 5: The Influence of Bond Markets on Economic Growth; Source: Fink (2006)**

- **Developed countries:**
  - **Long range** time series studies (annual data; Fink/Haiss/Hristoforova, 2005) show
    - Granger causality of financial markets to growth in selected countries: USA, UK, Germany, Switzerland, Austria;
    - bilateral causalities between financial markets and growth in Japan, The Netherlands;
    - a positive impact of bank markets on growth at earlier stages of development.
  - **Developed countries:**
    - **Short range** time series studies (quarterly data; Fink/Haiss/Kirchner, 2005) show in different countries
      - Granger causality of economic growth to issues of government bonds;
      - Granger causality of bank and corporate bonds to economic growth;
      - overall growth of financial intermediation had either no significant effect on growth or it **had negatively affected** economic growth.

Fink/Haiss/Mantler (2005) use a Growth Accounting Specification to analyse the differences between the link of the development of the financial sector and economic growth in developed market economies and newly industrialising countries. The authors describe the development of the financial
sector by an indicator which comprises bank credit volume, share market capitalisation and the volume of outstanding bonds. They do not only examine the link between the development of the financial sector and economic growth, but also the transition channels between them.

Fink/Haiss/Mantler (2005) find that the development of the financial sector generally brings about positive exogenous growth effects. The intensity of these effects is different, however. Whereas it is rather low in developed market economies, the financial sector contributes to economic growth to a higher extent in emerging markets. The most important transmission channel in this context is an increase in productivity. The growth effects triggered by the financial sector seem to be rather short-term than long-term. The authors come to the conclusion that the structure of the financial sector may well play a more important role than believed up to now, as they find that the different segments of the financial sector lead to growth effects which differ in size. On the basis of the different size of growth effects of the various segments of the financial sectors, the countries examined can be grouped in the following way (Fink/Haiss/Mantler 2005, p. 28): In the ME-1 group of developed market economies (Austria, Belgium, Ireland, Italy, Norway, Spain), there is no difference in the intensity of growth effects between the banking sector and stock markets. In the ME-2 group of developed market economies (Denmark, Finland, France, Germany, Greece, Japan, Malta, Portugal, Turkey, the UK and the USA) the stock markets show the most pronounced growth effects, followed by the banking sector and finally the bond markets. In the ME-3 group of developed market economies (Cyprus, Luxembourg, the Netherlands, Spain, Switzerland) the structure of the financial sector is not relevant. For emerging market economies in Central and Eastern Europe the following classification can be made: In the TE-1 group (Poland, Latvia and Lithuania) the share markets and the banking sector seem to have more influence on economic growth than the bond markets. In the TE-2 (Slovakia, Estonia, Croatia, Slovenia, the Czech Republic) and TE-3 group (Bulgaria, Hungary, Romania) the structure of the financial sector has no impact.

Fink/Haiss/Vuksic (2004) are also concerned with the importance of the financial sector in relation to the level of the economic development of countries. They use a production function approach. The explanatory variables in the various models are real capital stock growth, labour participation, and educational attainment. The stage of development of the financial sector is described by the following variables: domestic credit volume, private credit volume, stock market capitalisation, and the volume of outstanding bonds. One central finding of this study is that measures that include public financial flows (domestic credit volume and the volume of outstanding bonds) have a significant positive influence on economic growth for countries with less well developed market economies, while no such relationship is found for private credit (a measure solely based on private

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6 ME stands for 'market economies'
7 TE stands for 'transition economies'
financial flows). The growth of real capital stock is significant for economic growth in all models. The importance of educational attainment rises in line with an increase in economic development.

Box 6: The Influence of Financial Sectors in CEE und EU-Cohesion Countries; Source: Fink/Haiss/Vuksic (2005)

- **EU accession countries:**
  - financial development had a positive and significant impact on growth,
  - bond markets turned out as important determinant of growth,
  - stock markets had no significant effect.
- **EU structural fund countries:**
  - positive influence of bond markets on economic growth,
  - negative impact of domestic credit,
  - no significant effect of aggregate financial intermediation on growth,
  - positive impact of level of education.

For mature market economies Fink/Haiss/Vuksic (2004) find that the development of the financial sector shows no nexus with economic growth. For the New EU Member States and EU Accession Countries, Fink/Haiss/Vuksic (2004) find the strongest positive correlation of all financial variables used for bond markets, while stock markets had no significant influence on economic growth in these countries. Deidda/Fatouh (2005) and Hasan/Malkamäki (2001) support this view, stressing the importance of the legal environment. Minier (2003) shows that a positive relationship between the financial sector, defined as stock market capitalisation and domestic credit volume, depends on the development stage of stock markets. Even though the development of these markets is progressing rapidly in these countries, their role in finance is still relatively low compared to mature market economies. Moreover, the shares of many listed companies are not traded actively. In these markets trading volumes and liquidity are therefore even lower than one could expect from market capitalization. Fink/Haiss/Vuksic (2004) thus conclude that in emerging market economies with improving financial sector structures, public finance may play a growth-enhancing role.

Changes in the market micro structure can have further implications. Haiss/Steiner/Eller (2005a,b,c) as well as Haiss/Staeva (2005a,b) study financial sector foreign direct investment (FSFDI) and examine its possible effects on economic growth. As the banking sector in Central and Eastern European countries is now mainly in the hands of foreign banks, the question arises, in how far and through which transmission channels foreign banks contribute to economic growth in these countries.

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8 A working paper which addresses the mature European and US markets and poses questions such as “What explains differences in the financial structure of the US and the euro area?” can be found at De Fiore/Uhlig (2005).

9 For further evidence on bond markets in CEE see ECB (2004) and Haiss/Marin (2002a, b).
Among other things, the authors look at the channels through which foreign banks have influenced the national economies and examine how the banking industry in CEE-countries has developed in view of these changes in the market microstructure. Haiss/Staeva (2005a, b) find that foreign banks contribute positively to the development of the financial sector and to growth through direct (price, volume) and indirect channels (e.g. signalling effects) if they have a strategy which is prudent, long-term, and which takes into account the regional needs. Claessens/Demirgüc-Kunt/Huizinga (2001) point to the fact that investments made by foreign banks in newly industrialising countries are more efficient in terms of cost and yield than investments by domestic banks. The opposite is true for already developed market economies.

Table 3: The Transmission Channels from FSFDI to Economic Growth;
Source: Eller/Haiss/Steiner (2005)\(^{10}\)

<table>
<thead>
<tr>
<th>Transmission Channel</th>
<th>Effect on Financial Sector</th>
<th>Effect on Real Economy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediation / efficiency:</td>
<td>FSFDI ↑ spread ↓ cost of capital ↓ investment ↑ GDP ↑</td>
<td></td>
</tr>
<tr>
<td>Intermediation / volume:</td>
<td>FSFDI ↑ credit availability ↑ investment ↑ GDP ↑</td>
<td></td>
</tr>
<tr>
<td>Institution building &amp; corporate governance:</td>
<td>FSFDI ↑ bad loans ↓ GDP ↑</td>
<td></td>
</tr>
<tr>
<td>Signal effects:</td>
<td>FSFDI ↑ FDI &amp; PFI ↑ GDP ↑</td>
<td></td>
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</tbody>
</table>

Eller/Haiss/Steiner (2005) integrated two different approaches of the existing literature: The „Finance-Growth-Literature“ basically emphasises the contribution of the financial sector to real economic growth. The literature on the effects of foreign direct investment (FDI) assumes that direct investment can foster economic growth. Eller/Haiss/Steiner (2005) identify a number of possible transmission channels from financial sector foreign direct investment to the development of the financial sector: intermediation / efficiency (foreign bank entry leading to a reduction in interest-rate spread and lending margins); intermediation / credit volume (foreign banks can provide fresh money based on higher lending capacity); corporate governance & institution building (foreign banks improve general financial market standards); and signal effects of FSFDI for real sector FDI and portfolio investments (where foreign banks invest, others follow). Eller/Haiss/Steiner (2005) examine the impact of financial sector foreign direct investment (FSFDI) on economic growth by estimating a panel data model for 11 Central and Eastern European countries between 1996 and 2003 in a cross-country growth accounting framework. While Detragiache/Tressel/Gupta (2006) investigate the credit

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\(^{10}\) FDI = foreign direct investment; FSFDI = financial foreign direct investment; GDP = gross domestic product; PFI = portfolio foreign investment
volume channel and find rather adverse short-term effects of rising foreign bank presence in the least
developed countries, Eller/Haiss/Steiner concentrate on the efficiency channel linking FSFDI to
economic growth in emerging market economies at intermediate levels of development and find rather
positive medium-term effects.

**Fig. 2: The Influence of Foreign Direct Investment of Banks on Economic Growth in Central and
Eastern Europe; Source: Eller/Haiss/Steiner (2005)**

Eller/Haiss/Steiner (2005) provide novel data on FSFDI in CEE, analyse the impact of FDI on
a sectoral level and model the hitherto rather qualitatively discussed relationship between foreign
banks and economic development into a structural, econometric model. The results of
Eller/Haiss/Steiner (2005) gives reason to believe that rising foreign investment can have a significant
and generally positive influence on the economic development of host countries in an intermediate
level of development as in Central and Eastern Europe. According to their study, approaching a
medium degree of financial M&A is rewarded by higher economic growth after two periods.
Eller/Haiss/Steiner (2005) find that Level-Effects, educational attainment, and the size of capital stock
in the host country are significant for the intensity of the impact of financial sector foreign direct
investment on GDP growth of the host country. Domanski (2005) argues that FSFDI also poses
challenges for bank supervision and the congruence of host and home country regulatory systems,
which add to the overall cost of foreign ownership.

For further clarifying the impact of FSFDI, we suggest the separate assessment of the various
transmission channels (efficiency, volume, signals etc.), an examination of their interaction, and
comparisons across emerging markets to control for region-specific fixed effects. On the
methodological side, we recommend a broadening or robustness checks e.g. by including inflation, market concentration and real sector cross-border trade in the econometric specifications, as well as by applying GMM and Granger causality tests. With due respect to market imperfections, we recommend to include the link between the provision of new products and services by foreign banks such as foreign currency loans into investigations of the credit channel. This might also provide an interesting link to analyzing the efficiency of financial intermediation.

Hartmann/Manganelli/Monnet (2004) recommend focusing on the costs and benefits related to the modernisation of the financial system. Following this strategy, Fink/Haiss/Mantler (2004) look at the influence of the market micro structure and the efficiency of the financial sector on a macro-economic level. They deal with the concepts, the measurement, as well as theoretical and empirical foundations which can contribute to the efficiency/inefficiency of the financial sector and in this way to higher or lower economic growth. For the literature review, the 39 most important journals and 34 working paper series were scanned for papers on this topic. Based on that, recommendations for three types of country groups were worked out. For already industrialised countries one cannot expect policies aiming at an enlargement and increase in efficiency of the financial sector to spur further growth. Opposite conclusions can be drawn for countries which are in a transformation stage: in these countries priority should be placed on policies which increase the efficiency of the financial sector and reduce the concentration in the banking sector. For emerging economies, a policy-mix can be recommended which is aimed at fostering the intermediary function of banks (and, building on Fink/Haiss/Vuksic, 2005, of bond markets) and raising the efficiency of the financial sector.

Compared to the New EU Members and EU Accession Countries in CEE, South-Eastern Europe is a laggard in economic transformation. Fink/Haiss/Ugljesic (2005) as well as Fink/Haiss/von Varendorff (2005) examine the banking sector in South-Eastern Europe and in particular in Serbia, the latter showing a very peculiar economic-political development. They emphasise that an advancement of the banking sector can generally foster economic growth. Also Cottarelli/Dell’Arriccia/Vladkova-Hollar (2005) show that in newly industrialising countries the reasons for different economic growth rates are mainly related to factors which can be assigned to the banking sector and not so much to other fields. For the South-Eastern European countries high investment volumes by foreign banks and loans by foreign banks which flowed into these countries could have acted as a kind of substitute for the growth of the domestic banking sector and in this way could have added to real economic growth (Fink/Haiss/Ugljesic 2005, p. 23). In order for the financial sector to be able to trigger growth incentives, it is necessary, though, that the real sector is efficient (just like in mature market economies) and that the regulatory and political conditions promote growth (Bordo/Rousseau, 2006; La Porta et al, 1998). Compared to the Central and Eastern European countries, the development towards free market economies started later in the South-Eastern European countries. Serbia trails behind the rest of the other countries in this respect. For this reason, political decision-makers are
required to create stable macroeconomic conditions and to introduce efficient regulatory mechanisms. The activities of foreign banks are important, since they have a stabilising effect on the banking sector (Fink/Haiss/Ugljesic 2005, p. 23).

While finance-growth research is scarce in South-Eastern Europe, the insurance sector in general is a similar blind spot: the nexus between the insurance sector and economic growth has hardly been dealt with up to now. As insurance companies are playing an ever more important role in the financial intermediation process, the paper by Haiss/Sümegi (2005) gives an overview of the literature on the ‘insurance-growth nexus’ in order to identify the channels of influence of the insurance sector in interaction with other financial sectors. They highlight that the neglect of the insurance sector may be one of the reasons why the nexus between finance and economic growth cannot be proved anymore and seems to be generally less robust in studies using recent data, e.g. Rousseau/Wachtel (2005). They also mention evasion strategies, such as the shift of risks from the banking to the insurance sector, which seem to be worth studying in the context of liberalisation, European market integration and regulatory dialectic (Kane, 1981).

Fig. 3: The Insurance Sector and Economic Growth (Eurozone, Index: 2000 = 100); 
Source: Haiss/Sümegi (2005)
### Table 4: Overview of the Empirical Studies within the Nexus-Project

<table>
<thead>
<tr>
<th>Study</th>
<th>Method</th>
<th>Countries</th>
<th>Time period</th>
<th>Variables / dependent</th>
<th>Major findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eller/ Haiss/ Steiner (2005)</td>
<td>Cross-country panel regression</td>
<td>CEECs</td>
<td>1996-2003</td>
<td>Real GDP per employee&lt;br&gt;Volume of direct investments in the financial sector&lt;br&gt;Capital stock per employee&lt;br&gt;Human capital stock per employee&lt;br&gt;Public sector consumption</td>
<td>The capital stock per employee and the human capital stock per employee show a positive relationship with economic growth, public sector consumption a negative relationship. Approaching a medium degree of financial M&amp;A is rewarded by higher economic growth after two periods. FSFDI spurs economic growth depending on a higher human capital stock. The crowding-out of local physical capital caused by the entry of foreign banks hampers economic growth.</td>
</tr>
<tr>
<td>Fink/ Haiss/ Hristoforova (2006)</td>
<td>Time series analysis VAR-, VEC-models</td>
<td>USA&lt;br&gt;Japan&lt;br&gt;France&lt;br&gt;Germany&lt;br&gt;Netherlands&lt;br&gt;Italy&lt;br&gt;UK</td>
<td>1957-2001</td>
<td>Real GDP&lt;br&gt;Volume of outstanding bonds&lt;br&gt;Share market capitalisation&lt;br&gt;Domestic private credit volume</td>
<td>Confirmation of the supply leading hypothesis (one or more segments of the financial sector are causal for economic growth) in all countries except Germany. Feedback relationships between loans and economic growth in Japan, between the volume of outstanding shares and economic growth in the Netherlands and Japan.</td>
</tr>
<tr>
<td>Fink/ Haiss/ Vuksic (2005)</td>
<td>Production-function approach</td>
<td>Bulgaria&lt;br&gt;Czech Republic&lt;br&gt;Hungary&lt;br&gt;Slovenia&lt;br&gt;Poland&lt;br&gt;Romania&lt;br&gt;Malta&lt;br&gt;Turkey</td>
<td>1996-2000</td>
<td>Real GDP per capita&lt;br&gt;Real growth of capital stock&lt;br&gt;Labour participation&lt;br&gt;Educational attainment&lt;br&gt;Domestic credit volume&lt;br&gt;Private credits&lt;br&gt;Share market capitalisation&lt;br&gt;Volume of outstanding bonds</td>
<td>The development of the whole financial sector and of the segments ‘domestic credit volume’, and ‘volume of outstanding bonds’ have a positive influence on economic growth. The volume of private credits and share market capitalisation show no significant influence. The real capital stock also has significant impact on economic growth, labour participation and educational attainment do not.</td>
</tr>
<tr>
<td>Fink/ Haiss/ Kirchner/Thorwartl (2005), Fink/ Haiss/ Kirchner (2005)</td>
<td>Time series analysis VAR-models</td>
<td>USA&lt;br&gt;Japan&lt;br&gt;Belgium&lt;br&gt;Denmark&lt;br&gt;Germany&lt;br&gt;Finland&lt;br&gt;France&lt;br&gt;Italy&lt;br&gt;Norway&lt;br&gt;Austria&lt;br&gt;Portugal&lt;br&gt;Sweden&lt;br&gt;Switzerland&lt;br&gt;Spain&lt;br&gt;UK</td>
<td>1994-2003 Quarterly data</td>
<td>Real GDP&lt;br&gt;Net issue volumes of all bond sectors aggregated&lt;br&gt;Net issue volumes of public sector bonds&lt;br&gt;Net issue volumes of corporate bonds&lt;br&gt;Net issue volumes of financial institution bonds</td>
<td>Over the shorter period and when using quarterly data, causalities show the following tendency: Economic growth is causal for net issue volumes of public sector bonds, net issue volumes of corporate and financial institution bonds are causal for economic growth.</td>
</tr>
<tr>
<td>Fink/ Haiss/ Mantler (2005)</td>
<td>Growth accounting specification&lt;br&gt;Strategic and dynamic panel regressions</td>
<td>22 developed market economies, 10 newly industrialising countries</td>
<td>1990-2001</td>
<td>Real GDP per capita&lt;br&gt;Indicator for the development stage of the financial sector comprises: Bank credit volume&lt;br&gt;Share market capitalisation&lt;br&gt;Volume of outstanding bonds</td>
<td>In developed market economies, the financial sector has little influence on economic growth. In newly industrialising countries, however, this influence is strong. The financial sector triggers rather short-term than long-term growth effects.</td>
</tr>
</tbody>
</table>

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11 In some studies the time periods for the different countries show different lengths. In these cases the period given in this summary is the longest respectively.

12 The term „causal“ and „causality“ respectively denote „causality“ in the meaning of Granger causalities; see Granger (1969).
### Study Method Countries Time period Variables / dependent Major findings

**Fink/ Haiss/ Vuksic (2004)**
- **Production function approach**
- **EU 14 (without Luxembourg)**
- **USA**
- **Japan**
- **Norway**
- **Switzerland**
- **Bulgaria**
- **Czech Republic**
- **Slovakia**
- **Hungary**
- **Slovenia**
- **Poland**
- **Romania**
- **Malta**
- **Turkey**
- 1996-2000
- Real GDP per capita
- Real capital stock growth
- Labour participation
- Educational attainment
- Domestic credit volume
- Private credits
- Share market capitalisation
- Volume of outstanding bonds

Bond markets and credit volumes have a positive influence on economic growth in newly industrialising countries. The further the market economies of the countries under review are developed, the more important educational attainment and labour participation become.

**Fink/ Haiss/ Hristoforova (2004)**
- **Time series analysis VAR-, VEC-models**
- **USA**
- **Japan**
- **Germany**
- **Finland**
- **France**
- **Italy**
- **Netherlands**
- **Austria**
- **Portugal**
- **Sweden**
- **Switzerland**
- **Spain**
- **UK**
- 1950-2001
- Real GDP
- Volume of outstanding bonds

Confirmation of the supply leading hypothesis (the development of share markets is causal for economic growth) in the USA, the UK, Switzerland, Germany, Austria, the Netherlands, and Spain. In Japan, Finland, and Italy there are feedback relationships between the bond markets and economic growth.

**Haiss /Marin (2005)**
- **Descriptive-comparative analysis**
- **EU-25**
- **USA**
- **Japan**
- **Bulgaria**
- **Romania**
- **Hungary**
- **Turkey**
- **Hong Kong SAR**
- **Indonesia**
- **South Korea**
- **Malaysia**
- **Philippines**
- **Singapore**
- **Thailand**
- 2003
- Real GDP
- Volume of outstanding bonds (overall, government bonds, financial institution bonds, corporate bonds)
- International bonds
- Credit volume
- Share market capitalisation
- Bank assets
- FDI

Analysis of the possibilities for the development of the bond markets, particularly in small countries. Recommendations for the establishment of bond markets, e.g. through regional bond markets which build on already-existing trade, investment and banking relationships.

### 4 Conclusion

By including explicitly and in great detail the bond markets and foreign direct investments of banks as well as through the implementation of the product function approach in empirical studies, the research done within the framework of the Nexus-Project makes a substantial and novel contribution to the literature dealing with the nexus between the development of the financial sector and real economic growth. For longer time periods, the following conclusions can be drawn for the EU member states (without the New Member States), Japan, Switzerland, and the USA: The „supply leading hypothesis“ is ‘confirmed’ or there are feedback relationships between the development of the financial sector and real economic growth which take the form of long-term equilibria. When restricting the observation to the segment of bond markets and when using a higher data frequency, the significant positive causality between the development of bond markets and economic growth, which was found in a long-term study in many countries, disappears in the 1990s. At the end of the 1990s, significant Granger causalities rather ran from economic growth to public bond issues. The long-term

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13 Causality denotes „Granger causality“ in this context (Granger, 1969).
positive exogenous growth effects of the financial sector seem to be considerably weaker (if they still exist at all) in mature market economies than in emerging markets.

**Box 7: Overview of the Results of the Nexus-Project**

- Efficient Banks are important institutions for growth.
- Foreign direct investment in CEE financial sector helped to stabilize banks and markets.
- Bond markets and bank credit contribute to growth in early stages of development.
- Regional approaches advisable to achieve critical market size of bond markets and stock exchanges.
- Recent reversal in causal links between financial markets and economic growth in developed economies.

The most important transmission channel, through which the financial sector can have a positive influence on economic growth, is an increase in productivity. The results of studies on the influence of different segments of the financial sector on economic growth are heterogeneous and do not allow a clear statement on whether some segments of the financial sector are more important for real economic growth than others. However, the necessity to include the bond sector in future studies seems to be undisputed. In the Central and Eastern European countries a positive relationship between foreign direct investments by banks and economic growth could be shown empirically for the first time. The argument is that, among other things, they contribute to the development of the financial markets and the stability of the financial sector via enhancing productivity and efficiency. Such developments of the market micro structure are also to be considered in future studies. Analysing the impact of bank FDI across a broader range of emerging markets and across a broader set of transmission channels; including the provision of new products like foreign currency loans by foreign banks; extending the methodological setting to interactions with real sector cross-border trade and applying Granger causality tests might enhance the robustness of current findings and provide important guidance for economic policy.

Whereas earlier studies confirm the „finance-growth nexus“, the studies conducted within this project show that this relationship is less robust when using more recent data and depends on the development stage of the country under review. One major difference could be the liberalisation and integration of the financial markets, and the emergence of new institutional types, such as e.g. hedge funds, and more recent finance techniques, such as securitisation, which has taken place in the meantime. The appearance of new influential players in the financial markets and new financial techniques obviously also changes the channels which lead to the financing of economic development.
In order to capture these developments, more research is necessary. When considering the results of the studies at hand, it is therefore recommended to include all financial sectors and also to consider the mutual influence of liberalisation, regulation, market integration, and intermediation.

5 List of References


Annex

Annex 1: Project team

The research project „The Nexus between the Financial and the Real Sector“ was headed by Peter Haiss who lectures at the Vienna University of Economics and Business Administration and also is with the department for Corporate and Public Finance Austria of Bank Austria Creditanstalt, where he is also responsible for Basel II. The quality control of the project was with Gerhard Fink, Jean Monnet Professor at the EuropeInstitute und head of the doctoral programme of the Vienna University of Economics and Business Administration.

The other members of the project team, who contributed to the realisation of the project through constructive cooperation, engagement and many interesting and important contributions, are: Johannes Bolzano, David Blum, Markus Eller, Klaus Federmair, Bettina Hagmayr, Sirma Hristoforova, Dagmar Inzinger, Herwig Kirchner, Hans-Christian Mantler, Stefan Marin, Sindhu Olimalayil, Andreas Pichler, Milena Staeva, Katharina Steiner, Kjell Sümegi, Ulrike Moser, Mina von Varendorff-Ugljesic, Nastja Vogl, Goran Vukšić and Jennifer Weichselbraun. Elisabeth Beer and Roman Puff supported the team in such areas as editing, administration and the Nexus-webpage.

Annex 2: List of presentations of papers within the Nexus-Project

Presentations of papers during the project period 2001-2005


Fink, G., Haiss, P., Vuksic, G., Importance of Financial Sectors for Growth in Accession Countries, paper presented at the 18th Annual Australasian Finance and Banking Conference (AFBC), Sydney, Australia, Dec. 2005

Fink, G., Haiss, P., Kirchner, H., Thorwartl, U., Financing Through Bond Issues and the Nexus with Economic Growth, paper presented at the 18th Annual Australasian Finance and Banking Conference (AFBC), Sydney, Australia, Dec. 2005

Haiss, P., Marin, S., Asia and Eastern Europe: the Role of Developed Bond Markets to Support Stability and Growth, paper presented at the 18th Annual Australasian Finance and Banking Conference (AFBC), Sydney, Australia, Dec. 2005


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14 The list is in chronological order, starting with the most recently held presentation.


Follow-up presentations of papers by the Nexus team in 2006


**Invitations to members of the Nexus team to participate in conferences**


VI. Central European Conference on “The Role of the State: Reformed or Deformed”, Rajk László College for Advanced Studies, Budapest, April 3-9, 2006, [http://cec.co.hu](http://cec.co.hu)


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15 For the participation in these conferences no funds from the OeNB-Project No. 8868 were used.
Annex 3: Publications within the Nexus-Project


All studies published as Working Papers of the EuropeInstitute of the Vienna University of Economics and Business Administration can be downloaded from the Nexus-Homepage, abstracts are available for the remaining papers, http://fgr.wu-wien.ac.at/institut/ef/nexus.html.


Papers in progress in the Nexus team


EI Working Papers

18. Fritz Breuss, Austria's Approach towards the European Union, April 1996.
19. Gabriele Tondl, Neue Impulse für die österreichische Regionalpolitik durch die EU-Strukturfonds, Mai 1996.
23. Katrin Forgó, Differenzierte Integration, November 1996.
29 Fritz Breuss, Sustainability of the Fiscal Criteria in Stage III of the EMU, August 1998.
30 Gabriele Tondl, What determined the uneven growth of Europe’s Southern regions? An empirical study with panel data, März 1999.
31 Gerhard Fink, New Protectionism in Central Europe - Exchange Rate Adjustment, Customs Tariffs and Non-Tariff Measures, Mai 1999.
33 Fritz Breuss, Costs and Benefits of EU Enlargement in Model Simulations, Juni 1999.
34 Gerhard Fink, Peter R. Haiss, Central European Financial Markets from an EU Perspective. Theoretical aspects and statistical analyses, August 1999.
35 Fritz Breuss, Mikulas Luptacik, Bernhard Mahlberg, How far away are the CEECs from the EU economic standards? A Data Envelopement Analysis of the economic performance of the CEECs, Oktober 2000.
40 Harald Badinger, Growth Effects of Economic Integration – The Case of the EU Member States, Dezember 2001.
42 Harald Badinger, Gabriele Tondl, Trade, Human Capital and Innovation: The Engines of European Regional Growth in the 1990s, Januar 2002.


49 Gerhard Fink, Peter Haiss, Sirma Hristoforova, Bonds Market and Economic Growth, April 2003.


51 Gabriele Tondl, Goran Vuksic, What makes regions in Eastern Europe catching up? The role of foreign investment, human resources and geography, May 2003.

52 Fritz Breuss, Balassa-Samuelson Effects in the CEEC: Are they Obstacles for Joining the EMU?, May 2003.


55 Harald Badinger, Do we really know that the EU’s Single Market Programme has fostered competition? Testing for a decrease in markup ratios in EU industries, February 2004.


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59 Gabriele Tondl, EU Regional Policy. Experiences and Future Concerns, July 2004.

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65 Fritz Breuss, Austria, Finland and Sweden after 10 Years in the EU: Expected and Achieved Integration Effects, March 2005.
68 Gerhard Fink, Peter Haiss, Herwig Kirchner, Ulrike Thorwartl: Financing through Bond Issues and the Nexus with Economic Growth, September 2005
69 Markus Eller, Peter Haiss, Katharina Steiner, Foreign Direct Investment in the Financial Sector: The Engine of Growth for Central and Eastern Europe?, December 2005
70 Gerhard Fink, Peter Haiss, Sirma Hristoforova, Credit, Bonds, Stocks and Growth in Seven Large Economies, January 2006
72 Michaela Seifert: Die Durchführung des Gemeinschaftsrechts durch die Europäische Kommission als Teil europäischer “Gesetzgebungstätigkeit” – aktuelle Rechtslage und Modell der Europäischen Verfassung, Juli 2006
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