The cross-country importance of global sentiments –evidence for smaller EU countries

by

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Abstract

This paper examines the importance of the economic sentiments of some macroeconomic key variables in Estonia, Slovenia and Latvia. We analyze the importance of domestic as well as foreign sentiments with respect to these economies against the background of their accession to the European Monetary Union. For this purpose, we develop and apply a framework which is based on a restricted autoregressive model. We focus on two issues: firstly, we investigate the relationship between domestic stock prices, income and sentiments; and, secondly, we take external effects stemming from EMU and US share prices and sentiments into account. Our results show that European sentiments are important for income and domestic sentiments. Furthermore, we are able to establish linkages between global share prices and domestic income. From a more general perspective, we find a significant positive influence stemming from (domestic) share prices on sentiments in Estonia and Latvia, and also find evidence for an inverse relationship in Latvia.

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1 Introduction

Contrary to expectations, the role of market moods or market sentiments has played a minor role in macroeconomics for a long time. The discrepancy, of course, has been partly due to the non-availability of adequate data for empirical research. In the recent past, the question of whether market sentiments, asset prices and economic activity are linked has been controversial (Baker and Wurgler, 2006, 2007; Brown and Cliff, 2005). In most studies, a bilateral link between sentiment indicators and asset prices or economic activity has been scrutinized. In so doing, the literature identifies two different links between economic sentiment indicators and economic variables. First, there is some evidence from the USA that sentiment indicators are able to predict household spending (Carroll, Fuhrer and Wilcox, 1994; Bram and Ludvigson, 1998, Howrey, 2001) and economic growth (Matsusaka and Sbordone, 1995; Howrey, 2001) with a positive correlation.[1]

The second link stems from the fact that market sentiments also have the potential to have an impact on stock prices. Various studies indeed provide evidence that confidence indicators have some predictive power with respect to asset prices (Fisher and Statman, 2003; Schmeling, 2009).[2] The underlying channels of influence are not well established, however. An explanation for the link to household spending and growth is that sentiments reflect expectations, which are translated into decisions on expenditure and investment. Speaking broadly, sentiments represent a belief about future cash flows and investment risks and can therefore influence expenditure and stock prices. A relationship between stock prices and sentiments might also arise through wealth effects or because stock prices serve as an indicator of future economic activity and potential labour income growth (Otoo, 1999).

Further research seems necessary to gain further insights into the role of sentiments and their overall significance. In particular, the cross-country importance of sentiment indicators has

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[1] However, Lemmon and Portniaguina (2006) find weak predictive power of consumer confidence indices on economic growth with a negative correlation. They explain this negative relationship by a precautionary savings motive.

[2] Various studies indeed provide evidence that consumer confidence has some predictive power with respect to asset prices, at least on a disaggregated level (Fisher and Statman, 2003; Schmeling, 2009). Lemmon and Portniaguina (2006) show for the USA that interdependencies between consumer confidence, stock returns (of small stocks) and macroeconomic activity started to prevail in 1977.

rarely been considered in this context, neither empirically nor theoretically. Most studies have up to now only tested for the effect of domestic sentiments. However, *foreign* sentiments have the potential to impact on domestic market returns as well, which is a relevant issue with respect to the evaluation of contagion effects.

This issue is of particular importance in the context of financial integration. Because of the potential for the absorption of asymmetric shocks, a key issue in a monetary union is the deep integration of domestic capital markets among member countries (McKinnon, 1963). This is particularly true when we look at the European Union and the tensions related to the government debt problems of some member countries. Financial market integration may also reinforce trade effects and should increase the synchronicity of business cycles between economies. For the CEEC economy, however, the empirical evidence concerning this is mixed.[3] Needless to say, the convergence of monetary policies is of central interest in the integration process in the run-up to joining a monetary union (Fratzscher, 2001). The degree of integration can be measured, for example, in terms of bond yield co-movements. For several CEEC countries, a time-varying degree of integration into the European Monetary Union can be observed (Gabrisch and Orlowski, 2010). In general, empirical evidence of a deeper integration of both equity and bond markets has been delivered for the euro area (Baele and Ferrando, 2005; Beakaert; Hodrick and Zhang, 2008).

With the ongoing integration of some accession countries into global markets, there is not only enhanced risk sharing in consumption, but the price developments on domestic, formerly closed, markets might also become ever more dependent on global influences. Hence, developments on the global market that are not related to fundamentals will also have an impact on domestic asset prices. For this reason, spillover effects from abroad gain importance. Such effects can stem from portfolio adjustments due to the holding of domestic shares by international investors, or because domestic agents need to rebalance their portfolios owing to price developments in foreign assets. In addition, through stronger links to the global economy, global sentiments might be increasingly important in transition economies such as the CEECs in the case of financial and real integration.

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[3] According to recent calculations by Darvas (2010), the positive impact of EU enlargement on growth is about 0.3-0.4 percent per year in 10 CEEC economies.

In the context of this paper, the direct contagion effect is the influence of foreign sentiments on domestic asset returns and income, while the indirect effect generally occurs when foreign sentiments impact on domestic sentiments, which for their turn influence the domestic economy. A direct relationship can, for example, occur when foreign investors engaged in the domestic capital market redistribute their portfolios when their perception as directed to one market changes, or in the case of direct trade linkages. An indirect effect stems from the possibility that domestic market participants might adjust their portfolios when faced with changes in foreign sentiments. If they realize that the economic situation abroad is changing, and if they are aware that their own country is linked to the foreign economy, for example via trade flows, they may also revise their expectations regarding the future of the domestic economy.

Typically, the sentiments of the market participants of a country's major trading partners should be particularly important. A simultaneous effect arises when such trading partners report their current perceptions or when domestic market participants extrapolate the economic situation from media reports about the foreign economic situation. With an eye on the outlined arguments, we may say that domestic sentiments might be affected by foreign sentiments.

2 Literature overview and outline of this study

When looking at various kinds of sentiment indicators, we see that the terms `consumer sentiment` and `investor sentiment` are sometimes used interchangeably; but they are not necessarily the same (Fisher and Statman, 2000). Indices of consumer confidence or consumer sentiment are collected in order to evaluate the economic situations of households. Investor sentiment indicators relate to professional investors and can also be collected through surveys. The indicator developed by Brown and Cliff (2005), for example, draws on the number of newsletters from which information about market performance is extracted. The sentiments of professional investors seem to be heavily influenced by information coverage in press articles (Doms and Morin, 2004).[4] The empirical record altogether suggests that

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[4] An alternative technique is to extract a sentiment indicator from observable variables which are subject to sentiments. With such a construction it can be shown that the cross section of returns and investor sentiments are related (Baker and Wurgler, 2006, 2007).

consumer confidence indicators, and the broader economic confidence indicators which also include investor sentiments, share similar dynamics with respect to stock prices (Fisher and Statman, 2000; Brown and Cliff, 2005; Schmeling, 2009). As described in the next section, the present study applies the broader economic sentiment indicators, which relate to consumer as well as investor sentiments.

Turning to the empirical evidence, only a small number of studies have dealt with the importance of sentiment indicators in the context of financial integration. From a cross-sectional perspective, Schmeling (2009) reports that countries with less integrated markets show signs of a stronger relationship between consumer confidence and stock prices.[5] Jansen and Nahuis (2003, 2004) investigate European countries between 1986 and 2001 but exclude the CEECs from their analysis. They use the consumer confidence indices published by the European Commission for a couple of European countries (before the EU enlargement) and find that stock prices tend to Granger cause consumer confidence. Their results suggest that stock prices are positively affected by sentiments in the short run, and negatively in the long run. An explanation for this dynamic might be that in the short run equity prices are driven by moods in the market, i.e. optimism, which lets the market value deviate from the fundamental value. In the long run, this kind of mispricing is removed, resulting in negative relationships (Brown and Cliff, 2005).[6]

Beckmann, Belke and Kühl (2011) examine the importance of various sentiment indicators in four central and eastern European countries (CEECs), namely Poland, Hungary, Slovakia and the Czech Republic, during the transition process. They analyze the importance of economic confidence with respect to CEEC financial markets as well as the relationship between global factors, domestic income and share prices. Applying a restricted cointegrating VAR (CVAR) framework, they distinguish between long-run and short-run dynamics and provide evidence that domestic as well as global sentiments play an important role in the CEEC economies in this context. An interesting and natural question therefore is whether the importance of global

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[5] In addition, he relates the argument to cultural issues.

[6] Burdekin and Redfern (2009) examine the importance of sentiment effects on asset allocation decisions and share prices and savings deposits in mainland China and beyond.

and domestic sentiments can be observed in other CEEC economies, at the cost of applying a shorter span of data.

The aim of this contribution, therefore, is to put the role of both domestic and global economic confidence in further CEEC countries under closer scrutiny. An analysis of this kind is important for several reasons. Firstly, most of the present literature has focused on the G-10 countries when analyzing the role of sentiments. However, to draw clear-cut and broad-based conclusions on the importance of sentiments, it is necessary to include transition economies and emerging markets as well. An interesting question, for example, is whether the relationship between stock prices and domestic sentiments continues to hold in countries with comparably small financial markets. Furthermore, the dependence of CEEC economies on global sentiments and stock prices is also an important issue. The recent crisis has clearly shown the importance of determining the degree to which moods influence domestic financial market performance as well as domestic economies. We will come back to the impact of the recent crisis in Section 3. In general, we are interested in effects stemming from domestic and foreign sentiments. We try to explain to what extent domestic effects have their roots in foreign influences, in the sense that domestic sentiments depend on foreign sentiments. Accordingly, we feel legitimized in differentiating between a direct and an indirect sentiment effect.

We consider three countries in our analysis: Slovenia, Latvia and Estonia. The reason for this choice is that, although all of them are European Transition Economies, their individual degree of integration into the European Monetary Union is different. Slovenia introduced the euro in 2007 and the two Baltic states Latvia and Estonia were originally on the point of following in 2010. However, owing to economic turbulence in the eye of the financial crisis, which had a different impact on each of the three economies, the date of introduction has been shifted. Estonia introduced the currency in 2011, while Latvia is likely to have to wait until 2014. Consequently, a comparison between these countries allows us to draw interesting policy conclusions.

On a national level, we test whether domestic economic confidence has an impact on the financial markets of CEECs, or whether the causality is the other way round. We also evaluate whether foreign sentiments can be used to assess the vulnerability of the domestic financial market with regard to the engagement of global investors. We also look at contagion

effects stemming from global share prices. However, a long-run analysis cannot be applied to the countries under consideration, because of the span of the available data. Furthermore, the analysis we carry out does not account for the financial crisis. Although the period since the beginning of the crisis is clearly important, an adequate analysis based on available data is not possible at this point in time. However, in Section 3 we do put our results in context to the impact of the crisis.

In order to test for these "causalities", we employ a macroeconomic approach based on the CAPM and the Fama-French Model. Taking this framework as a starting point, we apply a structural analysis framework which builds upon a restricted vector autoregressive model. The analysis relies on a macroeconomic model which we derive in Chapter 2, where we also give a short literature overview with respect to sentiment indicators. Chapter 3 characterizes the economy and the financial markets in the CEECs in general, with a special eye on Latvia, Estonia and Slovenia. In addition, the consequences of the crisis for Emerging Europe and the three countries are also considered. This enables us to explain the results with regard to the developments in those countries. In Chapter 4 we describe the empirical framework, which relies on a seemingly unrelated regression, and analyze our results with an eye on the characterization of the economies carried out in Section 3. Chapter 5 concludes by summarizing the results and deriving some major policy implications.

3 Economic Methodology

3.1 Interdependencies between sentiments and macroeconomic variables

Taking the arguments we provided above, we model the sentiments. We relate domestic sentiments (sent) to domestic share prices (sp) because of their leading indicator function and possible wealth effects. In addition, we include domestic real income (y) as an explanatory variable for the domestic sentiments. The reason for this we also discussed above. An increase in real income allows the household to feel wealthier and should therefore be translated into a rise in sentiments. Besides these domestic determinants we also explain domestic sentiments with the help of foreign factors. If domestic households are engaged in the global capital market, there should be a feedback effect from developments in both foreign sentiments (sent^f) and foreign share prices (sp^f). Foreign sentiments may influence domestic ones by virtue of trade linkages. A boost in income abroad leads to an increase in foreign sentiments and in foreign imports, which are domestic exports. When we know the trade linkages, we can

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see that the sentiments of domestic households depend on foreign sentiments. It should be noted that we see this channel more as an indirect one, i.e. knowledge of trade linkages is important. When domestic agents also hold foreign shares their price changes should affect domestic sentiments. Consequently, domestic sentiments can be explained as follows:

$$sent = \mu^{sent} + {\theta_2}^{sent} sp + {\theta_3}^{sent} y + {\theta_6}^{sent} sent^f + {\theta_7}^{sent} sp^f. \tag{1}$$

3.2 The impact of economic confidence on stock prices

The formulation of a behavioural equation for domestic share prices is not very easy to achieve because a generalized model with good empirical features is missing. In order to explain asset prices in an international environment one can make use of the international asset pricing theory (IAPM) developed by Solnik (1974). The IAPM explains the expected (real) return of the domestic market portfolio by the risk-free (world) interest rate, the market risk premium, which is equal to the difference between the expected world portfolio return and the risk-free world interest rate, and risk premia on all currencies with which the country is trading. In order to work with a tractable model for the empirical analysis we simplify this model significantly and construct a factor model.

Because we are working with the nominal market return (sp), we include the domestic rate of inflation into our behavioural equation for the equity return. A key variable in the IAPM is the risk-free rate. Usually, money market rates may be used as a proxy. However, they are predominantly based upon inter-banking rates, which are not available in a reasonable quality for our countries. For this reason, we take the long-run yields of government bonds (i). In the period we investigate all government bonds have investment grade rating which neglects country risk. Even if there is sovereign risk, we can check for it using the yields of sovereign bonds. For reasons already discussed, a further obvious candidate in explaining the returns of domestic share prices is the national real income. We also explain the returns of domestic share prices by way of domestic sentiments. Besides the domestic factors we further include foreign factors. Owing to contagion effects, it is possible for foreign shares to have an impact on domestic share prices. This is particularly true with any ongoing integration into globally integrated markets. Consequently, we include both foreign share prices and foreign sentiments into the behavioural equation of share prices. The corresponding model representation is

$$sp = \mu^{sp} + {\theta_1}^{sp}\pi + {\theta_3}^{sp}y + {\theta_4}^{sp}sent + {\theta_5}^{sp}i + {\theta_7}^{sp}sent^f + {\theta_8}^{sp}sp^f. \qquad (2)$$

3.3 Structure of the macroeconomy

After having specified the behavioural equations of our determinants of main interest, we proceed with the specification of the rest of the economy. We explicitly model the rest of the macroeconomy because we intend to catch the effects we are interested in in a joint modelling framework. Although not all the behavioural equations are derived from a closed form model, we believe that our approach provides an approximation to such a model.

In a similar fashion to in a Phillips curve, we relate the rate of inflation to real income. In addition, we include the return of share prices in the behavioural equation of the rate of inflation. The reason is simply that increases in share prices can contribute to inflation dynamics because of wealth effects via consumption. Hence, we have for the rate of inflation:

$$\pi = \mu^{\pi} + {\theta_2}^{\pi}sp + {\theta_3}^{\pi}y \qquad (3)$$

As explained above, we make use of the long-run yields of government bonds. In order to control for the expectation of inflation we put the rate of inflation into the corresponding behavioural equation. Furthermore, a rise in real income due to a side effect of demand will increase the interest rate. For this reason we also include real income. Against the background of substitution effects it is possible that stock prices may also affect domestic interest rates. Consequently, the behavioural equation of the interest rate equation arises as:

$$i = \mu^{i} + {\theta_1}^{i}\pi + {\theta_2}^{i}sp + {\theta_3}^{i}Y . \qquad (4)$$

The final domestic variable we model is real income. In so doing, we explain domestic real income with the help of domestic share prices via a wealth effect. A similar argument can be applied for using the domestic sentiment indicator. Besides the domestic variables we also include foreign sentiments and foreign stock prices:

$$y = \mu^{Y} + {\theta_2}^{Y}sp + {\theta_4}^{Y}sent + {\theta_6}^{Y}sent^f + {\theta_7}^{Y}sp^f \qquad (5)$$

Both sentiments and stock prices can act as leading indicators. For sentiments and stock prices, we also draw on foreign variables because stock prices can affect income, for example via a wealth effect. Foreign sentiments also have an impact on domestic income because of

their leading indicator property abroad. If they are able to forecast foreign consumption, they should also have the potential to predict domestic income via an export channel.

4 Characteristics of (CEEC) financial markets and economies before and during the crisis

4.1 Development and characteristics of (CEEC) financial markets and economies

The central and eastern European countries (CEECs) have made considerable progress toward financial integration with the European Monetary Union during their transition process. One criterion for an accession to the EU is the need to lift all capital controls: the removal of restrictions on capital flows, the establishment of adequate governance structures and the creation of ownership rights accompanied by an increasing engagement of foreign investors in the real economy as well as in the banking sector. As a result, market capitalization and daily trading volumes increased significantly during the transition (Caporale and Spagnolo; 2010). GDP growth had resumed by the mid-1990s and further accelerated in many CEECs after the beginning of the millennium. The annual real growth rates for some economies of Emerging Europe are displayed in Table 1.

The rapid development of the financial sector played a key role in this context, as it allowed the import of large amounts of capital to finance economic growth and a convergence process. As a relatively large proportion of those capital flows were FDI flows, they were considered by domestic authorities to be less volatile and more beneficial. Nevertheless, they resulted in large external imbalances, as many CEECs ran current account deficits of more than 10% between 2006 and 2008. The exact numbers are displayed in Table 2. Although most countries took measures like reserve requirements and prudential and administrative measures in order to rein in credit growth, they at best succeeded temporarily in controlling credit growth financed by capital flows (ECB, 2010). Overall, the financial sectors in the CEECs are still of small size - both in absolute terms and relative to GDP - and exhibit low liquidity compared with Western European exchanges. Stock exchanges in Poland, the Czech Republic and Hungary have the best-developed markets, while those of the three countries under observation in this study are of small size even among the CEECs (Köke and Schröder, 2001).

As outlined in Chapter 2, an effect stemming from global sentiments might also be due to trade effects. It is therefore interesting to take a closer look at the main trading partners of the

countries under observation. They are displayed in Table 2 in terms of export shares between 2000 and 2009. Interesting is that Slovenia is heavily linked to industrial countries in Central Europe while, for geographical and cultural reasons, the most important trade partners of Estonia are the Scandinavian economies of Sweden and Finland, as well as that of Russia.[7] Compared with Estonia, Latvia is more closely connected to the major central European economies, with Germany as a main trading partner, while no important links to Scandinavian countries occur. Altogether, Slovenia and Latvia have stronger trade ties to members of the European Monetary Union, compared with Estonia.[8] In all countries, export shares to the United States are not higher than 5% in each year. Hence, Latvia and Estonia are more closely linked to Russia, compared with the US, in terms of exports. Nevertheless, we decided to stick with the US sentiments in our investigation, as the subprime-crisis has clearly demonstrated the important role of the US economy for the rest of the world. The impacts of the crisis are described in the next section. Table 3 additionally displays the overall exports relative to GDP. Obviously, Estonia has the highest export-to-GDP ratio out of the three economies.

With respect to the countries considered in this paper, it is also worth mentioning that the Baltic states were confronted with more adverse initial conditions, as compared to the central European transition countries. They were also among the first transition countries to take massive steps toward a mobilization of domestic and foreign savings for productive purposes. Successive banking crisis in all Baltic states turned the Baltic banks into more prudent lenders (Adahl and Barisitz, 2002). Latvia went through a boom before and after the EU accession in 2004. The growth of GDP exceeded 6% in each year from 2000 to 2007 and went beyond 10% from 2005 to 2007. The main cause of the boom was a very high domestic credit growth, which exceeded 50% between 2006 and 2007 and resulted in high consumption and investment. Capital inflows increasingly took the form of bank flows from foreign banks to their domestic subsidiaries as the foreign ownership of banks increased to 60%. As a result, Latvia was increasingly exposed to foreign shocks (Blanchard, Das and Faruqee, 2010).

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[7] In general, Estonia has experienced a quick reorientation of trade flows to Europe, in particular to Scandinavia, during the nineties (Fainštein and Netšunajev, 2010).

Estonia was the leading reformer of the Baltic States. The earliest reforms that were carried out during the mid-nineties included privatization to strategic investors and effective bankruptcy rules (Adahl and Barisitz, 2002). Estonia also experienced very high growth from 2000 up to 2007. The rate increased after EU accession in 2004 and was nearly 7% in 2008. In a similar way to other European emerging economies, capital inflows increased significantly during this period, with foreign-owned banks entering as lenders to the public. The Central Bank increased capital and reserve requirements, with the latter amounting to 15% of the liabilities, in order to establish a financial cushion in case of crisis. An important feature of Estonian financial markets is the remarkable role of Scandinavian financial institutions and investors (IMF, 2009). As outlined above, the same is true with respect to the main trading partners.

Slovenia joined the EU in 2004 and replaced its currency, the tolar, with the euro in January 2007. After a short period of minor turbulence, the euro turned out to be beneficial for the economy (Weyerstrass and Neck, 2008).[9] Prior to the crisis, Slovenia had enjoyed the highest GDP per capital of the new member states in the European Union. The economy of Slovenia in general is highly dependent on foreign trade, with Western European countries being the main trading partners. Compared with other emerging European countries, Slovakia has, however, attached comparable small flows of FDI with might be attributed to comparable high tax rates.

4.2 Emerging Europe and the consequences of the crisis

Central and eastern European countries (CEECs) have been affected by the recent crisis through real and financial channels. On the real side, a sharp decrease in exports and a decline in domestic demand have occurred. On the financial side, direct effects stemming from exposure to subprime-related assets have not been the main source, while indirect and second-round effects, most notably capital and banking flows, clearly can be identified as the most important transmission channels (ECB, 2010).[10]

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[9] According to simulations carried out by Weyerstrass and Neck (2008), the euro resulted in higher real GDP growth, a higher GDP level, more employment, lower inflation and improved public finances.

All emerging markets have been affected by the financial crisis but the impact differed significantly within regions. After the spread of the crisis in 2008 it first seemed as if many emerging markets had decoupled, in the sense that they were less affected by the crisis. The average growth rates, for example, remained much higher in emerging countries, compared with advanced economies (Blanchard, Das and Faruqee; 2010). As mentioned above, this was mostly due to the fact that most emerging markets had only negligible exposure to toxic assets. However, the collapse of Lehman Brothers in September 2008 marked a turning point, as the real sector and the financial sector in the CEECs and other emerging economies increasingly suffered from the worldwide downswing and uncertainty in the financial markets.

Remarkable differences with respect to the impact of the crisis can be observed between Emerging Europe and other emerging markets but also between the CEEC economies. Countries in Central and Eastern Europe tend to be hit less seriously than the Baltic or south-eastern European economies (ECB, 2010). There are various reasons for the differing impact on the crisis, with the institutional arrangements of financial markets playing a key role in this context. During the first period, healthier banking sectors and a deeper financial integration compared with other emerging market regions in Asia and Latin America in particular helped most countries in Emerging Europe to limit the decline in cross-border loans (Herrmann and Mihaljek, 2010).[11] Up to the third quarter of 2008, the crisis had a visible impact only on some of the Baltic states.

The case of Latvia is of particular interest in this context, for two reasons: the developments preceded the worldwide crisis; and arguably no country suffered more from the crisis in terms of output. House prices in Riga increased by 385% from 2005 to 2007 and then began to decline early in 2007. Output growth decreased in 2007 and turned out to be negative in the first three quarters of 2008. Output even fell at an annual rate of 18% in the fourth quarter of 2008, at a rate of 38% in the first quarter of 2009, and declined by 18% in 2009 (Blanchard, Das and Faruqee; 2010). In December 2008, the IMF agreed to support Latvia with a lending agreement of around 1500 million special drawing rights, from which nearly 900 million were

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[11] Herrmann and Mihaljek (2010) apply a gravity model of financial flows to identify the nature of spillover effects in cross-border lending as well as specific transmission channels.

drawn. In comparison, Estonia first remained relatively resilient to the crisis. This was due to the capital and reserve requirements established by the Central Bank prior to the crisis. Another factor stemmed from the fact that Scandinavian banks were already the dominant lenders when the global crisis started, which may have resulted in a controlled slowdown of the economy. However, GDP started to fall in the third quarter of 2008, with a decreasing growth rate of 3%. In 2009, Estonia was one of the worst performing economies worldwide in terms of GDP, which decreased by 14%. The main reasons for this development were a decline in foreign trade and a slump in investment and consumption (IMF, 2009). By the end of 2010 the Estonian economy had recovered significantly and the country became the 17th member of the Eurozone in January 2011.

Compared with Estonia and Latvia, Slovenia suffered much less from the crisis, although it experienced the largest contraction within the Eurozone in 2009. The real economy and the financial sector weathered the initial stage of the crisis comparably well. Banks remained liquid and the level of non-performing loans remained relatively low. With the beginning of 2009, funding markets, especially for long maturities, dried up, credit growth declined and the exports of the country declined significantly owing to the global downswing. Slovenia experienced a mild economic recovery in 2010, with real GDP growth estimated to have risen by around 1%. The currency board arrangements of Estonia and Latvia have turned out to be problematic during the crisis, as countries like Slovakia and Slovenia, which had already introduced the Euro, have been less affected.[12] According to the ECB, the length and depth of the economic downturn in the CEECs depends on domestic and global factors. The magnitude of non-performing loans, the resumption of lending activity, and labour market developments are important on the domestic side, while the global economic prospects and the availability of foreign capital also play a crucial role (ECB, 2010).

Economic sentiments obviously played an important part during the recent crisis, as financial stability has, without any doubt, become a global phenomenon, with global factors becoming increasingly important. The engagement of cross-border institutional investors is increasing,

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[12] No clear pattern arises for the third group of European countries with floating exchange rates, which includes Poland, Hungary and the Czech Republic.

which indicates that their sentiments are also becoming more important. Foreign sentiments, for example, are gaining in importance, considering the substantial FDI flows to the CEEC economies. These flows, however, were not fully covering the current account deficits of those economies during the recent crisis. This resulted in an increase in short-term external debt. As a consequence, the ratio of short-term external debt to foreign exchange reserves increased as the crisis emerged and CEECs became more vulnerable to changes in foreign investor sentiments (ECB, 2010). From a more general point of view, the most important transmission channel with respect to capital flows during the recent crisis have stemmed from a reassessment of global risk and expected market volatilities. Advanced economies mainly adjust cross-border bank loans to emerging markets because of the response to their own exposure in the primary crisis country (common lender effect) or as a result of expected global financial market volatility (wake-up call) and in (Herrmann / Mihaljek, 2010). Foreign sentiments are of particular importance for the latter, with a decline in economic confidence probably resulting in capital outflows. A decline in domestic economic sentiments might also be partly responsible for the decline in domestic consumption and investment after the acceleration of the crisis. Nevertheless, the spread of the crisis stems from the global economy, with global sentiments playing the major role.

5. Empirical analysis

5.1 Data

Let us now turn to our choice of data. As a proxy for economic confidence we employ the Economic Sentiment Indicator (ESI), as published by the European Commission for Estonia and Latvia. This indicator is based on harmonized surveys from across the countries of the European Union (EU). The economic sentiment indicator consists of surveys addressed to representatives of the industry sector (manufacturing) and services, retail trade, construction sectors and consumers, while the consumer sentiment indicator relates only to consumers. For Slovenia we use the domestic business sentiment indicator, as the ESI is not available over the full sample we consider. When talking about EMU sentiments, we also refer to the ESI for the corresponding economies of the EU that have introduced the euro.

In addition to the EMU sentiment indicator, we would like to catch global effects. For this reason we use a sentiment indicator from the USA as a proxy for worldwide sentiments. We do this because some relevant developments begin in the USA as the world's leading economy. Here, we have the choice between two important sentiment indices that are commonly used in scientific research: the Michigan Consumer Confidence Index (MCCI) and the Conference Board Consumer Confidence Index (CBCCI). Although they may appear alike, they are nevertheless quite different because the MCCI focuses on long-term considerations and long-term expectations, while the CBCCI primarily highlights the current situation (Bram and Ludvigson, 1998; Ludvigson, 2004). In economic performance regarding forecasting power with respect to expenditure they behave similarly. However, it is known from the literature that the CBCCI is slightly superior in forecasting. As a consequence, we use the CBCCI as the economic confidence indicator for the United States.[13]

All remaining data have been taken from the OECD and international financial statistics. We proxy real income (y) with the production index, as provided by the IMF. We employ the leading composite indices of each country as provided by the IMF as a proxy for share prices (sp). For interest rates, we use government bond yields as a measure. In addition, we use the consumer price index to reflect price developments and to calculate the rate of inflation (π). On the whole, we are able to estimate an array of three models based on monthly data and a sample period starting in January 2000 and ending in July 2008.

5.2 Framework for the structural analysis

We now apply a structural analysis framework which builds upon a restricted autoregressive model. The intention of this analysis is to gain further insights into causalities between variables. In particular, we are interested in the role of US and European sentiments for the transition economies. We first use differences to achieve stationary variables. Basically, our analysis refers to the following model:

$$\Delta X_t = \Theta \Delta X_{t-1} + \mu + \varepsilon_t. \tag{6}$$

The restricted coefficient matrix θ introduces the structure outlined in Equations 1 to 5, as described in Section 2, by restricting the lags of the corresponding variables in the VAR to

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[13] Beckmann, Belke and Kühl (2010) additionally use the MCCI as a proxy for consumer confidence.

zero. By treating basically all variables as endogenous we still stick to the structure of the economy established in Chapter 3. The matrix θ can then be written as:

$$\Theta = \begin{pmatrix} 0 & \theta_2^{sent} & \theta_3^{sent} & \theta_4^{sent} & 0 & \theta_6^{sent} & \theta_7^{sent} & \theta_8^{sent} & \theta_9^{sent} \\ \theta_1^{sp} & \theta_2^{sp} & \theta_3^{sp} & \theta_4^{sp} & \theta_5^{sp} & \theta_6^{sp} & \theta_7^{sp} & \theta_8^{sp} & \theta_9^{sp} \\ \theta_1^{y} & \theta_2^{y} & \theta_3^{y} & \theta_4^{y} & 0 & \theta_6^{y} & \theta_7^{y} & \theta_8^{y} & \theta_9^{y} \\ \theta_1^{\pi} & \theta_2^{\pi} & \theta_3^{\pi} & 0 & 0 & 0 & 0 & 0 & 0 \\ \theta_1^{i} & \theta_2^{i} & \theta_3^{i} & 0 & \theta_5^{i} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \theta_6^{sentUS} & \theta_7^{sentUS} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \theta_6^{sentEMU} & \theta_7^{sentEMU} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \theta_8^{spUS} & \theta_9^{spUS} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \theta_8^{spEMU} & \theta_9^{spEMU} \end{pmatrix} \qquad (7)$$

Compared with the equations in Section 3, we include two more θ coefficients, as we distinguish between Europe and the United States with respect to foreign sentiments and stock prices. We allow for correlated error processes to preserve endogeneity. Consequently, the errors ε_t are normally distributed with zero mean and a variance-covariance matrix of $\sigma^2 \Omega$, which captures the correlation structure. Thus, we employ a VAR structure with restricted coefficients, which we estimate with a seemingly unrelated regression approach.

In each setting, we employ US and European share prices as control variables by modelling the link between both variables without including further variables. In each case we begin our analysis by determining the lag order according to the Akaike information criterion (AIC). As a lag of one month is an adequate choice for all models, we decided to use exactly this configuration for each model.

5.3 Results

Let us start with an assessment of the results for Estonia. As can be seen in Table 5, the domestic confidence indicator is influenced only by domestic share prices. The relationship between the variables is of a positive nature. Two possible factors might explain this finding. One explanation is that Estonian subjects are engaged in the stock market and the developments of share prices serve as a leading indicator, which is consequently translated into sentiments due to wealth effects. Another explanation might be that, owing to a lack of other sources, news of the stock market becomes very important in the information building process in inferring the state of the economy. Although we cannot identify the exact channel, we believe that the latter is more plausible because the financial market in Estonia is dominated by Scandinavian investors, as outlined in Section 3. In addition, the results for the income variable (Table 6) confirm this. Domestic income in Estonia is also positively influenced by domestic share prices at the 5% significance level. Besides the indicator function of share prices, this positive link points to the increasing importance of financial markets in the domestic economy. Domestic income is also negatively related to their own one-period lag and to the EMU share prices. While the latter effect might be due to short-run volatilities, the negative sign of income can be explained by the characteristics of a Multiplier Accelerator model, where the negative impact of lagged income generates oscillations.

With respect to domestic share prices as the left-hand-side variable, only the one-period lagged value of share prices turns out to be significant (Table 7). All other coefficients show no significance. Nevertheless, this pattern is an interesting result, bearing in mind our considerations in Section 3, where we argued that Scandinavian institutions and investors dominate financial markets in Estonia. The fact that neither foreign confidence indicators nor foreign share price developments feed through into the domestic economy might result from the strong ties to Scandinavia and Russia. Finland forms part of the EMU, but Scandinavian and Russian share prices and sentiments deviated from EMU averages until 2008. An important task for future research should be to identify this kind of link after Estonia's accession to the European Monetary Union. The missing causality from domestic income and sentiments to share prices might also be explained by the fact that domestics rarely enter the domestic stock market as investors and therefore do not influence domestic stock prices. As outlined above, domestic stock prices do, on the other hand, have an impact on the domestic

economy, which might be due to their function as a leading indicator or to an increasing importance of the financial sector.

We now turn to the results of the estimation referring to Latvia. Again we start with the domestic confidence indicator (Table 5). Similarly to the Estonian case, the domestic share prices are significant, even at the 1% level. In the same vein as argued in the Estonian case, this can be attributed to the function of domestic share prices as a leading indicator. In addition to domestic share prices, there is also a positive influence stemming from sentiments in the EMU. The estimated coefficient is significant at the 5% level. This relationship might be a hint of a stronger integration of Latvia into the European Union compared with Estonia prior to the crisis. Obviously, sentiments directed to developments in the EMU are important for domestic subjects. A possible reason might be that the sentiments can be used as a leading indicator of the development of the European economy. If Latvian economic agents are aware of this relationship and evaluate the trade linkages between their country and the EMU they can expect a positive impact on the domestic economy. This explanation is also plausible, considering the fact that Latvia has stronger trade linkages to the EMU compared with Estonia, as outlined in 3.1.

Such an explanation is confirmed by a closer look at the results, with income as the left-hand-side variable (Table 6). In addition to the significant negative impact of the one-period lagged value (significant at the 1% level), domestic income is positively influenced by EMU sentiments. It seems that a kind of expectation effect is in play, since the effect cannot be manifested in real variables over such a short period. In addition, US sentiments also enter significantly (at the 1% level). However, in contrast to the EMU sentiments, their sign turns out to be negative, which means that an increase in sentiments reduces domestic income.

Let us now discuss the results of the domestic share prices as the left-hand-side variable for Latvia (Table 7). First of all, the constant term enters the regression equation significantly at the 10% level. Since we are using changes in stock prices as the explanatory variable, the positive constant term signifies a positive tendency and a steadily growing stock market, which is true for the period up to 2008. The next important finding for the domestic stock market is the significant and positive impact of the domestic economic confidence indicator (significant at the 5% level). Obviously, the domestic stock market is driven by factors which can be caught by the sentiment indicator. On the one hand, this might be due to the leading

indicator function of sentiments. Given the finding that non-fundamental factors are often embedded in sentiments, this impact can, on the other hand, be an indication of the impact of non-fundamental factors. What is more, the significance of European sentiments turns out to be a borderline case. Altogether, the observed influence of European sentiments points to a substantial integration of the Latvian economy into the EMU.

Interestingly, European sentiments also prove to be important in the Slovenian economy. Starting with domestic sentiments (Table 5), both foreign sentiment indicators are significant and enter with a positive sign. When we analyze the determinants of income, the results point to an even stronger influence stemming from global factors, as both foreign share prices and sentiment indicators turn out to be significant (Table 6). Again, the influence of European sentiments turns out to be positive, with the same result for US stock prices. With respect to Slovenian stock prices (Table 7), interest rates turn out to be significant, besides lagged domestic stock returns. The pattern of explanation for Latvia can therefore also be applied to Slovenia. These results clearly point to the Slovenian economy being highly influenced by foreign factors, which makes sense considering the fact that the country has already introduced the euro.

An inspection of the overall results for inflation and interest rates (Tables 8 and 9) suggests that inflation is positively influenced only by its own lagged value. Missing effects from income and share prices might be obsolete because they can be observed only in the long run. An influence on long-term interest rates stemming from inflation (for Slovenia and Latvia) and income (for Estonia) can also be observed. However, the relationship between interest rates and inflation is of a positive nature for Latvia, while it is negative for Slovenia. This might be explained by the different expectations of market participants with respect to the future paths of monetary policy.

6 Conclusions

In this paper we have focused on two main issues. First, we investigated the connection between domestic stock prices, income and sentiments in the cases of Latvia, Estonia and Slovenia. Secondly, we took external factors such as EMU and US share prices and sentiments into account. While the results relating to the first issue are mixed, we can show that domestic variables are not segmented but are influenced by foreign variables.

The most important result we have come up with is that European sentiments turn out to be important for income and domestic sentiments for both Slovenia and Latvia, while this does not seem to be the case for Estonia. Furthermore, we are able to establish links between global share prices and domestic income. Overall, we observe the strongest influence from global factors in Slovenia. Interestingly, we can also show that Latvia is influenced by foreign factors to a higher extent than Estonia. Our results are consistent with the convergence process on the route to the EMU. Slovenia has already introduced the euro. Furthermore, Latvia and Estonia were both on the route to introducing the euro in 2011, prior to the crisis.

However, Slovenia and Latvia have stronger trade ties to members of the European Monetary Union, compared with Estonia.

Our results might also offer an explanation for the varying impact of the recent crisis described in Section 3. Until 2008, Latvia was more strongly influenced by foreign sentiments and share prices than Estonia. This offers an explanation for the fact that Latvia suffered more from the financial crisis than Estonia. On the other hand, the decline in Estonian GDP during the crisis stemmed to a large extent from a fall in exports to some Scandinavian countries and Russia, neither of which is considered in this paper. Our results do not imply that Estonia should have refrained from introducing the Euro in 2011, since our analysis does not allow any clear conclusions with respect to real convergence. Furthermore, our results do suggest that, like Latvia, Slovenia was strongly connected to the global economy in terms of the EMU and the US. Nevertheless, the country managed the crisis comparably well. This might be explained by the introduction of the euro in Slovenia, as compared to the currency board arrangements in Latvia and Estonia, as well as to the relatively low importance of FDI flows in Slovenia.

Our general results are in line with the literature, in particular with the findings by Beckmann, Belke and Kühl (2011) for other CEEC economies, insofar as we are able to establish a positive influence stemming from (domestic) share prices on sentiments for Estonia and Latvia, and also find evidence for a reverse relationship in Latvia. We also detect a positive influence on domestic income stemming from global sentiments. However, our results with respect to share prices should be handled with some caution, as our analysis is based on a relatively small sample, which makes the explanation of share price returns

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notoriously difficult. This fact might also explain the reversed sign in some cases. Altogether, we would expect more of this type of research to be encouraged in the future.

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Tables

Table 1: Annual real growth rates in Emerging Europe

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Estonia	9.56	7.66	8.02	7.24	8.26	10.15	11.19	7.11	-5.13	-14.08
Latvia	6.91	8.04	6.47	7.20	8.68	10.60	12.23	9.98	-4.55	-18.01
Slovenia	4.39	2.85	3.97	2.84	4.29	4.49	5.81	6.80	3.49	-7.80
Czech Republic	3.65	2.46	1.90	3.60	4.48	6.32	6.81	6.13	2.46	-4.25
Hungary	6.22	4.10	4.40	4.30	4.70	3.90	4.00	1.00	0.60	-6.30
Poland	4.25	1.21	1.44	3.87	5.34	3.62	6.23	6.79	5.00	1.70

Source: World Bank

Table 2: Current account balances in Emerging Europe in BN. US-Dollar

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Estonia	-0.299	-0.325	-0.779	-1.115	-1.369	-1.386	-2.585	-3.721	-2.340	0.893
Latvia	-0.371	-0.626	-0.625	-0.921	-1.762	-1.992	-4.522	-6.425	-4.492	2.284
Slovenia	-0.548	0.031	0.244	-0.216	-0.893	-0.681	-1.088	-2.298	-3.632	-0.720
Czech Republic	-2.690	-3.273	-4.265	-5.785	-5.749	-1.577	-3.559	-5.754	-1.247	-2.147
Hungary	-4.004	-3.205	-4.693	-6.721	-8.470	-7.934	-8.119	-9.081	-10.808	0.441
Poland	-10.343	-5.945	-5.544	-5.473	-10.067	-3.716	-9.394	-20.253	-26.909	-7.207

Source: World Bank

Table 3: Export shares of the main trading partners in Estonia, Latvia and Slovenia

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Estonia										
Finland	27%	28%	20%	22%	23%	26%	18%	18%	18%	19%
Sweden	17%	12%	12%	12%	15%	13%	12%	13%	14%	13%
Latvia	7%	7%	8%	7%	8%	9%	9%	12%	10%	10%
Russia	7%	9%	10%	11%	6%	6%	8%	9%	10%	9%
Latvia										
Germany	17%	16%	15%	15%	12%	10%	10%	8%	8%	8%
LIthunia	8%	8%	8%	8%	9%	11%	14%	15%	15%	15%
Estonia	5%	6%	6%	7%	8%	11%	12%	14%	13%	14%
Russia	4%	6%	6%	5%	6%	8%	12%	13%	15%	13%
Slovenia										
Germany	27%	26%	25%	23%	18%	19%	19%	19%	19%	19%
Italy	14%	13%	12%	13%	13%	12%	12%	12%	12%	11%
Croatia	8%	9%	9%	9%	7%	9%	9%	8%	8%	8%
Austria	8%	8%	7%	7%	12%	8%	8%	7%	8%	7%

Source: Own calculations based on IMF data.

Table 4: Exports relative to GDP in percent in Estonia, Latvia and Slovenia

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Estonia	84.59%	79.83%	70.93%	69.19%	73.07%	77.72%	80.15%	72.76%	75.64%	70.60%
Latvia	41.64%	41.58%	40.87%	42.07%	43.96%	47.85%	44.88%	42.23%	41.74%	42.17%
Slovenia	53.95%	55.48%	55.24%	53.97%	58.00%	62.12%	66.53%	69.55%	67.68%	58.92%

Source: World Bank

Table 5: Estimation results for sentiments as LHS variable

	Slovenia	Estonia	Latvia
$\Delta sent$			
Const	0.247	-0.195	-0.356*
	(0.688)	-(0.859)	-(1.854)
$\Delta sent_{t-1}$	-0.285**	0.106	-0.193*
	-(2.704)	(1.059)	-(1.963)
Δy_{t-1}	-5.697*	3.128	-1.453
	-(1.822)	(0.387)	-(0.465)
Δsp_{t-1}	0.684	8.533*	8.284***
	(0.091)	(1.958)	(3.141)
Δsp_{t-1}^{emu}	1.038	13.665	1.386
	(0.049)	(1.457)	(0.129)
$\Delta sent_{t-1}^{us}$	0.190**	-0.059	0.051
	(2.476)	-(1.191)	(1.185)
$\Delta sent_{t-1}^{emu}$	0.507*	0.111	0.288**
	(1.905)	(0.822)	(2.531)
Δsp_{t-1}^{emu}	-7.435	-9.878	-13.580*
	-(0.456)	-(1.227)	-(1.656)

Note: The table reports the estimation results for $\Delta sent$ as the dependent variable. * Statistical significance at the 10% level, ** at the 5% level and *** at the 1% level. i denotes the long-term interest rates, y real income, sp share prices, and π the inflation rate. Sent stands for economic sentiments. US refers to the USA and EMU to the European Monetary Union.

Table 6: Estimation results for income as LHS variable

	Slovenia	**Estonia**	**Latvia**
Δy			
Const	-0.001	0.005^{**}	0.004
	-(0.056)	(2.101)	(0.645)
$\Delta sent_{t-1}$	-0.004	-0.001	-0.001
	-(1.266)	-(0.894)	-(0.478)
Δy_{t-1}	-0.460^{***}	-0.351^{***}	-0.405^{***}
	-(4.833)	-(3.787)	-(4.390)
Δsp_{t-1}	-0.208	0.120^{**}	0.027
	-(0.909)	(2.393)	(0.341)
Δsp_{t-1}^{emu}	-1.089^{**}	-0.177^{*}	-0.056
	-(2.201)	-(1.918)	-(0.230)
Δsp_{t-1}^{US}	1.602^{**}	0.111	0.062
	(2.472)	(1.035)	(0.194)
$\Delta sent_{t-1}^{us}$	-0.008^{***}	0.000	-0.005^{***}
	-(3.379)	-(0.169)	-(3.553)
$\Delta sent_{t-1}^{emu}$	0.020^{**}	0.000	0.006^{*}
	(2.455)	-(0.162)	(1.642)

Note: The table reports the estimation results for ΔY as the dependent variable. * Statistical significance
at the 10% level, ** at the 5% level and *** at the 1% level. i denotes the long-term interest rates,
 y real income, sp share prices, and π the inflation rate. Sent stands for economic sentiments.US refers to the
USA and EMU to the European Monetary Union.

Table 7: Estimation results for share prices as LHS variables

	Slovenia	Estonia	Latvia
Δsp			
Const	0.009*	0.006	0.020**
	(1.738)	(1.189)	(2.556)
$\Delta sent_{t-1}$	0.001	-0.001	0.008**
	(0.473)	-(0.375)	(2.163)
Δy_{t-1}	-0.029	0.232	-0.094
	-(0.741)	(1.418)	-(0.771)
$\Delta \pi_{t-1}$	0.388	0.373	-0.812
	(0.466)	(0.529)	-(0.639)
Δsp_{t-1}	0.481***	0.408***	-0.232**
	(4.589)	(4.623)	-(2.264)
$\Delta sent_{t-1}^{us}$	0.000	-0.007	0.001
	-(0.033)	-(1.268)	(0.585)
$\Delta sent_{t-1}^{emu}$	0.001	0.001	-0.007
	(0.182)	(0.676)	-(1.498)
Δsp_{t-1}^{us}	-0.041	0.004	-0.018
	-(0.140)	(1.367)	-(0.042)
Δsp_{t-1}^{emu}	0.107	-0.101	0.313
	(0.491)	-(0.461)	(0.957)
Δi_{t-1}	0.033*	0.080	0.011
	(1.925)	(0.440)	(0.351)

Note: The table reports the estimation results for ΔSP as the dependent variable. * Statistical significance at the 10% level, ** at the 5% level and *** at the 1% level. i denotes the long-term interest rates, y real income, sp share prices, and. π the inflation rate. Sent stands for economic sentiments. US refers to the USA and EMU to the European Monetary Union.

Table 8: Estimation results for inflation as LHS variable

	Slovenia	Estonia	Latvia
$\Delta\pi$			
Const	0.000	0.001	0.001*
	-(0.692)	(1.132)	(1.956)
Δy_{t-1}	0.002	0.011	-0.011
	(0.289)	(0.494)	-(1.142)
$\Delta\pi_{t-1}$	-0.049	0.210**	0.240**
	-(0.431)	(2.198)	(2.365)
Δsp_{t-1}	0.009	-0.012	0.005
	(0.717)	-(1.140)	(0.680)

Note: The table reports the estimation results for $\Delta\pi$ as the dependent variable. * Statistical significance at the 10% level, ** at the 5% level and *** at the 1% level. i denotes the long-term interest rates, y real income, sp share prices, and π the inflation rate. US refers to the USA and EMU to the European Monetary Union.

Table 9: Estimation results for the interest rate as LHS variable

	Slovenia	Estonia	Latvia
Δi			
const	0.113*	0.001	-0.077*
	(1.670)	(1.132)	-(1.878)
Δi_{t-1}	0.254**	0.011	0.145
	(2.402)	(0.494)	(1.422)
Δy_{t-1}	-0.265	0.210**	-0.326
	-(1.107)	(2.198)	-(0.885)
$\Delta\pi_{t-1}$	-3.848**	-0.012	1.115*
	-(2.544)	-(1.140)	(1.937)

Note: The table reports the estimation results for Δi as the dependent variable. * Statistical significance at the 10% level, ** at the 5% level and *** at the 1% level. i denotes the long-term interest rates, y real income, sp share prices,and π the inflation rate. Sent stands for economic sentiments. US refers to the USA and EMU to the European Monetary Union.