

# **Analysis of Income and Profitability Indicators in Banking Sectors During the Period 1995 - 2009: Post-communist vs. OECD Countries**

Aleš Rod, Jonáš Rais

J. E. Purkyně University in Ústí nad Labem

## **Abstract**

This article presents an analysis of income and profitability indicators for the banking sectors of six post-communist countries and compares them with a group of eighteen OECD countries without a “communist” past. The analysis focuses on five relative indicators (interest income/fees and commissions income; fees and commissions/bank assets; interest income/bank assets; profit/assets; fees and commissions/non-interest income), which are subsequently controlled with macroeconomic indicators (GDP, interest rate and inflation) for the period 1995 - 2009. The results of the econometric model corresponded with three out of the five assumptions made about the effects of post-communism. However, only the hypothesis that post-communist countries used their assets for higher net income from fees and commissions is significantly verified. Discrepancies were explained by x-inefficiencies on the cost side and a constant pressure on revenue stream diversification, which is in accordance with scholarly literature.

**Key words:** Bank, post-communist economy, profitability, interest income, non-interest income, fees and commissions.

## **Introduction**

Retail banking in the Czech Republic can be characterized as being in very good shape and very profitable, whereby clients are considered to be very conservative in terms of their behaviour on the financial markets. The Czech banking market was, and still is considered to be a lucrative one with regards to the charging and collection of banking fees and commissions. Investors, mainly international financial groups, noticed similar characteristics in other post-communist economies as well. It is for this reason that the

privatization of the main banks in the 1990s went relatively smoothly<sup>1</sup>. Their foreign owners can now rely on the repatriation of profits from post-communist markets to Western Europe during financial crises. As Claessens, et al. (2010) or Levine (2012) concluded, the 2007-2008 financial crisis has changed the conditions on financial (banking) markets in various countries around the world, including the countries in the dataset. It was therefore decided not to analyse the immediate post-crisis period, but to focus on the period towards the end of 2009 onwards.<sup>2</sup>

The rudiments for such research not only lie in scholarly literature, but also in personal experience in a post-communist economy. The aim of this study is to empirically test the proposed hypotheses using an econometric model to determine whether the data for a block of post-communist economies (banking markets) produces similar results for indicators of bank income and profitability, and whether these results correspond with the outputs for more developed countries from Western Europe and other parts of the world.

This paper consists of six sections. Section 1 provides an overview of scholarly literature and other materials that deal with issues such as banking in transition economies, diversification of banking income, processes of disintermediation and universalization, and the use of specific datasets and appropriate methods for this paper. Section 2 summarizes and explains the hypotheses and the applied methodology. The model is presented in Section 3, followed by the dataset in Section 4, and the results and their interpretation in Section 5. The conclusions are presented in the last section.

## **Literature review**

In the past few decades, the extent of research into net interest margins, efficiency and general bank profitability has been extensive in scholarly literature. While interest income has traditionally been the core of banking activities (Stiroh 2006), DeYoung and Rice (2004a) found, using US data, that non-interest income has been playing an ever increasing role since the 1980s. Nevertheless, DeYoung and Rice (2004b) note that non-interest income serves more as an addition to, rather than the replacement of, interest income from intermediation activities.

However, the non-interest income of banks, in particular fees and commissions, remains a relatively unexplored area. The notable exceptions are Hannan (2006), Dvořák and Hanousek (2009), Tennant and Sutherland (2014), Ružicková and Teplý (2015) and Rais (2015). Nevertheless, these authors mostly focused on the impact of bank-specific determinants, rather than the impact of the environment banks operated in. Rais (2015) argues that the banking sectors are quite heterogeneous and that research should be focused on smaller blocks of relatively homogeneous countries. Tennant and Sutherland (2014, p. 186) found that fee-based profits are significantly affected by cultural issues.

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<sup>1</sup> It goes without saying that massive state support was essential. This topic is analyzed in Rod (2015).

<sup>2</sup> The reaction of regulators in post-communist countries and their impact on the performance of the banking industry would be an interesting and challenging topic to analyze.

Specifically, they found that in countries where gender roles are blurred and society is more consensus-oriented, banks earned higher profits from fees and commissions, whilst these tended to be lower in countries where “such roles are clearly defined and the assertiveness and competitiveness associated with masculinity is dominant.” Their results imply that fee-based profits will be lower “in societies where competition is highly valued, and strong opposition to high fees is propelled by a culture of assertiveness.” This is consistent with our hypothesis on the effect of the communist legacy i.e. in communist societies the opposite was true and that the expectation is that this will only be eroded slowly over time.

After the collapse of centrally-managed economies, most post-communist states faced similar challenges. Overnight, the fall of communism dismantled the socialist system of coordination. Agents were not properly equipped to deal with such changes, and an appropriate system of market coordination still needed to be established (Redek and Sušjan 2005; Estrin and Mickiewicz 2011). The banking sectors were no exception. Whilst the research into the transition of the banking sectors in post-communist economies has been extensive, it has mainly focused on the cost efficiency of banks (e.g. Kraft and Tirtiroglu 1998; Matousek and Taci 2002; Nikiel and Opiela 2002; Hasan and Marton 2003; Fries and Taci 2005, etc.). The findings on the cost efficiency of privately owned and state owned banks were mixed. Nevertheless, all the authors that analysed the various post-communist countries were consistent in asserting that there were similar problems on the supply side and the demand side. Banks were underinvested, produced many x-inefficiencies and there was a lack of skilled managers and employees with knowledge of the market principles associated with the modern approach to banking. On the demand side, clients had no idea about banking services that were not provided by the state, no experience of competition on the market, no knowledge about the opportunities and threats related to banking, in particular about individual responsibility. All of these produced a huge level of rational ignorance. It led to banks utilizing the knowledge garnered from their foreign shareholders in Western Europe to take advantage of rationally ignorant clients with no information (Hainz 2003)<sup>3</sup>. Given the shared similarities in the banking sectors of post-communist countries, banks could therefore employ different profit generating strategies compared to banks in developed western countries.

In addition to the cultural and management issues common to post-communist countries, the banks’ abilities to generate fee-based profits could be significantly affected by the overall performance of the given economy. This effect can be captured through several channels, although the ultimate impact is not always clear. Tennant and Sutherland (2014) found a positive relationship between profits from fees and commissions and inflation volatility. They argue that when faced with lower or more volatile interest revenues due to inflation volatility, banks tend to rely more heavily on fee-based profits. In contrast, Hahm (2008) found that banks tend to have a higher proportion of non-

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<sup>3</sup> Further analyses of the struggles in post-communist countries are provided in, for example, Eyal et al. (1998), Hoskisson et al. (2000), or Brandt and Li (2003).

interest income in stable inflation environments. Similarly, while Hahm (2008) found that banks tended to diversify towards non-interest income as economic growth slows down, DeYoung and Rice (2004b) and Rais (2015) found some evidence that banks tend to generate higher amounts of non-interest income (or fee-based profits) in strong and growing economies. Similarly, banks operating in countries with better developed financial markets (Tennant and Sutherland 2014; Rais 2015) and stronger protection for investors (Rais 2015) tend to earn more profits from fees.

## **Method**

On the basis of the literature review, the following hypotheses were formulated:

- 1) The banking markets in post-communist economies are characterized by common income and profitability indicators i.e. the post-communist banking markets can be viewed as one block.
- 2) Given the cultural differences, the income and profitability indicators in the block of post-communist countries are different to those in more developed Western European and other OECD<sup>4</sup> countries.

On the basis of scholarly literature, indicators for income and profitability were conceived and the generated data tested to determine the within effects (post-communist and OECD countries separately) and between effects (post-communist vs. OECD countries)<sup>5</sup>. Furthermore, since fees can usually be modified in complex ways (one banking product can be readily connected with various fees), and given consumers' relative inexperience, we argue that banking fees and commissions were likely to have been the main tool for income diversification in post-communist economies. Therefore, their use would have been more widespread and intense than in other OECD countries, whereby the profitability indicators would be better.

Since the activities of universal banks are very complex, five different indicators were employed to capture the potential differences in profitability:

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<sup>4</sup> It is understood that all OECD countries are considered to be "developed" economies. However, the dataset covers the period 1995 – 2009 when some of the listed countries were not yet members of the OECD. It is for this reason that we distinguish between post-communist countries and other OECD countries (without central-planning experience). The paper uses data from 24 countries. Six countries were identified as post-communist (Czech Republic, Estonia, Poland, Russia, Slovakia and Slovenia), and the remaining 18 countries in the dataset as non-post-communist developed countries i.e. a benchmark for the comparison (Austria, Belgium, Denmark, Finland, France, Germany, Chile, Ireland, Italy, Japan, Luxembourg, Mexico, the Netherlands, Norway, South Korea, Spain, Sweden and Switzerland).

<sup>5</sup> It is understood that the issue could be explained by the risk management of banks with regards to dealing with clients with no history i.e. banks used aggressive pricing strategies to cover potential credit defaults. However, several arguments can be raised: the consolidation of the banking sectors (governments provided state programmes and guarantees to cover the costs of banks, moral hazard activities included); continuity in banking (successors of state banks controlled a significant market share and quickly adopted market tools for risk management and implemented them for interest income and non-interest income generation); regulation (after affairs in the early 1990s, regulators focused heavily on the health of the financial sectors); prices, revenues and profits over time (despite increasing client histories and increased competition, banking fees increased and key income indicators did not follow expectations). Nonetheless, the issue of risk management in post-communist countries is of great interest for further research.

### ***Net Interest Income on Net Fees and Commissions (INT-FEE)***

As previously stated, interest income has traditionally been at the core of banking activities. Nevertheless, on the basis of the argument that banking fees and commissions were a more suitable tool to raise the profitability of banks in post-communist countries, the expectation is that the income from fees and commissions was therefore more dominant in these states.

To capture this effect, the *INT-FEE* indicator was used. It is calculated as the ratio of net interest income to net income from fees and commissions. According to theory, the ratio should be positive and above one because interest income forms one of the main activities of banks and fees and commissions only form a part of their non-interest income. However, even though the value should still be above one, the ratio should be lower for post-communist countries in comparison with other OECD countries.

### ***Net Fees and Commissions on Assets (FEE-BAL)***

This indicator shows how efficiently banks use their assets to generate income from fees and commissions. Fees and commissions are an important instrument in a bank's pricing policy (Matoušek and Taci 2004). The pricing policy of banks is the manifestation of their ability to use their assets to generate non-interest income i.e. to generate revenue that is less-risky, more stable<sup>6</sup> and directly proportional to the amount of transactions accounted. However, banks work under several constraints – competition on the banking market and the level of financial literacy of consumers.

As detailed in the literature review and confirmed by Hedvičáková et al. (2011), consumers in post-communist countries showed relatively low levels of financial literacy. This is evidenced by the lack of experience of consumers with the operation of universal banks and non-banking competitors in (former) communist countries, and which is enhanced by the bad experiences with fraud and the bankruptcies of many banking and non-banking financial institutions during the early stages of the transition process. With regards to the diversification of financial services, bank clients were, and still are, rather conservative and prefer universal products supplied by universal banks. With regards to banking mobility, clients were, and still are, rather passive. The expectation is therefore that banks in post-communist countries were able to use fees and commissions more efficiently which is reflected in a higher *FEE-BAL* ratio.

### ***Net Interest Income on Assets (INT-BAL)***

The *FEE-BAL* (see above) indicator works on the premise that post-communist banking sectors generated suitable conditions for income diversification. However, interest income still remains at the core of banking activities. Information asymmetry between banks and clients (Hedvicakova et al. 2011) and/or the role of rational ignorance in consumers' perceptions of banks' pricing policies (Hedvicakova et al. 2012) also affects

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<sup>6</sup> Fees and commissions are also considered a tool for securing the greater stability of the banking sectors (Stiroh, 2004).

interest income. The assumption is that banks in post-communist countries operated with higher interest margins during the studied period.<sup>7</sup>

The *INT-BAL* indicator was used to test this hypothesis. It is calculated as a ratio of net interest income (interests receivable minus interests payable) to the annual sum of balance sheets (total assets or total liabilities). The expectation is that the ratio will be higher for the post-communist countries.

### ***Return on Assets (ROA)***

Return (profit) on assets was used to test the profitability of banks in general. This is a standard indicator which demonstrates the ability of a company to use assets and transform them into profit. The main part of a banks' balance sheet consists of deposits (liabilities) which are put on the market and transformed into credit facilities and loans. The expectation is that former communist countries generated higher ROA i.e. they were able to generate higher profits from their assets.

### ***Share of Net Fees and Commissions in Non-Interest Income (FEE-N-INT)***

Fees and commissions form the majority of non-interest income, but they are not the only part. A bank can provide other financial services, investment opportunities, brokering, bond issues for third parties, etc. These additional activities diversify banks' non-interest revenues. Banks can choose their strategy according to various factors – management of clients' risk, covering administrative costs related to entering a market, or factors on the demand side<sup>8</sup>. For whichever of these reasons, the assumption is that post-communist countries systematically faced similar conditions, leading to a higher proportion of fees and commissions. Fees were therefore either the only way in which banks could diversify their income, or there was no need to seek alternatives due to their ability to apply them.

Each indicator was tested to determine what the actual influence was of the post-communist experience. In line with Tennant and Sutherland (2014), Hahm (2008), DeYoung and Rice (2004b) and Rais (2015), the results were subsequently correlated with the figures for the annual growth rate of real GDP and the consumer price index. Furthermore, given the cross-subsidization hypothesis, which implies that there is a direct relationship between banks' decisions on interest rates and fees (Dvořák and Hanousek 2009; Lepetit et al. 2008; Tennant and Sutherland 2014; Rais 2015), the overnight interest rate provided by central banks to commercial banks was also controlled.

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<sup>7</sup> This hypothesis is not considered to contradict hypothesis 2. Banks could utilize information asymmetry, the conservatism of clients and rational ignorance for operating with higher interest margins, as well as for pricing strategies relating to fees and commissions. Interest income and income from fees and commissions were complementary in post-communist countries.

<sup>8</sup> Arguments suggesting that higher fees and commissions were the result of the need to cover investments and other costs of the under-capitalized post-communist banking sectors may be relevant. However, the development of the profitability indicators does not reflect this. The issue is definitely one that requires additional research.

## Model

In the simplest case, it would be possible to model the research using Pooled OLS, but this approach is not appropriate here. The hierarchical structure of the dataset demands the inclusion of an individual component that represents unobserved country factors (time-invariant). In this case, it is necessary to estimate, either on the basis of the Random Effects (RE) or Fixed Effects Estimator (FE). Due to the fact that one important explanatory variable (the communist regime indicator) is constant over time, the FE cannot be used because all time-invariant regressors would disappear.

Due to the hierarchical nature of the data (observations nested within countries), the model needs to account for unobserved fixed effects. Therefore, the model is formulated as:

$$y_{ij} = \beta_0 + \beta_1 x_{ij} + \beta_2 z_j + (u_j + e_{ij}) \quad (1)$$

$$E(u_j | x_{ij}, z_j) = E(e_{ij} | x_{ij}, z_j) = 0$$

where  $y_{ij}$  is the dependent variable,  $\beta_0$  is the intercept,  $x_{ij}$  is a vector of time-varying covariates (measured at lower levels i.e. occasions) which consists of real GDP growth, interest rate and CPI.  $z_j$  is the time-invariant covariate measured at higher levels (countries), which indicates whether a country used to have a communist regime. The random part of the model consists of  $u_j$  and  $e_{ij}$ .  $u_j$  is the higher-level residual that allows for the dependence of the repeated indicators of a higher-level entity.  $e_{ij}$  is the occasion-level residual.

The residuals are assumed to be normally distributed with zero mean. Due to the fact that the exogeneity assumptions given above do not often hold (because covariates usually consist of two parts, the between effect that is specific to the higher-level entity and the within effect which represents the difference between occasions within the higher-level entities, and if these are not controlled out, part of their variance can be absorbed into the residuals leading to endogeneity (Bell and Jones 2014)), the usual approach is to use the FE (fixed effects) estimation which enables the higher-level variance to be controlled out. Unfortunately, this means that it is only possible to estimate the within effects since the between effects and any time-varying covariates are removed. Due to the fact that the interest in this study is in the time-invariant covariate (whether a country used to be communist), this approach is not suitable. The Bell and Jones (2014) reformulation of Mundlak (1978) was therefore used. This explicitly includes the between effects (higher-level means) in the equation and therefore requires the correct standard errors to be calculated (Bell and Jones 2014).

After some modifications the following equation is acquired:

$$y_{ij} = \beta_0 + \beta_1(x_{ij} - \bar{x}_j) + \beta_3 \bar{x}_j + \beta_2 z_j + (u_j + e_{ij}) \quad (2)$$

where  $(x_{ij} - \bar{x}_j)$  represents the within effects (that are identical to the ones from the FE estimation) and  $\bar{x}_j$  the between effects of the covariates. The model was estimated using Restricted Maximum Likelihood, which should have better properties for small samples than ML. The estimation was run on an unbalanced panel of 24 countries for the period 1995 – 2009. Given the time series nature of the data, it was also necessary to determine the order of integration in the variables, since the presence of non-stationary variables leads to biased standard errors (Mahadeva and Robinson, 2004). Unfortunately, the relatively small dimensions of both the time period (T) and the dataset (N) meant that existing unit root test provided particularly reliable results. Therefore, in order to assess the stationarity of the data, ADF – Fisher and LLC tests were used in conjunction with economic conjecture based on the findings about the nature of the used variables in previous literature. As a result, and as expected, all the dependent variables were found to be stationary. GDP per capita growth, CPI and the overnight interest rate were also found to be stationary. The stationarity of inflation is consistent with the findings of Im, Lee and Tieslau (2010) who found CPI to be stationary in OECD countries. The stationarity of interest rates is consistent with the findings of Lopez and Reyes (2009) and others. Furthermore, since GDP per capita is usually considered difference stationary, (though not without debate) its growth rate should be stationary.

## **Data**

In the model, annual data from 24 countries was applied. The dataset covers the period from 1995 to 2009, which gives up to 314 observations. The data spread was specifically chosen because the banking statistics and performance indicators were affected to some degree by the impact of the “financial crisis” on the economies in 2009, as well as by ongoing regulation.

The income and profitability indicators were calculated as ratios (indices) on the basis of OECD data, which consisted of balance sheets and income statements for the entire banking sector in a given country.

The effect of “post-communism” is tested using a binary measure (1 = post-com; 0 = other OECD). The research goal was controlled against macroeconomic indicators, covering the economic cycle, money markets and inflation (Athanasoglou, et al., 2008). The indicator “gdp” (whereby  $w$  indicates the within effect and the mean the between effect) represents the annual growth of Real Gross Domestic Product in a given year and a given country. This variable controls the cyclical fluctuations for the observed indicators. The conditions on the “money markets” are represented by the indicator “inter” i.e. overnight interest rate (p.a.) provided by the central banks to commercial banks. This indicator de facto controls the price of money. The rate of inflation is represented by the indicator “cpi”, which is none other than the Consumer Price Index (level compared to the year 2005 =



100) in a given country and a given year<sup>9</sup>. This indicator controls whether the selected indicators follow changes in consumer prices.

The 18 countries in the dataset previously identified as being developed OECD countries, form the benchmark for the international comparison.

## **Results**

The estimation results are presented in Table 1. The VPCs, which are standardized measures of the similarity between higher-level entities (Bell and Jones 2014), are relatively large for all the model specifications (1-5). This suggests that a large degree of variance occurs at higher levels, which implies that the use of the random effects model is a suitable approach.

When looking at specifications (1) to (5), it is clear that most of the between effects are insignificant. This implies that countries average values for the particular variables do not influence the dependent variable. The only exception is the between effect of the overnight interest rate for specification (3), which is significant and positive. Therefore, unsurprisingly, countries with higher average values for the overnight interest rate tend to have higher interest revenues given their assets (*INT-BAL1000*<sup>10</sup>).

With regards to the within effects, it can be stated that most of them are significant and have the expected sign. Conceivable explanations for each specification follow. Under specification (1), when GDP growth in a country increases, *INT-FEE* decreases (therefore, either net interest revenues decrease or net revenues from fees and commissions increase, or both). Similarly, as the CPI in a country increases, *INT-FEE* decreases. This can be explained by the fact that a key factor related to the interest revenue of commercial banks is a stable interest margin, which is dependent on many factors, whereas fees and commissions are generated directly by the pricing policies of individual banks. The results show that after an increase in the CPI, banks' interest margins remain relatively stable, whilst banks apparently reflect the increase in prices in their price lists and tariffs. On the other hand, as the interest rate in a country increases, *INT-FEE* increases as well. This is not unexpected because with an increasing interest rate, net interest revenues should increase in comparison with net revenues from fees and commissions. This result also supports the cross-subsidization hypothesis, which implies that there is a direct relationship between banks' decisions on interest rates and fees and commissions. When faced with potentially higher interest-based profits, banks may opt for a strategy of low fees in order to attract more customers and earn higher interest margins. Therefore, with an increase in interest rates, the share of fee-based profits may decrease in comparison with interest-based profits. Under specification (2), increasing GDP growth in a country results in an increase in the *FEE-BAL1000* indicator. This suggests that either net fees and commissions increase or assets decrease, or both. This is consistent with the findings of DeYoung and Rice (2004b) and Rais (2015), who found that banks tended to generate

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<sup>10</sup> Stationarity of the CPI data is discussed in Section 3.

<sup>10</sup> For better interpretation, the data was multiplied by 1000.

higher amounts of non-interest income (or fee-based profits) in strong and growing economies. On the other hand, as the overnight interest rate in a country increases, *FEE-BAL1000* decreases. Similarly, as the CPI in a country increases, *FEE-BAL1000* also decreases. With an increasing overnight interest rate, *INT-BAL1000* increases, and as the CPI in a country increases, *INT-BAL1000* decreases.

Under specification (4), *ROA1000* increases with increasing GDP growth. Similarly, as the CPI in a country increases, *ROA1000* also increases. On the other hand, as the overnight interest rate in a country increases, *ROA1000* decreases. Finally, under specification (5), only the within effect of the CPI is significant. Therefore, as the CPI increases, so does *FEE-N-INT*.

While the above results are interesting and indicate how the respective indicators are influenced by the interest rate, inflation and GDP, the primary effect of interest is captured by the post-com variable. As is evident, it is insignificant for most of the specifications. This suggests that there isn't a statistically significant difference in the profitability indicator between former communist countries and other OECD countries. The only exception is specification (2), for which the post-com variable is significant at the 10% level. This suggests that banks in post-communist countries earned more from fees and commissions (given their level of assets) in comparison with other OECD countries. This result supports the hypothesis that lower financial literacy and the lack of experience of agents in the market facilitated the imposition of higher fees for customers by banks without them fearing the loss of their customer base to competitors. However, the insignificance in specification (5) suggests, contrary to expectations, that fees and commissions may not have been the only non-interest tool banks utilized to increase profits, and that in combination with higher fees, these activities also increased.

Nevertheless, the rest of the results complicate the interpretation, which generates room for further, more specific research into interest and non-interest revenue distribution. The insignificant result under specification (3) shows that the banks in post-communist countries were not earning more from interest in comparison with banks in the other OECD countries. This gives rise to an additional hypothesis that high interest margins could be easily detected by customers and compared with competitive products. The insignificance under specification (1) suggests that there is no difference in the *INT-FEE* ratios i.e. a certain level of interest revenues implies an adequate level of fees and commissions in both analyzed groups of countries. Furthermore, even without this contradiction in the results, the insignificance under specification (4) shows that while banks in post-communist countries may have earned more revenue from fees and commissions when utilizing their level of assets, they were also likely to have incurred some additional costs and were therefore unable to transform them into more profit.

Therefore, while it seems that the banks in post-communist countries were to some degree more effective in their use of fees and commissions in comparison with banks in other OECD countries, the results of this study indicate that there wasn't a significant difference in the profitability of the banks between the two groups of countries.

Table 1: Results

Dependent variable	<i>INT-FEE</i>	<i>FEE-BAL 1000</i>	<i>INT-BAL 1000</i>	<i>ROA 1000</i>	<i>FEE-N-INT</i>
Independent variable	(1)	(2)	(3)	(4)	(5)
cons	3.594112*** (.3685172)	5.919948*** (.524165)	18.98199*** (1.197623)	5.909658*** (.7711674)	.6095178*** (.0546454)
post-com	-1.135128 (.9133902)	2.411846* (1.2986)	.6238767 (2.968934)	-.617788 (1.927008)	-.2141027 (.1370321)
gdpw	- .0925115*** (.0226148)	.1372605*** (.0257902)	.0453196 (.0789188)	1.125765*** (.1130591)	.0074297 (.0069238)
interw	.0621434** (.0271125)	- .2031264*** (.0309195)	.1559361* (.0946147)	- .5008253*** (.1366589)	.0038385 (.0081568)
cpiw	- .0282445*** (.0094794)	- .0335782*** (.0108104)	- .1860834*** (.0330801)	.0816398* (.0479048)	.0072093** (.0028783)
cgdp_mean	.2087922 (.2634056)	-.4301969 (.3746542)	-.0456066 (.856029)	.2423743 (.5534997)	.0360175 (.0391505)
cinter_mean	.2162361 (.2019419)	.3677347 (.2871313)	2.216124*** (.6563794)	.4823742 (.4256327)	-.009298 (.0300962)
ccpi_mean	.0377371 (.0578705)	-.1102702 (.0821625)	-.1614606 (.1882164)	-.1553746 (.1253213)	-.0051929 (.008737)
Level 2: country var	2.115284 (.6324286)	4.34222 (1.282041)	22.20021 (6.698843)	7.55492 (7.55492)	.0408497 (.0141559)
Level 1: year var	1.095266 (.0909557)	1.424441 (.1182908)	13.33818 (1.107686)	27.16329 (2.25908)	.0983947 (.0082419)
Log restricted- likelihood	-494.75339	-541.30212	-885.48187	-975.04065	-98.12854
VPC	0.659	0.753	0.625	0.218	0.293
Restricted- deviance	989.50677	1082.6042	1770.9637	1950.0813	196.25708
Observations	314	314	314	313	309

*Note: Standard errors are given in parenthesis. \*\*\*, \*\* and \* denote significance at 1%, 5% and 10% level. Following Bell and Jones (2014), the between effects (means) were calculated using the full data prior to list wise deletion and the within effects were calculated using the unit means of the cut down data. Furthermore, the between effects were centred using the grand mean (from the cut down data) to correct for the measurement error bias (Bell and Jones, 2014).*

Source: Own calculations

## **Conclusion**

This article compares income and profitability indicators for the banking sectors in a block of post-communist countries with those for a group of OECD countries without experience of central planning. Five different indicators (ratios) were used, each calculated on the basis of annual banking sector balance sheets and financial statements. The study sought to determine if being identified as a “post-communist economy” had any effect on the income and profitability statistics of the banks, and to what extent the dependent variables were influenced by the annual growth of real GDP, the overnight interest rate provided by central banks to commercial banks, and the rate of inflation represented by the Consumer Price Index in a given country and in a given year.

The Random Effects Model was used because of the hierarchical heterogeneous nature of the dataset. Under this model, it is assumed that potentially unobserved effects, both fixed and random, can present themselves. The data sample was relatively small. As a result, the Restricted Maximum Likelihood (REML) estimator was applied instead of the Maximum Likelihood (ML). The reason for this, is that the former provides better small sample properties and generates a lower bias.

Whilst there was some evidence to suggest that banks in post-communist countries were more effective in their use of banking fees and commissions in comparison with banks in other OECD countries, most of the results were insignificant. It can therefore be concluded that the banks in post-communist countries were seemingly not more profitable than their counterparts in other OECD countries. Nevertheless, the small size of our dataset may have influenced the results. Therefore, a re-evaluation of our hypothesis at bank level, rather than at country level, may be a fruitful avenue for future research.

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**Contact address of the authors:**

Ing. Aleš Rod, Ph.D., Faculty of Social and Economic Studies, J. E. Purkyně University, Ústí nad Labem, Czech Republic.

Ing. Jonáš Rais, MSc., Faculty of Social and Economic Studies, J. E. Purkyně University, Ústí nad Labem, Czech Republic.

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