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**Financial Deregulation and Financial Development, and
Subsequent Impact on Economic Growth in the Czech
Republic, Hungary and Poland**

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Financial Deregulation and Financial Development, and Subsequent Impact on Economic Growth in the Czech Republic, Hungary and Poland

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Abstract

Results support Arestis's theory, that low real interest rates do not prevent economic growth (though he related it to the regulation debate). Here in the deregulation environment, it also stands. Results also support Shaw's assertion that financial liberalisation increases the monetary sector. Stiglitz's theory, that government intervention leads to improved quality of loans, is contradicted as the reduction of state involvement led to bad loans falling. Support is given to Everett and Kelly's view that financial liberalisation supports growth. Finally King and Levine studies are supported – banking sector development leads to faster growth, and also Barth's view that state involvement leads to poorly developed banks.

Keywords: Transition Economies, Financial Deregulation, Financial Development, Economic Growth, Eastern Europe

JEL CODES: G Financial Economics, G15 International Financial Markets, G21 Banks; Other Depository Institutions, Micro Financing Institutions, Mortgages

Non technical summary

The banking sectors in all three countries experienced change once financial liberalisation began. In the Czech Republic the number of domestic banks increased from 1990-1995 and then fell up to 2003. No foreign banks existed in 1990 and these increased year on year to 2003. Hungary also experienced a large increase in foreign ownership of banks in this period (1990-2003) while in Poland the number of domestic banks fell and there was an increase in the number of foreign banks in operation.

The Czech Republic suffered from a bad loan problem. Various attempts were made to overcome this: the KOB acted as a receiver for other banks' debts. The NBP provided funds in 1993, 1994 and 1995 for income losses due to bankruptcies of banks. The Banking Act was amended in 1994 to provide more stringent supervision. Banks failed in 1994, 1995 and 1996. The deposit insurance scheme was used to support failing small banks and the state propped up failing large banks. In 1996 the Stabilisation Programme helped to strengthen public confidence in the banking system. By 1998 large inflows of foreign direct investment helped to create credit levels through to 2000.

In Hungary the State had a large controlling interest in most banks, but this changed after financial liberalisation when privately owned and foreign banks entered the market. Hungary suffered from bad loan problems mainly due to the fact that shareholders in banks (whether state owned firms or privately owned firms) received large flows of credit. Credit standards were lowered as a result, thus exacerbating the bad loan problem. In 1992 strengthened bank regulations along with a recession, led to banks failing. In 1992 the SBSA enforced rules on bank supervision and new standards were introduced for credit control. While credit to households and enterprises reduced in 1992-1994, the state was forced to intervene five times to help the bad loan problem. By the end of the nineties most of the equity capital of banks was owned by foreign investors while five large banks dominated the banking sector.

The recession in the early 1990's worsened the bad loan problem in Poland. By 1992 new rules on capital adequacy and bad debt provision put extra pressure on banks. In 1993 some co-operative banks failed and weak banks were put under mandatory external control. This trend continued to 1996 and the NBP declared bankruptcy of 61 banks. In the late nineties an increase in the number of foreign banks and the expansion of private banks led to the overall banking system becoming more competitive. By 2002 the number of bank operating in Poland fell, as a result of consolidation and mergers. The bad loan problem worsened as household finance deteriorated.

Results on the relationship between financial deregulation and economic growth (financial variables and Industrial Production) showed, in the Czech Republic, bi-directional causality for M0 and Industrial Production while Credit to Government caused Industrial Production. Industrial Production caused M2, Deposits in Commercial Banks, Deposits held in the Central Bank and Commercial Banks, and Exports & Imports. Hungary had a bi-directional causality between Credit to the Private Sector, Credit to the Non-Financial Sector, Credit to Government, Deposits in Commercial

Banks, Deposits in the Central Bank and Commercial Banks, Exports & Imports and Industrial Production. Industrial Production caused M0 and M2 but not vice versa. Poland showed bi-directional causality for all financial variables (M0, M2, CRPR, CRNF, DPC, DPCC and EXIMP and Ind Prod).

Ratios for M0 and M2 to Industrial Production showed increases for all three countries. Treasury Bill Interest Rates fell for all three. Private Sector Credit to Domestic Credit fell overall in the Czech Republic, it rose overall in Hungary, and fell and then rose in Poland though the end result was lower than the level experienced in 1990. The level of Credit to Government showed the opposite trend for all three countries i.e. in the Czech Republic it increased overall especially at the end of the period, in Hungary and Poland it rose initially and then fell. The level of deposits in commercial banks to deposits in the central bank and commercial banks, rose overall in the Czech Republic showing increased lending activity by the central bank. Hungary showed a steady performance while it increased in Poland. The interest rate ratio fell in all three countries while the Exports&Import ratios rose.

Ratios for profitability showed that the average Return on Equity fluctuated and then rose in the Czech banks, and fell in both Hungary and Poland. The Return on Assets fluctuated and rose in the Czech Republic, steadied then rose and fell in Hungary, and fluctuated then fell in Poland. The Equity Multiplier ratio rose overall in the Czech Republic and fluctuated in both Hungary and Poland.

Efficiency ratios indicated that Non Interest Earnings to Total Assets rose overall in the Czech Republic, fluctuated in Hungary and fell in Poland. Total Expenses to Total Assets fluctuated in the Czech Republic, fluctuated and then steadied in both Hungary and Poland.

Bad loans fluctuated and then steadied in the Czech Republic and fell in Hungary and Poland.

In conclusion financial deregulation led to financial development (M0 and M2 increased overall for all three countries over the period). Financial deregulation led to economic growth as private sector credit increased in Hungary, there were increases from the mid nineties in Poland and it was steady in the Czech Republic. Causality was established between financial deregulation/development and economic growth with bi-directional causality established for the majority of financial variables and industrial production.

1.0 Introduction

This study examines the effect financial deregulation has on financial development, and the extent to which this impacts on economic growth in three countries: the Czech Republic, Hungary and Poland. This chapter answers the following questions:

- i) does financial deregulation lead to financial development in the Czech Republic, Hungary and Poland?
- ii) does financial development lead to economic growth in the three countries?
- iii) is causality established between financial deregulation/development and economic growth?
- iv) what direction/s does it take?

The chapter is organized as follows:

Section 2 examines the background to financial sectors in the three countries.

Section 3 investigates empirical findings on financial deregulation/development and economic growth in other countries.

Section 4 presents empirical findings on financial deregulation in the Czech Republic, Hungary and Poland.

Section 5 examines the relationship between financial variables and industrial production using ratio analysis.

Section 6 analyses bank profitability using ratios.

Section 7 analyses bank efficiency using ratios.

Section 8 examines bad loans.

Section 9 summarises results to date.

Section 10 concludes the chapter.

2.0 Financial Sector in the Czech Republic, Hungary and Poland

Below is a presentation of all the monetary financial institutions in the three countries in 2003. Note that the Czech Republic's total MFI's equals 36% of Hungary's MFI's. In turn Hungary's total equals 36% of Poland's MFI's.

Table 2.1 Monetary Financial Institutions

Countries	All MFI's	Central Bank	Credit Institutions	Money Market Funds
Czech Republic	86	1	77	8
Hungary	238	1	222	15
Poland	661	1	660	0

Source: European Central Bank, List of Monetary Countries in the Accession Countries, February 2004. Above is the number of financial institutions currently existing in the three countries. A breakdown of each country is shown in the next section.

Table 2.2 Czech Republic

	Total Banks	State Banks	State Owned Banks	Czech Controlled	Total	Foreign Controlled Banks	Bank Branches	Total
Jan90	5	4	1	0	5	0	0	0
Dec 1990	9	4	1	4	9	0	0	0
Dec 1991	24	4	1	15	20	4	0	4
Dec 1992	37	1	4	212	26	9	2	11
Dec 1993	52	1	5	28	34	12	6	18
Dec 1994	55	1	5	28	34	13	8	21
Dec 1995	55	1	6	25	32	13	10	23
Dec 1996	53	1	6	23	30	14	9	23
Dec 1997	50	1	6	19	26	15	9	24
Dec 1998	45	1	5	14	20	15	10	25
Dec 1999	42	1	4	10	15	17	10	27
Dec 2000	40	1	4	9	14	16	10	26
Dec 2001	38	0	3	9	12	16	10	26
Dec 2002	37	0	2	9	11	17	9	26
Dec 2003	35	0	2	7	9	17	9	26

Source: Czech Central Bank Website¹

¹ http://www.cnb.cz/en/bd_ukazatele_tab01.php

Hungary

Table 2.3

Number of Financial Institutions by Type 1990-1995 (End of Period)

	1990	1991	1992	1993	1994	1995
Commercial banks of which:	20	31	32	35	36	35
Hungarian owned	12	18	16	15	15	14
Foreign or Jointly owned	8	13	16	20	21	21
Specialised Financial Institutions	9	5	8	8	8	8
Insurance Companies	6	11	13	13	13	13
Savings Co-operatives	260	259	258	255	255	255

Source: National Bank of Hungary (includes one off-shore bank)

Poland

Table 2.4

Polish Banks 1993-2002

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Commercial Banks of which:	87	82	81	81	83	83	77	74	71	64
Banks with majority public sector interest of which:	29	29	27	24	15	13	7	7	7	7
Directly owned by Treasury	16	15	13	8	6	6	3	3	3	3
Indirectly owned by Treasury	11	11	11	13	8	7	4	4	4	4
Owned by NBP	2	3	3	3	1	0	0	0	0	0
Banks with majority private sector interest of which:	58	53	54	57	68	70	70	67	64	57
Under Polish control	48	42	36	32	39	39	31	20	16	10
Under foreign control	10	11	18	25	29	31	39	47	48	47
Co-operative banks	1608	1653	1610	1394	1295	1189	781	680	642	608
Total Banks	1740	1694	1591	1475	1378	1272	858	754	713	692

Source: National Bank of Poland, General Inspectorate of Banking Supervision
Summary Evaluation of the Financial Situation of Polish Banks, October 2002

2.1 Developments in the Banking Sector 1990-2003

1.1.1 Czech Republic

In 1990, with the changeover to a market based economy, the Czech monobank system was split into a two tier system: the Czech National Bank and four state financial institutions. By 1992 there was only one state financial institution left – Konsolidacni Banka (KOB), which acted as the receiver for the other banks bad debts². The government initiated several operations to clean up the bad loan problem: in 1991 a block of credits issued by the old monobank was transferred from Komerčni Banka to KOB. That same year four banks were recapitalized. Also the National Property Fund issued bonds to two banks to increase their capital. The KOB purchased 15 billion Czech Kroner for 80% of their face value from three banks, with the banks writing of the final 20%. In 1993 the NPF provided capital of three billion to the KOB, and in 1994 they provided further funds of 15.8 billion to KOB for income losses due to bankruptcies. More funds were provided in 1995 to strengthen KOB reserves to fifteen billion.

By 1993 out of fifty two banks, only twenty four banks were fully Czech owned. Czech banks tended to grant credit to non-financial enterprises and households, rather than the State. Banks credits to the State accounted for around 5% of bank assets and the State avoided major budgetary deficits. The Czech Republic still suffered from bad loans. 50% of assets were in the form of bank loans with 39% classified as non-performing by 1995. In 1994 the Czech National Bank strengthened its supervisory powers under the amendment of the Banking Act, which also provided a national system of deposit insurance. The CNB also issued regulations under the Banking Act covering capital adequacy ratios – 6.25% by the end of 1993 and 8% by 1996. The credit risk was limited to 25% of the bank's capital. Banks had to classify loans into five categories with reserves being set according to the severity of the bad loan category.

In 1994 and 1995 three banks failed. – Credit and Industrial Bank, AB Bank and Bohemia Bank and these failures exhausted the new deposits insurance fund. More small banks failed in 1996, followed by the sixth largest bank failing – Kreditni Banka. The banking sector consolidated with the failures of small and medium sized banks. The State took some control of the country's newest bank, which reversed any movements forward in the privatization process.

In 1994 the Prague Stock Exchange opened. This followed the first wave of mass voucher privatization in 1991, when all adults were permitted to purchase 100 voucher points. Later there was a second wave in 1993. By 1999 over a thousand joint companies had shares traded on the stock exchange, where most of the adult population owned shares from the voucher scheme. Shares also traded on the over the counter market where larger sized blocks of trade took place.

Bankruptcy courts were available though much of transition policy aimed at avoiding bankruptcies. The bankruptcy process was backlogged and firms' managers received

² Op. Cit. Anderson, R.W. and Kegels, C. 1998, Chapter 6: The Czech Republic

increased protection while creditors faced unpredictable consequences. Generally Czech banks were healthy as the NPF gave handouts, and bad loans could be transferred to the KOB. In 1995-1996 when smaller banks failed, the deposit insurance scheme was used to fund up to prescribed limits. When a large bank failed, the State stepped in with additional support. This type of support can prove problematic as the monitoring processes set up are not the mechanisms used to check the robustness of individual banks. The question of stability of the overall banking system became doubtful. This consolidation undermined public confidence in the banking sector³. The Czech government introduced the “Stabilisation Programme” which involved the purchase of insolvent receivables from banks at their nominal value.

The currency turmoil in 1997 did not have a catastrophic effect on the banking sector, as the Czech banks passed on foreign borrowing to domestic companies as foreign exchange loans. The economic recession in 1997-1998 did affect the banking sector as domestic firms under-performed and credit risks were exacerbated. However the banks were not also under pressure due to currency risk, and the scope of the crisis was reduced. By mid 1998 there was a slowdown in credit growth as banks struggled to clean up their credit portfolios and find suitable credit projects. At the same time there was a major inflow of foreign direct investment. Foreign investors took large interest in domestic companies and obtained controlling stakes in them. This avoided the problem of poor credit channels. This large inflow of foreign investment continued until 2000 and the Czech banks provided credit to foreign investors and deposited money with foreign banks. The outflow of money offset any exchange rate impacts of the increased flows of FDI.

By 2001 the Czech Republic had thirty eight banks and foreign bank branches⁴. Since 1989 sixty three licenses had been granted with twenty five terminated by the CNB Banking Supervision: seventeen of these because of weak financial condition and non-compliance with prudential rules. Since 1998 the majority of banks have been controlled by foreign investors and by the end of 2001, they totally dominated the Czech banking sector. Foreign owners held a 70% stake in the total equity capital by 31st December 2001, which represented an increase of 15.5% on 2000. A large share of this (over 50%) is concentrated in EU member states. Concentration in the banking sector increased in 2001. The banking sector’s net profit amounted to CZK 17.0 billion which represented an increase of 14.4% on 2000, with every bank group recording a profit⁵. Productivity and efficiency in the Czech banking sector increased by 21.9% in 2001, resulting from a growth in total assets and a reduction in employees. There was also a decrease in operating expenses, a reduction of 0.07% to 2.11% by 31st December 2001.

In recent years, the banks in the Czech Republic have become more involved in derivatives transactions⁶. Since 1994 six building societies have been in operation and

³ Zdenek, Tuna. Czech National Bank, Banking Sector Development in the Czech Republic, November 2002, http://www.cnb.cz/pdf/tuma_nov_2002.pdf

⁴ Czech National Bank, Banking Supervision in 2001, The Banking Sector in 2001, pp2-5

⁵ Ibid. Czech National Bank, pp26-27

⁶ Ibid. Czech National Bank, pp22

are regulated by both the Act on Banks and an additional law regulating building society savings schemes⁷.

2.1.2. Hungary

During liberalization in 1989, the size of the banking system in Hungary changed only gradually⁸. In June 1990 forty one banks, financial institutions and securities trading companies, opened the Budapest Stock Exchange. By 1991 the State was the largest shareholder in the five largest banks. While there was reduced State involvement in the medium-sized commercial banks, they were owned at least partly, by the State. When state owned firms or privately owned firms own shares in banks, generally they receive a flow of credit from that bank. This can lead to reduced credit standards, and explains the large amount of problematic loans in Hungary during the 1990's. From 1991 onwards, there was a dramatic increase in the entry of privately owned and foreign banks. By the end of 1991, trading in Hungarian treasury securities was introduced in the Stock Exchange. In 1992 strengthened banking regulation and a recession led to several institutions closing and a reduction in the demand for new licenses, thus reducing the number of active institutions.

In December 1992, the New Banking Act, put bank supervision under the State Banking Supervision Agency. The SBSA enforced rules on capital adequacy standards, assets classification and provisioning, lending limits and liquidity ratios. The capital adequacy was increased to 8%, though there were exemptions for some, until the end of 1994. New standards were imposed for defining loan losses and there was a limit on lending to a single customer to a maximum of 25% of the bank's adjusted capital. The New Banking Act set up the creation of a deposit insurance fund by January 1993. Also in 1993 increased foreign interest led to the opening up of new financial institutions. At the end of 1994, only the Hungarian Foreign Trade Bank had been privatised, and then only part of it was privatised. Hungary began to reduce its refinance credits for short-term loans, but they remained strong for long term debt. Credit to enterprises and households reduced from almost 41% in 1992 to just over 36% in 1994. Between 1992 and 1994 the State was forced to intervene five times in order to clean up the bad loan problem. Some bad loans were swapped to consolidation bonds, with others being transferred to specialised state-owned financial institutions. Banks with partial foreign owned ownership did not suffer from the same extreme of bad loans, and their position was generally good over this time period. The privatization law in 1995 led to the Budapest Bank being privatized in 1996. Stock market activity increased at this time, though it still remained underdeveloped.

In 1997 banking and capital market supervision were brought under one roof. The Act on the HFSA of 1999 established the agency as a national public administration organization. It operated under the direction of the government and was supervised by

⁷ Ibid. Czech National Bank, pp2

⁸ Op. Cit. Anderson, R.W. and Kegels, C. 1998, Chapter 4: Hungary

the Minister for Finance. By 2000 foreign ownership in the financial system was very high⁹, with foreign intermediaries owning over 70% of the equity capital of banks. Government ownership of banks reduced considerably, down to 17%, with plans by the government to reduce this even further. The largest five banks accounted for over 70% of household liabilities to households. Domestic financial intermediation remained low by international standards though the recent pace of credit growth deepened intermediation. The HFSA (Hungarian Financial Supervisory Authority) was formed due to the merger of the Hungarian Bank and Capital Market Supervision, the State Insurance Supervision and the State Pension Fund Supervision.

By 2002 the Budapest Stock Exchange rose to a high of 8,397.30. The Budapest Commodities Exchange also operated. The NBH continued to support initiatives to upgrade and develop capital market regulations, and encouraged deepening and increased concentration of the domestic government securities market¹⁰. Supervision of Hungary's capital markets was conducted by the HFSA. The overall capitalization of the BSE increased from eight hundred and eighty four billion forint in 1994 to seven thousand, three hundred and six billion forint in 1999¹¹. Insurance operations in Hungary were governed by Act XCVI on Insurance Institutes and Insurance Activities of 1995 (the Insurance Act)¹². Hungary applied the EU standards on minimum capital and solvency margins for both life and non-life insurance.

In 2003 Hungary had one of the most developed banking systems of Central and Eastern Europe¹³. Thirty three commercial banks, fourteen specialised institutions and two hundred co-operative credit institutions were in operation. Foreign ownership was high in the financial system. Foreign intermediaries owned over 70% of the equity capital of banks. The government owned only 17% of registered capital and planned to reduce it. Concentration remained high in the banking system and competitiveness in the retail sector depended on a bank's branch network. The largest five banks accounted for over 70% of bank liabilities to households. However competition had increased in all business segments.

2.1.3. Poland

The Polish banking sector transformed considerably at the end of the 1980's, and by 1990 there was the establishment of new banking institutions, created from the National Bank of Poland branch network¹⁴. Nine commercial banks were set up along with a large savings bank. The banking system also comprised several treasury stock commercial banks, co-operative agricultural banks, joint-stock commercial banks and ten

⁹ Report on the Observance of Standards and Codes, International Monetary Fund, Monetary and Exchange Affairs, Washington, Hungary April 2001

¹⁰ Monthly Report (includes data up to the end of March 2002), National Bank of Hungary, Statistics Department, Summary, Budapest, May 2002, pp20

¹¹ Op. Cit. Report on the Observance of Standards and Codes, April 2001, pp18

¹² Ibid. pp13-15

¹³ Ibid. pp6

¹⁴ Annual Report, Bank Slaski W Katowicach, 1990, pp4-7

representative offices of major foreign banks. While the system was hampered by a lack of qualified staff and banking premises, undercapitalisation and a poor telecommunications infrastructure, the overall economic climate was in a much improved state compared to the preceding year. Then, inflation was almost 2000% annually, with the budget in deep deficit and the authorities had lost control of credit growth. In 1990 the new government launched a successful stabilisation and liberalisation programme. The newly decentralized banking system emerged and the Polish authorities, who had previously controlled the banking sector, began to remove government accounts from balance sheets. The Polish banking system was governed by the National Bank of Poland (31st January 1989) and the Banking Act (31st January 1989). It was regulated and supervised by the National Bank of Poland.

By 1991 the government's tight monetary policy led to reduced credit, which hindered banks' ability to expand and grow¹⁵. Inflation was high, though reduced to a two digit figure. The whole economy was in a deep recession and recovery took longer than expected. Generally bank profits were low and there was an increase in bad debts. The banking sector became more market oriented and the nine state-owned commercial banks were transformed into Treasury joint stock companies. The Warsaw Stock Exchange emerged with nine shares being quoted by the end of the year. The number of independent banks rose and all banks increased their branch network.

1992 saw the introduction of open market transactions, initiated by the central bank¹⁶. Treasury bills and inter bank deposits were still the most common form of instruments used, with the range of instruments on the Polish money markets still very limited. The number of companies on the Warsaw Stock Exchange increased from nine to sixteen, and shares of companies were still the main instrument on the capital market. Though activity increased on the Stock Exchange, it was still small by international standards. There was commencement of trading in Treasury notes, and the number of brokerage houses, licensed brokers and investor service points increased. However by 1992, licensing of banks had become more restrictive. New regulations required the minimum capital of a bank from twenty to seventy billion zloty, which put pressure on existing banks to raise their capital to the new minimum. A new directive prevented laundering of money, and another concerned making provision for bad debts. Bad debts continued to be a problem for banks, while the new requirement for extra provision for bad loans put extra pressure on banks.

In 1993 there was a positive change in the economic climate. Cash resources of households increased and zloty deposits of the non-financial sector rose¹⁷. Bad debts were a constant burden to banks. The Act on Enterprise and Bank Financial Restructuring and Changes to Other Laws, came into force. Bank mergers and take-overs of troubled banks took place. Some co-operative banks were declared insolvent by the President of the National Bank of Poland. Weak banks were put under mandatory external management. The National Bank of Poland finally ceased its commercial

¹⁵ Annual Report, Bank Slaski W Katowicach, 1991, pp2-9

¹⁶ Annual Report, Bank Rozwoju Eksperty SA, 1992, pp7-8

¹⁷ Annual Report, Bank W Slaski Katowicach, 1993, pp12-14

banking activity. The Warsaw Stock Exchange began to attract more interest from potential customers, as falling interest rates encouraged customers to turn away from banking deposits. The legal framework needed for the Mass Privatisation Programme was put in place.

By 1994 economic growth was strengthened and accelerated¹⁸. Interest rates had declined substantially, with overall bank debt rising by 25%. Bad debts continued to increase and reducing inflation led to households increasing their savings. While gross profit was down over 70% for banks, they managed to establish a basis for sustainable improvement in their financial standing and loan portfolios. Banks made consolidation agreements, along with co-operatives. Various strategic alliance and mergers took place and the Stock Exchange activity increased initially, followed by a dramatic downturn. While the reduction in demand meant a decline of almost 73% in the value of turnover, there was recognition that the stock exchange was following a natural state in its development.

Banks witnessed stronger growth in 1995. Loan portfolios grew and improved, and financial results were higher than achieved previously¹⁹. Major restructuring continued with weaker banks being taken over by domestic and foreign banks. Some banks were forced out of the market altogether. The NBP declared bankruptcy of two banks and fifty nine co-operative banks. The Bank Consolidation Act was passed which stated that only banks, whose only shareholder was the State Treasury, could be consolidated.

1996 saw economic growth rise by 61%, with consumer prices falling and producer prices remaining steady. The cause of growth was high domestic demand in consumption and investment²⁰. 1997 witnessed economic growth rising to 6.9%, reflecting high domestic demand resulting from increased consumer purchasing power and expansion of bank loans. Amendments were made to the Act on the National Bank of Poland and the Banking Law, to bring the country closer to EU requirements. The Monetary Policy Council and the Banking Supervision Commission were established, and a new Act on Housing Savings and Loans was passed. This created separate banks for servicing these products. The Act on Mortgage Bonds and Banks was passed in August 1997, which led to separate mortgage banks being established with the right to issue mortgage bonds. The process of privatizing the banking sector continued with more and more banks being privatized. Banks began to focus more and more on the retail market as opposed to the previous focus on corporate clients. Branch networks were expanded with four hundred new branch offices being opened. Banks also developed investment banking, and new trust fund societies were established. Interest in commercial papers from the corporate sector also grew, with commercial papers being used as a source of financing and for investing funds. Economic growth fostered growth in the banking sector with balance sheets growing at almost 30%.

¹⁸ Annual Report, Bank W Slaski Katowicach, 1994, pp20-21

¹⁹ Annual Report, Bank W Slaski Katowicach, 1995 pp26-27

²⁰ Annual Report, Bre Bank SA, 1997, pp8-17

By 1998 banks' gross profits fell by 20%, with net profits falling by 36%²¹. The Banking Supervision Committee had responded to the Russian crisis and insisted that banks create 100% provision for Russian exposures. Higher reserve requirements, falling inflation and large investment in new technology and branch networks, led to a deterioration in banks' results. Foreign ownership of banks increased by 6.5% to 48%, while the State Treasury reduced its holdings. Further privatization of banks took place, and ten banks became involved in the creation of pension fund companies. Two direct banks emerged, offering services and products in micro branches to clients, via a limited amount of staff.

The next two years saw improved performance for Poland, with stronger macroeconomic fundamentals, steady bank privatization, and an increase in foreign investment in the financial sector²². Retail banks, both majority Polish owned and foreign owned, developed new strategies, increased training of staff, and expanded systems to capture new markets. Privatisation of banks increased, and capital almost doubled. While this figure for capitalization was low by international standards, it represented a major increase for Poland. Banks continued to take on increasing risk though increased attention was focused on risky sectors. Earnings were weaker than before, reflecting tightened margins in traditional areas of lending. Liquidity was strong for banks, and the easing of reserve requirements increased the amount available for lending. Deposits continued to be concentrated, with three banks accounting for almost 50% of total deposits. The Warsaw Stock Exchange opened new trading floors, and direct bank lending to the state sector declined further. There was increased harmonization of laws and regulations with the Joint Forum on Financial Stability driving the necessary changes, to create an environment more conducive to ongoing investment. Increased consolidation of banks took place with more foreign banks entering the market. Private banks expanded with major increases in the retail market. Overall the banking system became more competitive with most banks diversifying. There were huge gains in reducing the electronic and systems gaps that had existed. Interbank markets functioned well, though they remained thin. Management of banks improved, with high levels of public confidence in the overall system.

2001 was a difficult year for Poland generally, with growth slowing considerably²³. There was a large deficit in public finance, which seriously eroded the credibility of fiscal policy. There was a reduction in investment which affected all areas of banking. By 2002 there were signs of a recovery. Increased signs of confidence appeared, and private consumption increased. Interest rate cuts helped to increase levels of lending though overall activity was sluggish. The number of commercial banks in Poland reduced from seventy one to sixty four, due to consolidations²⁴, with a resulting loss of commercial bank offices (three hundred and thirty one in all since 2001). Mergers took place (Powszechny Bank Kredytowy SA and Bank Przemyslowo-Handlowy SA, and of

²¹ Annual Report, Bre Bank SA, 1998, pp11-16

²² An Assessment and Rating of the Polish Banking System 2000, Final Report, USAID Mission to Poland, URL:<http://www.usaid.gov/pl/2000bank.htm>

²³ International Monetary Fund, Article IV Consultation Concluding Statement of the IMF Mission, Poland, 2002, <http://www.imf.org.external/np/ms/2002/031402.htm>

²⁴ National Bank of Poland, Summary Evaluation of the Financial Situation of Polish Banks, General Inspectorate of Banking Supervision, First Half 2002, Warsaw, October 2002

Pomorski-Kujawski Bank Regionalny SA and Gospodarczy Bank Wielkopolski SA). Two new banks entered the market, MHB Bank Polska SA and Bank of Tokyo-Mitsubishi (Polska) SA. Three banks appointed administrators due to a rapid deterioration in their financial condition (Bank Spolem SA, Bank Wschodni SA and Wschodni Bank Cukrownictwa SA). The number of co-operative banks fell from six hundred and forty two to six hundred and eight, due to thirty four bank mergers. Banks strengthened their market position by developing electronic banking services, and staff numbers fell dramatically due to the introduction of new technology and mergers. The financial situation of households deteriorated, which meant the quality of consumer loans deteriorated also, leading to a 1.8 point increase in the proportion of these loans being classified as irregular.

By 2003 Poland continued to abstain from the foreign exchange market. This meant that Poland did not suffer from volatile market expectations. In the banking system credit growth remained slow with, with classified loans remaining high and profits low. Problem loan growth had fallen, with capital adequacy ratios for most banks remaining high. A new bankruptcy law was introduced and increased privatization took place, though scope remained for further privatization.

3.0 Empirical Estimate of the Theoretical Relationship between Financial Deregulation/Development and Economic Growth

Numerous studies have examined the relationship between financial liberalization and economic growth. Kar and Pentecost²⁵ studied economic growth in Turkey and found that the different variables used, affected results. With the money to income ratio, causality ran from financial development to economic growth while with bank deposits, causality ran in the opposite direction – from economic growth to financial development. Using private credit and domestic credit, causality also ran from economic growth to financial development. Calderon and Liu²⁶ examined one hundred and nine developing and industrial countries²⁷ over three decades and found bi-directional causality between

²⁵ Kar, Mushin. And Pentecost, Erick. J. “Financial Development and Economic Growth in Turkey: further evidence on the causality issue”, Economic Research Paper No. 00/27, Loughborough University, Department of Economics, December 2000

²⁶ Calderon, Cesar. And Liu, Lin. “The Direction of Causality between Financial Development and Economic Growth”, Central Bank of Chile Working Papers, No 184, October 2002

²⁷ Argentina, Australia, Austria, Barbados, Belgium, Canada, Chile, Denmark, Finland, France, Germany, Iceland, Ireland, Israel, Italy, Japan, Mauritius, Mexico, Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, Trinidad and Tobago, United Kingdom, United States, Uruguay, Venezuela, Algeria, Bangladesh, Benin, Bolivia, Botswana, Brazil, Burkina Faso, Burundi, Cameroon, Cape Verde, Central Africa, Chad, China, Colombia, Congo, Costa Rica, Cote d'Ivoire, Cyprus, Dominican Republic, Ecuador, El Salvador, Ethiopia, Fiji, Gabon, Gambia, The Ghana, Greece, Guatemala, Guyana, HAITI, Honduras, India, Indonesia, Jamaica, Kenya, Korea, Republic Lesotho, Liberia, Madagascar, Malawi, Mali, Malta, Mauritania, Morocco, Mozambique, Myanmar, Nepal, Nicaragua, Niger, Nigeria, Oman, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Portugal, Rwanda, Senegal, Seychelles, Sierra Leone, Singapore, Somalia, South Africa, Sri Lanka, Sudan, Swaziland, Syrian Arab, Republic Tanzania, Thailand, Togo, Tunisia, Turkey, Uganda, Zambia, Zimbabwe

financial development and economic growth. They also saw that the impact of financial development on economic growth is more positive the longer the time period studied, which indicates that it takes time for financial deepening to affect the real sector.

Oks²⁸ looked at ten countries²⁹ and found mixed results: four out of ten countries indicated a relationship with causality running from financial development to economic growth (Bulgaria, Czech Republic, Estonia and Poland). McLean and Shrestha³⁰ studied forty developing/developed countries³¹ and conclude that foreign direct investment and portfolio flows affect economic growth positively, while bank inflows have a negative effect on economic growth. Aziakpono³² found mixed results in studies of Botswana, Lesotho, Namibia, South Africa and Swaziland. These countries form the Southern Africa Custom Union (RAND) Common Monetary Area. South Africa had causality running from financial intermediation to economic growth, but in the other four countries, causality ran from growth to financial development. Demetriades and Law³³ discovered, in their studies of seventy two countries over two decades³⁴, that a sound institutional framework was needed in order for financial systems to operate. A framework such as this allowed financial development to affect growth positively, while the absence of it could easily lead to a failure of growth.

Darrat³⁵ examined Saudi Arabia, Turkey and the United Arab Emirates and found that financial deepening is a necessary causal factor of economic growth. Andreisz et al³⁶ studied Poland over eleven years and found a long run positive relationship between financial liberalization and economic growth, and causality between the two variables running from the former to the latter.

²⁸ Oks, Andrus. "Efficiency of the Financial Intermediaries and Economic Growth in CEEC", University of Tartu, Faculty of Economic and Business Administration, Tartu, 2001

²⁹ Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, Slovenia

³⁰ Op. Cit. Abstract, ppi

³¹ Argentina, Australia, Austria, Brazil, Canada, Chile, Columbia, Denmark, Finland, France, Germany, Greece, India, Indonesia, Ireland, Israel, Italy, Japan, Kenya, Korea, Malaysia, Mexico, Netherlands, New Zealand, Norway, Pakistan, Peru, Philippines, Portugal, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Thailand, United Kingdom, United States, Uruguay, Venezuela, Zimbabwe

³² Aziakpono, Meshach. "Financial Intermediation and Economic Growth in Economic Integration: the Case of SACU", National University of Lesotho, Department of Economics

³³ Demetriades, Panicos and Law. Siong Hook. "Finance, Institutions and Economic Growth", University of Leicester, Working Paper, No 04/05, February 2003

³⁴ High Income: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, United Kingdom, United States. Middle Income: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cyprus, Dominican Republic, Ecuador, El Salvador, Guatemala, Iran, Jamaica, Korea, Malaysia, Mexico, Nicaragua, Panama., Papua New Guinea, Paraguay, Peru, South Africa, Syria, Uruguay. Low Income: Algeria, Bangladesh, Cameroon, Egypt, Gambia, Ghana, Haiti, Honduras, India, Indonesia, Kenya, Malawi, Niger, Pakistan, Philippines, Senegal, Sierra Leone, Sri Lanka, Tanzania, Thailand, Togo, Tunisia, Zimbabwe, Zambia

³⁵ Op. Cit. Darrat, Ali. F. 1999

³⁶ Andreisz, Ewa et al, "The Linkage between Financial Liberalisation and Economic Development: Empirical Evidence from Poland", Discussion Paper Series, No 03/03, City University, Department of Economics, School of Social Sciences, abstract

Stock market liberalization was also found to increase economic growth – see Bekaert et al³⁷ for a positive relationship in Japan, Iceland, Malta, New Zealand and Spain. Caporale et al³⁸ found the same result in the long run for Argentina, Chile, Greece, Korea, Malaysia, Philippines and Portugal. Choong et al³⁹ found a long-run positive impact on economic growth when they studied stock market development in Malaysia, and that it also caused economic growth. Filer et al⁴⁰ found the same results especially for less developed countries. In their study sixty nine countries⁴¹ were examined: high income, upper middle, low middle and low income countries.

4.0 Empirical Evidence of the Theoretical Relationship between Financial Deregulation/Development and Economic Growth in the Czech Republic, Hungary and Poland, for years 1990-2003

To date there is no comprehensive study of these three countries over this time period, of the relationship between financial deregulation and economic growth. Oks addresses it to some extent in his 2001 works⁴², though his time frame for all countries is short: the Czech Republic is covered for years 1993-1999, Hungary 1992-1999 and Poland 1992-1999. Here the study is extended to cover years up to 2003, and open economy effects are used – imports and exports. Andriesz et al⁴³ examine Poland and find positive results with financial liberalization causing economic growth. The data sample used here is followed and this study also follows Gupta⁴⁴ by using industrial production as a proxy for economic growth. The following variables are used: M0, M2, Ratio of Credit to the Private Sector to Industrial Production, Three Month Treasury Bill Rate, Credit to Non-Financial Sector, Credit to Government, Domestic Deposits of Non-Financial Sector in Commercial Banks, Domestic Deposits of Non-Financial Sector in Central Bank and Commercial Banks. In line with Oks the interest rate spread is examined and like Darrat nominal GDP is used (with the investigation into the openness to trade variable: the ratio of exports and imports to nominal GDP). There is also an examination of the ratio of bad

³⁷ Bekaert, Geert, Harvey, Cambell, R. and Lundblad, Christian. “Does Financial Liberalisation Spur Growth”, NEBR Working Paper, No 245, 2001

³⁸ Caporale, Guglielmo Maria et al, “Stock Market Development and Economic Growth: the Causal Linkage”, Journal of Economic Development, Vol 29, No 1, June 2003, pp33

³⁹ Choong, Chee et al, “Financial Development and Economic Growth in Malaysia: the Stock Market Perspective”, 2003, Economic Working Paper Archive at WUSTL - Macroeconomics

⁴⁰ Filer, Randall. K et al, “Do Stock Markets Promote Economic Growth?”, Working Paper No. 267, September 1999

⁴¹ High Income: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Singapore, Spain, Sweden, Switzerland, United Kingdom, United States, Cyprus, Greece, Israel, Korea, Portugal. Upper Middle Income: Argentina, Botswana, Brazil, Chile, Czech Republic, Hungary, Malaysia, Mauritius, Mexico, Oman, Poland, Saudi Arabia, Slovakia, South Africa, Trinidad and Tobago, Turkey, Uruguay, Venezuela Uruguay. Low Middle and Low Income: Bangladesh, China, Columbia, Ecuador, Egypt, India, Indonesia, Iran, Jamaica, Jordan, Kenya, Morocco, Namibia, Nigeria, Pakistan, Panama, Paraguay, Peru, Philippines, Sri Lanka, Thailand, Tunisia, Zimbabwe.

⁴² Op. Cit. 2001

⁴³ Op. Cit. 2003

⁴⁴ Op. Cit. 1984

loans to overall lending by banks, and the focus is on banking development as opposed to stock market development.

4.1 Data and Methodology

All data was taken from the EU Commission⁴⁵, Central Bank Annual Reports for the three countries, Annual Reports from various banks, Information Bulletins, the International Monetary Fund⁴⁶, Abel et al⁴⁷, and Anderson et al⁴⁸. The Dickey Fuller (DF) and Augmented Dickey Fuller (ADF) tests were used to implement stationarity tests. The investigation of the relationship between financial development and economic growth used techniques of cointegration and Granger causality. Error correction models were used. Here the F-statistic is established, for testing the joint null hypothesis that the coefficients of these level variables are zero i.e. there exists no long-run relationship between them.

Variables were selected for the following reasons:

- a) Amount of bad loans, to measure the effectiveness of the banking sector from 1990-2003
- b) Quarterly Industrial Production (seasonally adjusted) is used as a proxy for economic growth. Data is provided from Quarter 1 1993 to Quarter 4 2003 for the Czech Republic, Quarter 1 1990 to Quarter 4 2003 for both Hungary and Poland
- c) Two different definitions of money are used: M0 and M2 to measure the monetary effects of financial liberalization. A higher ratio of M2 to industrial production implies greater financial intermediary development. Data is provided for both variables from Quarter 1 1993 to Quarter 4 2003 for the Czech Republic, for Quarter 1 1993 to Quarter 4 2003 for M0 and quarter 4 1990 to Quarter 4 2003 for M2 in Hungary, and Quarter 1 1990 to Quarter 3 2003 for both variables for Poland.
- d) Credit to the Private Sector to Domestic Credit, measures the magnitude of the banking sector. The supply of credit to the private banking sector is viewed as being responsible for the quantity and quality of investment, and for economic growth. Data from Quarter 1 1993 to Quarter 2003 for the Czech Republic, and from Quarter 1 1990 to Quarter 4 2003 for both Hungary and Poland is used.
- e) Three Month Treasury Bill Interest Rate as a ratio of Industrial Production. Data from Quarter 3 1993 to Quarter 4 2003 for the Czech Republic, Quarter 1 1990 to Quarter 4 2003 for Hungary, and from Quarter 2 1992 to Quarter 4 2003 for Poland is used.

⁴⁵ <http://www.europa.eu.int>

⁴⁶ <http://www.imfstatistics.org>

⁴⁷ Abel, I. Siklos. And Szekely, P. I., *Money and Financial in the Transition to a Market Economy*, Cheltenham, Edward Elgar Publishing Limited, 1998

⁴⁸ Anderson, R.A. and Kegela, C. *Transition Banking, Financial Development of Central and Eastern Europe*, Oxford, Clarendon Press, 1998

f) Credit to Government to Overall Credit indicates the amount available for government investment. Data ranges from Quarter 1 1993 to Quarter 4 2003 in the Czech Republic, Quarter 1 1990 to Quarter 4 2003 for both Hungary and Poland.

g) The Ratio of Domestic Credit issued by deposit banks, to Domestic Credit issued by Deposit Banks and the Central Bank, measures the role of the central bank in lending activities. A lower amount of loans issued by the Central Bank is deemed as preferable, as commercial banks are assumed to be able to select higher return projects. Data for both variables from Quarter 1 1993 to Quarter 4 2003 in the Czech Republic, and for both variables from Quarter 1 1990 to Quarter 4 2003 for both Hungary and Poland is used.

h) Interest Rate Spread - measures the amount of reserves absorbed by the banking sector. Data ranges from Quarter 1 1993 to Quarter 4 2003 in the Czech Republic, from Quarter 1 1990 to Quarter 4 2003 in both Hungary and Poland.

i) Ratio of Total Exports and Imports measures the openness to trade variable. Data covers Quarter 1 1991 to Quarter 4 2003 for exports and imports in the Czech Republic. In Hungary data ranges from Quarter 1 1990 to Quarter 4 2003, and for Poland exports and imports are covered from Quarter 1 1990 to Quarter 4 2003.

4.2 Findings

4.2.1 Unit Root Tests and Engle-Granger Cointegration Tests Results

We apply the Dickey Fuller (DF) and Augmented Dickey Fuller (ADF) tests, and assume lag length 4. The results are presented in tables 2.5 to 2,6 at log levels and first differences, with a trend for log level and without trend for first difference. There is a check that the logarithmic levels contain a unit root, before checking first difference.

Dickey Fuller and Augmented Dickey Fuller Test Results

Unit Root Tests at Levels for the Czech Republic

Unit Root Tests at Logarithmic Levels

Variables

*Evidence of unit root at 5% significance level – the null hypothesis cannot be rejected

*95% Critical Values for the Augmented Dickey Fuller statistic = -3.5279 (with trend) and -2.9400 (without trend)

Table 2.5

	With Trend	Without Trend
Industrial Production		
DF	-.67832*	
ADF(1)	-.81202*	
ADF(2)	-.75398*	
ADF(3)	-.46215*	
ADF(4)	-.10927*	

M0		
ADF(2)	-.11795*	
ADF(3)	-.27692*	
ADF(4)	-1.2132*	
M2		
DF	-2.0177*	
ADF(1)	-1.6082*	
ADF(2)	-1.9596*	
ADF(3)	-1.9570*	
ADF(4)	-2.6900*	
Credit to Private Sector		
DF	-2.1796*	
ADF(1)	-2.1170*	
ADF(2)	-2.3330*	
ADF(3)	-2.2559*	
ADF(4)	-1.9148*	
Three Month Treasury Bill Rate		
DF	-2.2736*	
ADF(1)	-2.3753*	
ADF(2)	-2.4559*	
ADF(3)	-2.3344*	
ADF(4)	-2.2060*	
Credit to Non-Financial Sector		
DF	-2.3494*	
ADF(1)	-2.2636*	
ADF(2)	-2.4338*	
ADF(3)	-2.3667*	
ADF(4)	-2.0554*	
Credit to Government		
DF	-.71845*	
Deposits of Non-Financial Sector in Commercial Banks		
DF	-2.1422*	
ADF(1)	-1.5535*	
ADF(2)	-1.8430*	
ADF(3)	-1.9022*	
ADF(4)	-2.3102*	
Deposits of Non-Financial Sector in the Central Bank and Commercial Banks		
DF	-2.0073*	

ADF(1)	-1.5791*		
ADF(2)	-2.0622*		
ADF(3)	-2.2167*		
ADF(4)	-2.5267*		
Interest Rate Spread			
DF	-1.1793*		
ADF(1)	-1.1467*		
ADF(2)	-.92327*		
ADF(3)	-.84417*		
ADF(4)	-1.1513*		
Exports and Imports			
ADF(1)	-2.1599*		
ADF(3)	-2.7412*		

Table 2.6

Unit Root Tests at First Difference	
Industrial Production	
ADF(4)	-2.3403*
M0	
ADF(2)	-2.5988*
ADF(3)	-1.6831*
ADF(4)	-1.8933*
M2	
ADF(3)	-2.1120
ADF(4)	-2.1632*
Credit to Private Sector	
ADF(1)	-1.9919*
ADF(2)	-1.8555*
ADF(3)	-2.0555*
ADF(4)	-1.7249*
Three Month Treasury Bill Rate	
ADF(4)	-2.8514*
Credit To Non-Financial Sector	
ADF(1)	-2.0071*
ADF(2)	-1.8665*
ADF(3)	-2.0838*
ADF(4)	-1.8169*
Credit to Government	
ADF(2)	-2.3423*
ADF(3)	-2.1842*
ADF(4)	-1.5626*
Deposits of Non-Financial Sector in Commercial Banks	
ADF(3)	-2.5013*

	ADF(4)	-2.1419*
	Deposits of Non-Financial Sector in Central Bank and Commercial Banks	
	ADF(2)	-2.8849*
	ADF(3)	-2.4067*
	ADF(4)	-2.2046*
	Interest Rate Spread	
	ADF(3)	-2.6914*
	ADF(4)	-2.1995*
	Exports and Imports	
	ADF(3)	-2.4742*

*Evidence of unit root at the 5% significance level – the null hypothesis cannot be rejected, *95% Critical Values for the Augmented Dickey Fuller Statistic = -3.5279 (with trend), and -2.9400 (without trend) 123 (Volume 1)

There is evidence of unit root at levels for all variables: Industrial Production, M0, M2, Credit to Private Sector, Three Month Treasury Bill Rate, Credit to Non-Financial Sector, Credit to Government, Deposits of Non-Financial Sector in Commercial Banks, Deposits of Non-Financial Sector in the Central Bank and Commercial Banks, Interest Rate Spread, Exports and Imports, and for first difference for all variables for the Czech Republic.

Dickey Fuller and Augmented Dickey Fuller Results Unit Root Tests at Levels for Hungary

*Evidence of unit root at the 5% significance level – the null hypothesis cannot be rejected

*95% Critical Value for the Augmented Dickey Fuller statistics = -3.4987 (with trend), and -2.9202 (without trend)

Unit Root Tests at Logarithmic Levels Variables Table 2.7

	With Trend	Without Trend
Industrial Production		
ADF(1)	-3.4034*	
ADF(2)	-3.4057*	
ADF(3)	-3.3710*	
(ADF4)	-3.4675*	
M0		
DF	-.73454*	
ADF(1)	-.0049224*	
ADF(2)	-.018447*	
ADF(3)	-.18809*	
ADF(4)	-1.2132*	
M2		
DF	-.34238*	

Credit to Private Sector		
DF	-2.1133*	
ADF(1)	-2.0820*	
ADF(2)	-2.2496*	
ADF(3)	-2.0290*	
ADF(4)	-2.0257*	
Three Month Treasury Bill Rate		
DF	-1.6551*	
ADF(1)	-2.9499*	
ADF(2)	-2.9739*	
ADF(4)	-3.0868*	
Credit to Non Financial Sector		
DF	-2.5748*	
ADF(1)	-2.1402*	
ADF(2)	-2.5096*	
ADF(3)	-2.0257*	
ADF(4)	-2.1119*	
Credit to Government		
DF	-1.4076*	
ADF(1)	-1.3918*	
ADF(2)	-1.3928*	
ADF(3)	-1.2572*	
ADF(4)	-1.3063*	
Deposits of Non Financial Sector in Commercial Banks		
DF	-.50832*	
ADF(1)	-4.036*	
Deposits of Non Financial Sector in the Central Bank and Commercial Banks		
DF	-.50884*	
ADF(1)	-.018340*	
Interest Rate Spread		
DF	-2.1469*	
ADF(2)	-3.0027*	
ADF(3)	-2.7350*	
ADF(4)	-2.5323*	
Exports and Imports		
ADF(1)	-2.1599*	
ADF(3)	-2.7412*	

Unit Root Tests at First Difference
Table 2.8

	Industrial Production	
	ADF(4)	-2.0343*
	M0	
	ADF(2)	-2.5988*
	ADF(3)	-1.6831*
	ADF(4)	-1.8933*
	M2	
	ADF(3)	-2.1120*
	ADF(4)	-2.1632*
	Credit to Private Sector	
	ADF(1)	-1.8594*
	ADF(2)	-.30548*
	Three Month Treasury Bill Rate	
	ADF(4)	-2.7514*
	Credit to Non Financial Sector	
	ADF(1)	-2.0071*
	ADF(2)	-1.8665*
	ADF(3)	-2.0838*
	ADF(4)	-1.8169*
	Credit to Government	
	ADF(1)	-2.3640*
	ADF(2)	-2.4238*
	ADF(3)	-2.1982*
	ADF(4)	-2.1150*
	Deposits of Non Financial Sector in Commercial Banks	
	ADF(3)	-1.3782*
	ADF(4)	-1.1021*
	Deposits of Non Financial Sector in Central Bank and Commercial Banks	
	ADF(3)	-1.3676*
	ADF(4)	-1.1644*
	Interest Rate Spread	
	ADF(3)	-2.6914*
	ADF(4)	-2.1995*
	Exports and Imports	
	DF	-2.3713*
	ADF(1)	-1.9973*
	ADF(2)	-2.2437*
	ADF(3)	-2.0041*
	ADF(4)	-2.4389*

*Evidence of unit root at the 5% significance level–the null hypothesis cannot be rejected
 *95% Critical Value for the Augmented Dickey-Fuller Statistic = -3.5279 (with trend),
 and -2.9400 (without trend)

There is evidence of unit root at levels for variables: Industrial Production, M0, M2, Credit to Private Sector, Three Month Treasury Bill Rate, Credit to Non Financial Sector, Credit to Government, Deposits of Non Financial Sector in Commercial Banks, Deposits of Non Financial Sector in Central Bank and Commercial Banks, Interest Rate Spread, Exports and Imports, and for first difference for all variable for Hungary.

Dickey Fuller and Augmented Dickey Fuller Results

Unit Root Tests at Levels for Poland

*Evidence of unit root at the 5% significance level – the null hypothesis cannot be rejected

*95% Critical Value for the Augmented Dickey Fuller statistics = -3.4987 (with trend),
 and -2.9202 (without trend)

Unit Root Tests at Logarithmic Levels

Variables

Table 2.9

	With Trend	Without Trend
Industrial Production		
DF	-2.5611*	
ADF(1)	-2.8992*	
ADF(2)	-3.1024*	
ADF(3)	-2.8577*	
ADF(4)	-2.3713*	
M0		
DF	-1.0462*	
ADF(1)	-.90151*	
ADF(2)	-1.3878*	
ADF(3)	-2.5550*	
ADF(4)	-1.4797*	
M2		
DF	-2.0176*	
ADF(1)	-1.9865*	
ADF(2)	-2.0883*	
ADF(3)	-2.3171*	
ADF(4)	-2.4956*	
Credit to Private Sector		
ADF(4)	-3.3954*	
Three Month Treasury Bill Rate		
DF	-1.4976*	
ADF(1)	-2.1579*	
ADF(1)	-1.8062*	

ADF(3)	-1.5170*	
ADF(4)	-1.2177*	
Credit to Non Financial Sector		
DF	-2.1876*	
ADF(1)	-2.1111*	
ADF(2)	-2.0398*	
ADF(3)	-2.1783*	
ADF(4)	-2.4490*	
Credit to Government		
DF	-2.2956*	
ADF(1)	-2.0570*	
ADF(2)	-2.1591*	
ADF(3)	-1.9655*	
ADF(4)	-1.9003*	
Deposits of Non Financial Sector in Commercial Banks		
DF	-2.9671*	
ADF(1)	-2.1271*	
ADF(2)	-1.9833*	
ADF(3)	-1.9617*	
ADF(4)	-1.9619*	
Deposits of Non Financial Sector in Central Bank and Commercial Banks		
DF	-1.7566*	
ADF(1)	-1.7857*	
ADF(2)	-2.0411*	
ADF(3)	-2.3013*	
ADF(4)	-2.5799*	
Interest Rate Spread		
DF	-2.4900*	
ADF(1)	-2.4576*	
ADF(2)	-1.3214*	
ADF(3)	-1.2292*	
ADF(4)	-1.7500*	
Exports and Imports		
DF	-2.2561*	
ADF(1)	-1.5676*	
ADF(2)	-1.6121*	
ADF(3)	-1.3012*	
ADF(4)	-2.0472*	

Table 2.10

Unit Root at First Difference	
M0	
ADF(1)	-2.8080*
ADF(2)	-1.1246*
ADF(3)	-2.2053*
ADF(4)	-2.2283*
M2	
ADF(2)	-2.3504*
ADF(3)	-1.9548*
ADF(4)	-2.0751*
Three Month Treasury Bill Rate	
DF	-2.9505*
ADF(4)	-2.8032*
Credit to Non Financial Sector	
ADF(2)	-2.0449*
ADF(3)	-1.6407*
ADF(4)	-1.1983*
Credit to Government	
ADF(4)	-2.1242*
Deposits of Non Financial Sector in Commercial Banks	
ADF(4)	-2.4534*
Deposits of Non Financial Sector in Central Bank and Commercial Banks	
ADF(2)	-2.3869*
ADF(3)	-1.8728*
ADF(4)	-1.8663*
Exports and Imports	
ADF(3)	-1.3824*
ADF(4)	-1.7146*

*Evidence of unit root at the 5% significance level – the null hypothesis cannot be rejected
 *95% Critical Value for the Augmented Dickey Fuller Statistic = -3.5279 (with trend), and -2.9400 (without trend)

There is evidence of unit root at levels for all variables: Industrial Production, M0, M2, Credit to Private Sector, Three Month Treasury Bill Rate, Credit to Non Financial Sector, Credit to Government, Deposits of Non Financial Sector in Commercial Banks, Deposits of Non Financial Sector in Central Bank and Commercial Banks, Interest Rate Spread, Exports and Imports, and for variables M0, M2, Three Month Treasury Bill Rate, Credit to Non Financial Sector, Credit to Government, Deposits of Non Financial Sector in Commercial Banks, Deposits of Non Financial Sector in Central Bank and Commercial Banks, and Exports and Imports for first differences for Poland.

Cointegration tests can be performed for all three countries, to test the long run relationship between variables.

4.2.2 Johansen-Juselius Maximum Likelihood Cointegration Tests

Johansen Maximum Likelihood Procedure

Testing for Cointegration between Industrial Production and other Financial Development Indicators for the Czech Republic

Variables

*rejection of the null hypothesis, that there is no cointegration between variables (that $R = 0$) but does not reject that there is a cointegration relation between two variables ($R = 1$)

Table 2.11

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

M0 Statistic	Order of VAR	Null	95% Critical Value
20.0036*	1	$R = 0$	15.8700
8.1833*	1	$R \leq 1$	9.1600
28.2169*	1	$R = 0$	20.1800
8.1833*	1	$R \leq 1$	9.1600

Table 2.12

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

M2 Statistic	Order of VAR	Null	95% Critical Value
29.8048*	1	$R = 0$	15.8700
6.9330*	1	$R \leq 1$	9.1600
36.7738*	1	$R = 0$	20.1800
6.9330*	1	$R \leq 1$	9.1600

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Table 2.13

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

CRPR Statistic	Order of VAR	Null	95% Critical Value
9.1122	1	$R = 0$	15.8700
4.1296	1	$R \leq 1$	9.1600
13.2418	1	$R = 0$	20.1800
4.1296	1	$R \leq 1$	9.1600

Table 2.14

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

TRS Statistic	Order of VAR	Null	95% Critical Value
14.7827	1	R = 0	15.8700
1.8227	1	R ≤ 1	9.1600
16.6054	1	R = 0	20.1800
1.8227	1	R ≤ 1	9.1600

Table 2.15

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

CRNF Statistic	Order of VAR	Null	95% Critical Value
6.9109	1	R = 0	15.8700
5.0915	1	R ≤ 1	9.1600
12.0023	1	R = 0	20.1800
5.0915	1	R ≤ 1	9.1600

Table 2.16

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

CRG Statistic	Order of VAR	Null	95% Critical Value
18.4449*	1	R = 0	15.8700
4.5373*	1	R ≤ 1	9.1600
22.9822*	1	R = 0	20.1800
4.5373*	1	R ≤ 1	9.1600

Table 2.17

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

DPC Statistic	Order of VAR	Null	95% Critical Value
19.0987*	1	R = 0	15.8700
6.8767*	1	R ≤ 1	9.1600
26.9665*	1	R = 0	20.1800
6.8767*	1	R ≤ 1	9.1600

Table 2.18

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

DPCC Statistic	Order of VAR	Null	95% Critical Value
21.2041*	1	R = 0	15.8700
7.3534*	1	R ≤ 1	9.1600
28.5575*	1	R = 0	20.1800
7.3534*	1	R ≤ 1	9.1600

Table 2.19

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

SPR Statistic	Order of VAR	Null	95% Critical Value
10.3026	1	R = 0	15.8700
4.9764	1	R ≤ 1	9.1600
15.2790	1	R = 0	20.1800
4.9764	1	R ≤ 1	9.1600

Table 2.20

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

EXIMP Statistic	Order of VAR	Null	95% Critical Value
19.0882*	1	R = 0	15.8700
9.1577	1	R ≤ 1	9.1600
28.6058*	1	R = 0	20.1800
9.1577	1	R ≤ 1	9.1600

For the Czech Republic, the Maximum Eigenvalue and Trace Eigenvalue statistics both strongly reject the null hypothesis that there is no cointegration between Industrial Production and M0/M2/Credit to Government/Deposits of Non Financial Sector in Commercial Banks/Deposits of Non Financial Sector in Central Bank and Commercial Banks/Exports and Imports but do not reject that there is one cointegration relation between the two variables. The conclusion is that causation exists in at least one direction.

Johansen Maximum Likelihood Procedure

Testing for Cointegration between Industrial Production and other Financial Development Indicators for Hungary
Variables

*rejection of the null hypothesis, that there is no cointegration between variables (that R = 0) but does not reject that there is a cointegration relation between two variables (R = 1)

Table 2.21

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

M0 Statistic	Order of VAR	Null	95% Critical Value
45.7772*	1	R = 0	15.8700
2.5157*	1	R ≤ 1	9.1600
48.2929*	1	R = 0	17.8800
2.5157*	1	R ≤ 1	9.1600

Table 2.22

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

M2 Statistic	Order of VAR	Null	95% Critical Value
93.3508*	1	R = 0	15.8700
5.4410*	1	R ≤ 1	9.1600
98.7918*	1	R = 0	20.1800
5.4400*	1	R ≤ 1	9.1600

Table 2.23

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

CRPR Statistic	Order of VAR	Null	95% Critical Value
34.3063*	1	R = 0	15.8700
1.4281*	1	R ≤ 1	9.1600
35.7334*	1	R = 0	20.1800
1.4281*	1	R ≤ 1	9.1600

Table 2.24

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

TRS Statistic	Order of VAR	Null	95% Critical Value
12.4237	1	R = 0	15.8700
3.5100	1	R ≤ 1	9.1600
15.9337	1	R = 0	20.1800
3.5100	1	R ≤ 1	9.1600

Table 2.25

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

CRNF Statistic	Order of VAR	Null	95% Critical Value
31.0762*	1	R = 0	15.8700
1.4753*	1	R ≤ 1	9.1600
32.5515*	1	R = 0	20.1800
1.4753*	1	R ≤ 1	9.1600

Table 2.26

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

CRG Statistic	Order of VAR	Null	95% Critical Value
14.6107	1	R = 0	15.8700
7.9630	1	R ≤ 1	9.1600
22.5737*	1	R = 0	20.1800
7.9630*	1	R ≤ 1	9.1600

Table 2.27

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

DPC Statistic	Order of VAR	Null	95% Critical Value
86.2979*	1	R = 0	15.8700
20.7502	1	R ≤ 1	9.1600
107.0481*	1	R = 0	20.1800
20.7502	1	R ≤ 1	9.1600

Table 2.28

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

DPCC Statistic	Order of VAR	Null	95% Critical Value
86.3837*	1	R = 0	15.8700
30.4833	1	R ≤ 1	9.1600
107.2270*	1	R = 0	20.1800
20.8433	1	R ≤ 1	9.1600

Table 2.29

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

SPR Statistic	Order of VAR	Null	95% Critical Value
9.0916	1	R = 0	15.8700
2.3448	1	R ≤ 1	9.1600
11.3644	1	R = 0	20.1800
2.3488	1	R ≤ 1	9.1600

Table 2.30

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

CRPR Statistic	Order of VAR	Null	95% Critical Value
25.1051*	1	R = 0	15.8700
12.6913	1	R ≤ 1	9.1600
37.7964	1	R = 0	20.1800
12.6913	1	R ≤ 1	9.1600

For Hungary, the Maximum Eigenvalue and Trace Eigenvalue statistics both strongly reject the null hypothesis that there is no cointegration between Industrial Production and M0/M2/Credit to the Private Sector/ Credit to the Non Financial Sector/Credit to Government – Trace Eigenvalue only/Deposits of Non Financial Sector in Commercial Banks/Deposits of Non Financial Sector in Central Bank and Commercial Banks/Exports and Imports but do not reject that there is one cointegration relation between the two variables. The conclusion is that causation exists in at least one direction.

Johansen Maximum Likelihood Procedure

Testing for Cointegration between Industrial Production and other Financial Development Indicators for Poland

Variables

*rejection of the null hypothesis, that there is no cointegration between variables (that $R = 0$) but does not reject that there is a cointegration relation between two variables ($R = 1$)

Table 2.31

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

M0 Statistic	Order of VAR	Null	95% Critical Value
16.0773*	1	$R = 0$	15.8700
3.8212*	1	$R \leq 1$	9.1600
19.8985	1	$R = 0$	20.1800
3.8212	1	$R \leq 1$	9.1600

Table 2.32

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

M2 Statistic	Order of VAR	Null	95% Critical Value
43.5182*	1	$R = 0$	15.8700
6.6093*	1	$R \leq 1$	9.1600
50.1276*	1	$R = 0$	20.1800
6.6093*	1	$R \leq 1$	9.1600

Johansen Maximum Likelihood Procedure

Testing for Cointegration between Industrial Production and other Financial Development Indicators for Hungary

Variables

*rejection of the null hypothesis, that there is no cointegration between variables (that $R = 0$) but does not reject that there is a cointegration relation between two variables ($R = 1$)

Table 2.33

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

CRPR Statistic	Order of VAR	Null	95% Critical Value
34.6995*	1	$R = 0$	15.8700
.97612*	1	$R \leq 1$	9.1600
35.6646*	1	$R = 0$	20.1800
.97612*	1	$R \leq 1$	9.1600

Table 2.34

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

TRS Statistic	Order of VAR	Null	95% Critical Value
15.3896	1	R = 0	15.8700
3.3193	1	R ≤ 1	9.1600
18.7089	1	R = 0	20.1800
3.3193	1	R ≤ 1	9.1600

Table 2.35

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

CRNF Statistic	Order of VAR	Null	95% Critical Value
52.3801*	1	R = 0	15.8700
7.2041*	1	R ≤ 1	9.1600
59.5842*	1	R = 0	20.1800
7.2041*	1	R ≤ 1	9.1600

Table 2.36

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

CRG Statistic	Order of VAR	Null	95% Critical Value
6.4518	1	R = 0	15.8700
5.0221	1	R ≤ 1	9.1600
11.4740	1	R = 0	20.1800
5.0221	1	R ≤ 1	9.1600

Table 2.37

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

DPC Statistic	Order of VAR	Null	95% Critical Value
20.3686*	1	R = 0	15.8700
8.8597*	1	R ≤ 1	9.1600
29.2282*	1	R = 0	20.1800
8.8597*	1	R ≤ 1	9.1600

Table 2.38

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

DPCC Statistic	Order of VAR	Null	95% Critical Value
38.6145*	1	R = 0	15.8700
6.5107*	1	R ≤ 1	9.1600
45.1252*	1	R = 0	20.1800
6.5107*	1	R ≤ 1	9.1600

Table 2.39

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

SPR Statistic	Order of VAR	Null	95% Critical Value
3.7357	1	R = 0	15.8700
2.6988	1	R ≤ 1	9.1600
6.4345	1	R = 0	20.1800
2.6988	1	R ≤ 1	9.1600

Table 2.40

Cointegration LR Test based on Maximum Eigenvalue of the Stochastic Matrix

EXIMP Statistic	Order of VAR	Null	95% Critical Value
16.0398*	1	R = 0	15.8700
7.8571*	1	R ≤ 1	9.1600
23.8969*	1	R = 0	20.1800
7.8571*	1	R ≤ 1	9.1600

For Poland, the Maximum Eigenvalue and Trace Eigenvalue statistics both strongly reject the null hypothesis that there is no cointegration between Industrial Production and M0 – Maximum Eigenvalue only/M2/Credit to the Private Sector/ Credit to the Non Financial Sector/Deposits of Non Financial Sector in Commercial Banks/Deposits of Non Financial Sector in Central Bank and Commercial Banks/Exports and Imports but do not reject that there is one cointegration relation between the two variables. The conclusion is that causation exists in at least one direction.

Variables:

IND = Industrial Production

CRPR = Credit to the private sector

TRS = Three Month Treasury Bill Rate

CRNF = Credit to the non financial sector

CRG = Credit to government

DPC = Deposits of non financial sector in commercial banks

DPCC = Deposits of non financial sector in central bank and commercial banks

SPR = Interest rate spread (difference between interest rate on loans and deposits)

EXIMP = Exports and imports

4.2.3 Granger Causality Tests on the ECM Representation Czech Republic

Error Correction Model for Variable IND (Industrial Production) by OLS (Ordinary Least Squares) based on cointegration VAR 1 (vector autoregressive), Variable IND is dependent, other variables are independent

Table 2.41 Supply Leading Hypothesis Tests

Variables	Co-efficient of ECM Term	T-ratio	F-Stat for ECM Term
IND/M0	.026916	.43729 [.664]	4.0332* [.026]
IND/M2	-.053062	-.49226 [.625]	1.3335 [.275]
IND/CRG	-.0040896	-.24211 [.810]	2.6881* [.081]
IND/DPC	-.035406	-.32633 [.746]	1.5568 [.224]
IND/DPCC	-.012967	-.73879 [.464]	1.5892 [.215]
IND/EXIMP	.030962	.82884 [.412]	1.8791 [.166]

Note: P value in brackets

*indicates rejection of the null hypothesis at the 95% significance level

Error Correction Model for Variable IND (Industrial Production) by OLS (Ordinary Least Squares) based on cointegration VAR 1 (vector autoregressive), Financial Development Variables are dependent, Industrial Production is independent

Table 2.42 Demand Leading Hypothesis Tests

Variables	Co-efficient of ECM Term	T-ratio	F-Stat for ECM Term
M0/IND	.17247	.43729 [.664]	6.0668* [.005]
M2/IND	-.11073	-.49226 [.625]	4.3917* [.019]
CRG/IND	-.34908	-.24211 [.810]	1.0829 [.349]
DPC/IND	-.07310	-.32633 [.746]	3,2703* [.049]
DPCC/IND	-1.0132	-.73879 [.464]	3.3757* [.044]
EXIMP/IND	-1474.0	-4.9002 [.000]	11.5896* [.000]

Note: P value in brackets

*indicates rejection of the null hypothesis at the 95% significance level

The results show that for the Czech Republic, causality exists bi-directionally between Industrial Production and M0 i.e. growth causes financial development and financial development causes growth. The supply leading hypothesis (i.e. financial development causes industrial production) also shows that credit to government causes growth. The demand leading hypothesis (i.e. industrial development causes financial development) indicates that industrial production causes M2, Deposits of Non Financial Sector in Commercial Banks, Deposits of Non Financial Sector in Central Bank and Commercial Banks, and Exports and Imports. The evidence is in favour of the demand leading hypothesis i.e. finance follows growth. However there is no evidence that finance leads to growth in two cases.

Hungary

Error Correction Model for Variable IND (Industrial Production) by OLS (Ordinary Least Squares) based on cointegration VAR 1 (vector autoregressive), Variable IND is dependent, other variables are independent

Table 2.43 Supply Leading Hypothesis Tests

Variables	Co-efficient of ECM Term	T-ratio	F-Stat for ECM Term
IND/M0	-.0054882	-.056825 [.955]	16.7400* [.000]
IND/M2	-.040319	-.33946 [.736]	33.6339* [.000]
IND/CRPR	.20975	2.8818 [.006]	8.2454* [.001]
IND/CRNF	.39302	4.0731 [.000]	8.6242* [.001]
IND/CRG	-.042546	-.94830 [.347]	10.6320* [.000]
IND/DPC	-.052774	-.49456 [.622]	19.2308* [.000]
IND/DPCC	-.051929	-.48254 [.631]	19.3666* [.000]
IND/EXIMP	.036630	1.0515 [.297]	16.9637* [.000]

Note: P value in brackets

*indicates rejection of the null hypothesis at the 95% significance level

Error Correction Model for Variable IND (Industrial Production) by OLS (Ordinary Least Squares) based on cointegration VAR 1 (vector autoregressive), Financial Development Variables are dependent, Industrial Production is independent

Table 2.44 Demand Leading Hypothesis Tests

Variables	Co-efficient of ECM Term	T-ratio	F-Stat for ECM Term
M0/IND	-.01101	-.056825 [.955]	1.6253 [.207]
M2/IND	-.057030	-.33946 [.736]	1.6255 [.206]
CRPR/IND	.64585	2.8818 [.006]	3.9690* [.025]
CRNF/IND	.60658	4.0731 [.000]	6.9643* [.002]
CRG/IND	-.39215	-.94830 [.347]	8.1974* [.001]
DPC/IND	-.087361	-.49546 [.622]	4.4576* [.016]
DPCC/IND	-.084232	-.48254 [.631]	4.7205* [.013]
EXIMP/IND	312646.6	1.8753 [.070]	8.7529* [.000]

Note: P value in brackets

*indicates rejection of the null hypothesis at the 95% significance level

For Hungary the results show that finance causes growth for all the variables. Six of the eight variables show that growth causes finance. The two money variables M0 and M2, do not indicate that growth causes finance. Overall the evidence points in favour of the supply leading hypothesis, though there is strong evidence for the demand leading hypothesis, thus showing the importance of all variables for the Hungarian economy.

Poland

Error Correction Model for Variable IND (Industrial Production) by OLS (Ordinary Least Squares) based on cointegration VAR 1 (vector autoregressive), Variable IND is dependent, other variables are independent

Table 2.45 Supply Leading Hypothesis Tests

Variables	Co-efficient of ECM Term	T-ratio	F-Stat for ECM Term
IND/M0	.083144	.88445 [.380]	5.3476* [.008]
IND/M2	-.029907	-.20790 [.836]	3.5291* [.037]
IND/CRPR	-.0073851	-.48758 [.642]	2.7722* [.072]
IND/CRNF	-.088684	-.88310 [.381]	2.9048* [.064]
IND/DPC	.0095548	-.093079 [.926]	3.1866* [.050]
IND/DPCC	.048049	.36307 [.718]	4.3464* [.018]
IND/EXIMP	.0074906	.14842 [.883]	2.8468* [.067]

Note: P value in brackets

*indicates rejection of the null hypothesis at the 95% significance level

Error Correction Model for Variable IND (Industrial Production) by OLS (Ordinary Least Squares) based on cointegration VAR 1 (vector autoregressive), Financial Development Variables are dependent, Industrial Production is independent

Table 2.46 Demand Leading Hypothesis Tests

Variables	Co-efficient of ECM Term	T-ratio	F-Stat for ECM Term
M0/IND	.17494	.88445 [.380]	14.2318* [.000]
M2/IND	-.027246	-.20790 [.836]	33.0880* [.000]
CRPR/IND	-.55628	-.46758 [.642]	3.6079* [.034]
CRNF/IND	-.16351	-.88310 [.381]	32.5514* [.000]
DPC/IND	.017106	.093079 [.926]	11.0719* [.000]
DPCC/IND	.051251	.36307 [.718]	21.2428* [.000]
EXIMP/IND	.055464	.14842 [.883]	2.1918* [.122]

Note: P value in brackets

*indicates rejection of the null hypothesis at the 95% significance level

Results for Poland show there is bi-directional causality between financial development and industrial development. All of the variables support both the supply leading and demand leading hypotheses, therefore growth causes and follows finance, and vice versa.

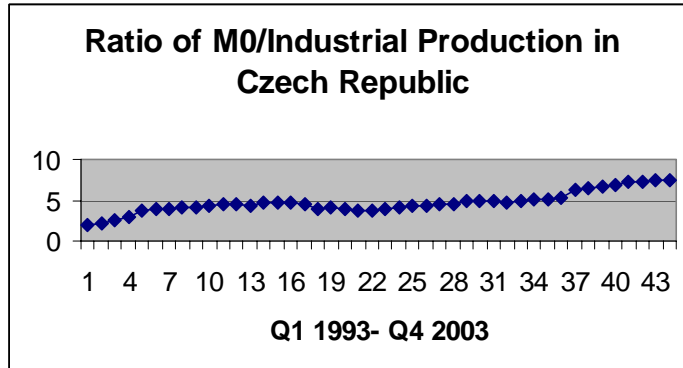
5.0 Ratios of Financial Indicators and Industrial Production

In this section, ratios are used to compare financial indicators to Industrial Production. As Industrial Production rose overall for the three countries over the time period studied, a higher ratio indicates an increase in the financial variable addressed.

5.1 Ratios of M0 to Industrial Production

5.1.1 Ratio of M0 to Industrial Production in the Czech Republic

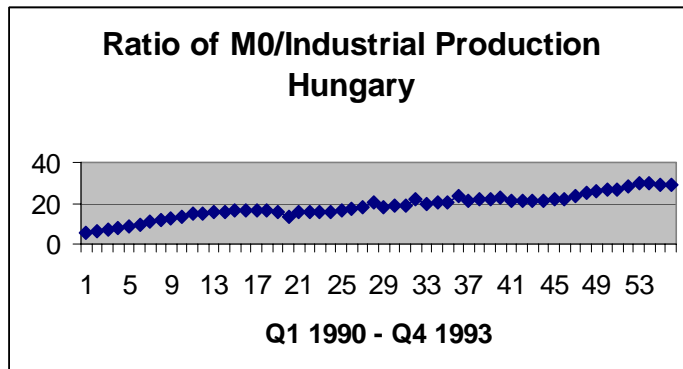
Figure 1.1



The M0 ratio increased from 1993 to 1996 and fell during 1997-1998 (see Appendix B: Table 5.1 for data). It began to pick up in 1999 and by 2000 it began to rise further. This rise continued upwards from 2000 to 2003, indicating an increasing supply of broad money.

5.1.2. Ratio of M0 to Industrial Production i Hungary

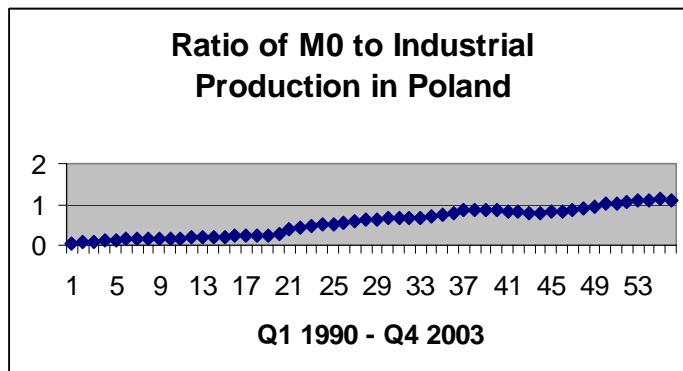
Figure 1.2



Overall M0 increased between 1990-2003 (see Appendix B: Table 5.2 for data). From 1990-1995 the ratio of M0 tripled with further increases in 1996. There was a slight drop in 1997 but by 1998 it began increasing. This trend continued upwards to the end of 2003.

5.1.3. Ratio of M0 to Industrial Production in Poland

Figure 1.3

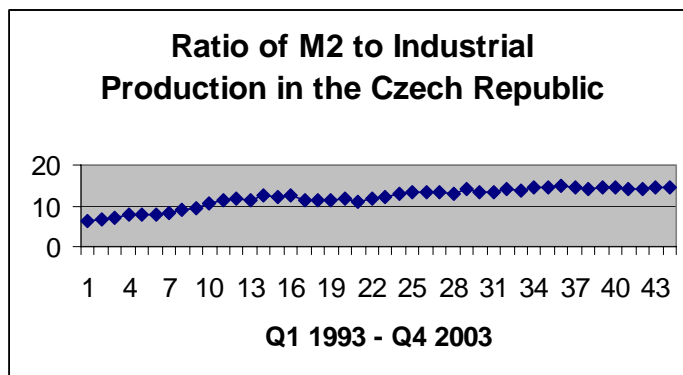


The ratio of M0 to industrial production increased steadily in Poland over the thirteen years (see Appendix B: Table 5.3 for data). By 1991 the ratio had tripled with increases year on year, apart from a slight dip at the beginning of 1999 and throughout 2000. By 2003 the trend had continued to rise upwards.

5.2 Ratios of M2 to Industrial Production

5.2.1. Ratio of M2 to Industrial Production in Hungary

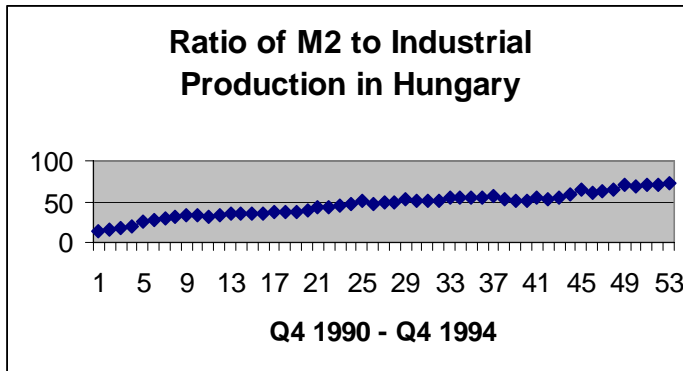
Figure 1.4



The ratio of M2 increased up to the beginning of 1996 (see Appendix A: Table 5.4 for data). There was another small dip in 1997, and the beginning of 1999 and 2001. Overall it doubled between 1990 and 1998, with increases up to the end of 2003. A higher ratio of M2 to industrial production, implies greater financial intermediary development. This shows that greater intermediation took place overall between 1990 and 2003, in the post financial liberalization period, indicating that financial liberalization was a factor that influenced positively, the degree of intermediation.

5.2.2. Ratio of M2 to Industrial Production in Hungary

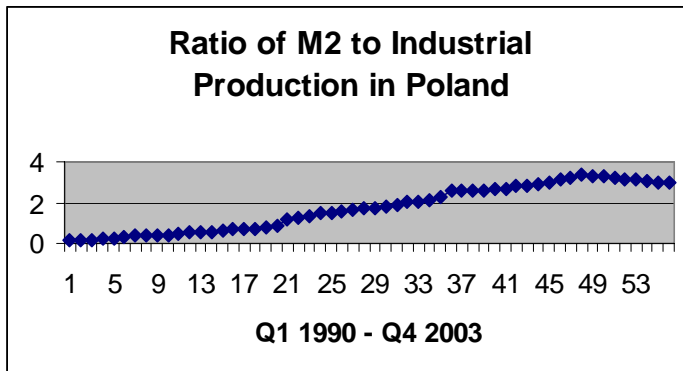
Figure 1.5



The M2 ratio for Hungary more than doubled over the period 1990-1992 (see Appendix B for Table 5.5 for data). There was an overall increase over time period, with slight falls at the beginning of 1998, 2000 and 2001. From the beginning of liberalization, the M2 ratio increased five fold, indicating the growing level of financial intermediation.

5.2.3. Ratio of M0 to Industrial Production in Poland

Figure 1.6

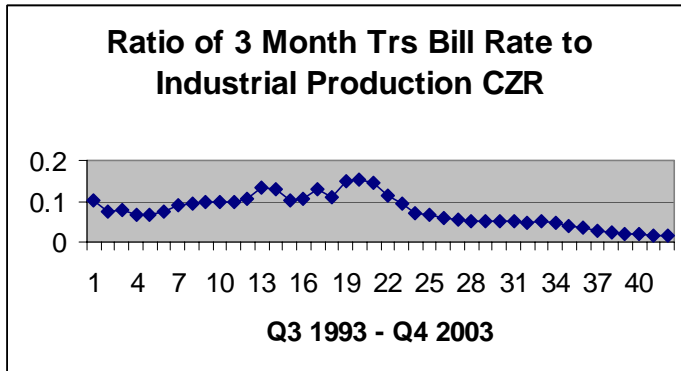


There was an increase in the ratio up to the middle of 2002 (see Appendix B: Table 5.6 for data). At various stages there were slight fall: at the beginning of 1998, in 1999 and 2000. Overall liberalisation led to M2 and therefore the level of financial intermediation increasing, though 2003 saw a fall in all quarters with figures returning to 2001 levels.

5.3 Ratios of Three Month Treasury Bill Rate to Industrial Production

5.3.1. Ratio of Three Month Treasury Bill Rate to Industrial Production in the Czech Republic

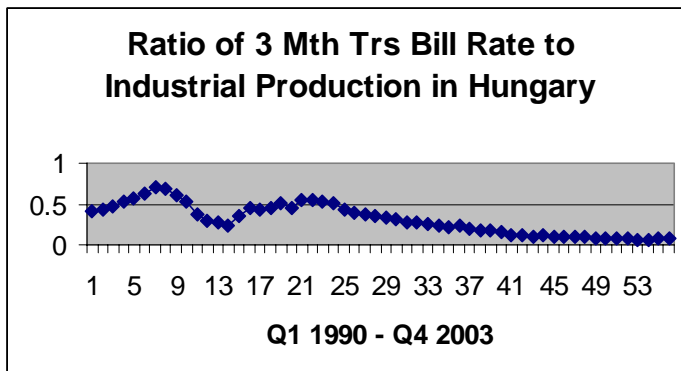
Figure 1.7



The ratio followed a cycle of increases and falls up to 1998 with large reduction in 1999. (see Appendix B: Table 5.7 for data). This reduction continued through 2001 and 2003 though it leveled out. By 2003 it had fallen to its lowest level.

5.3.2. Ratio of Three Month Treasury Bill Rate to Industrial Production in Hungary

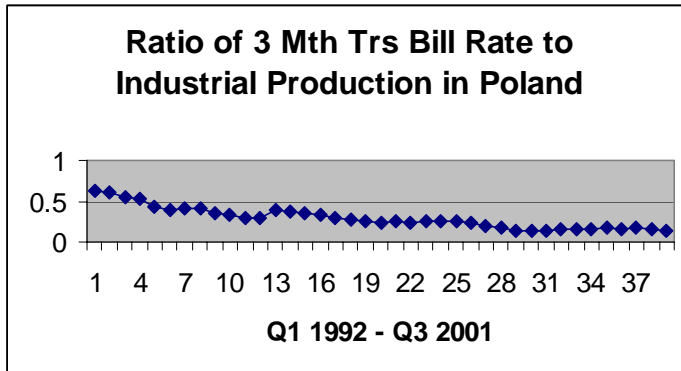
Figure 1.8



The ratio followed a cycle of sustained increases, then falls, until 1996 when it fell to the lowest levels since financial liberalization (see Appendix A: Table 5.8 for data).

5.3.3. Ratio of Three Month Treasury Bill Rate to Industrial Production in Poland

Figure 1.9

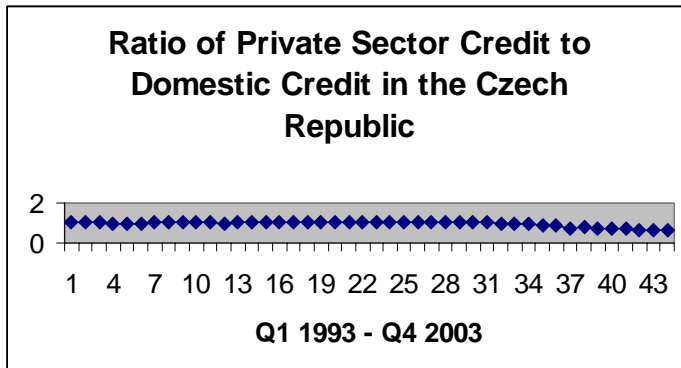


There was an overall fall in the ratio over the time period with figures not available for the Treasury Bill Rate for the end of 2001/beginning of 2002 and the end of 2002 (see Appendix A: Tables 5.9 for data).

5.4 Ratios of Private Sector Credit to Domestic Credit

5.4.1. Ratio of Private Sector Credit to Domestic Credit in the Czech Republic

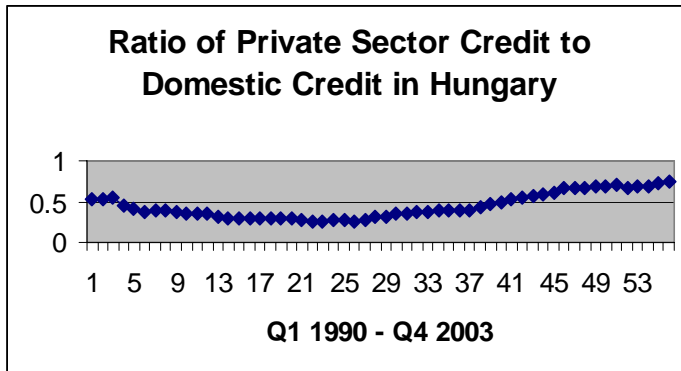
Figure 1.10



The ratio of private sector credit remained steady until 2000 and then fell and continued downwards (see Appendix B: Table 5.10 for data). This ratio measures the magnitude of the banking sector. The absence of any real increase in this ratio, indicates the absence of large credit markets for households.

5.4.2. Ratio of Private Sector Credit to Domestic Credit in the Czech Republic

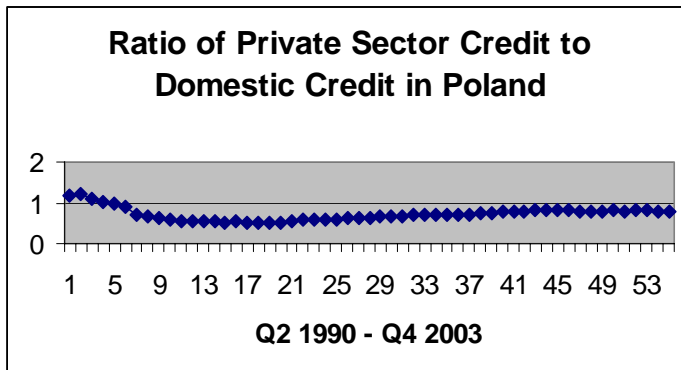
Figure 1.11



The ratio fell and then made large increases towards the end of the time period (see Appendix B: Table 5.11 for data). The increase in the ratio measures the extent to which private sector credit was responsible for the quantity and quality of investment, and for economic growth.

5.4.3. Ratio of Private Sector Credit to Domestic Credit in the Czech Republic

Figure 1.12

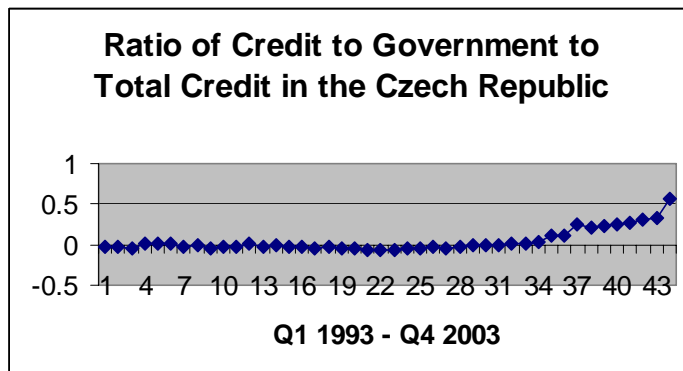


Private Sector Credit had an initial increase though there was a sustained fall up to 1995 (see Appendix B: Table 5.12 for data). From there on there was a steady rise up to the end of 2003. While the final figure was less than that at the beginning of 1990 and financial liberalization, the improving ratio at the end of the 1990's and beginning of 000's indicates improving credit availability for households and increasing investment opportunities.

5.5 Ratios of Credit to Government to Total Credit

5.5.1. Ratio of Credit to Government to Total Credit in the Czech Republic

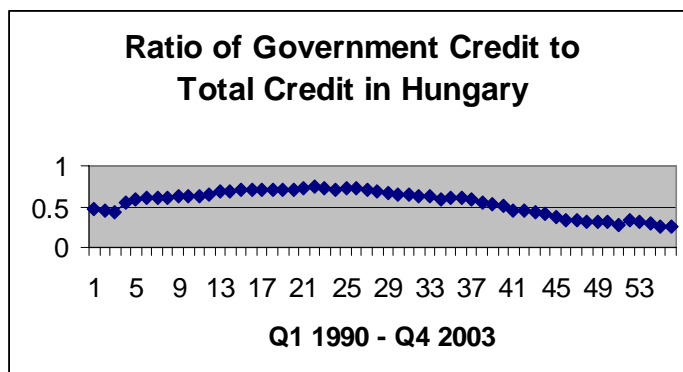
Figure 1.13



The ratio moved slightly from 1990-1992, hovering above/below zero (see Appendix B: Table 5.13 for data). It then escalated after 1992 right up to the end 1993. The amount available for government credit indicates how active the government is in investment projects. The higher rates towards the end of the era show the reduction in credit available for private sector projects.

5.5.2. Ratio of Credit to Government to Total Credit in Hungary

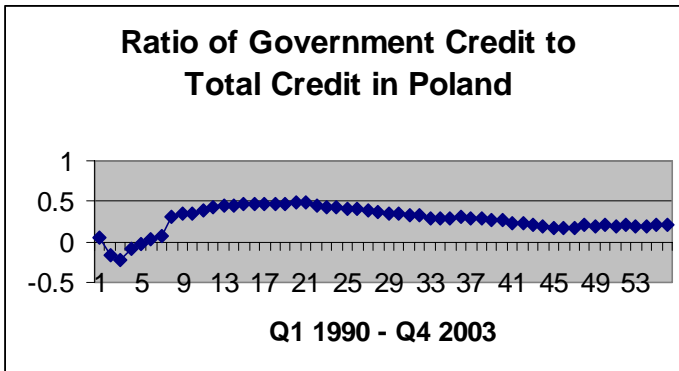
Figure 1.14



The ratio moved upwards from 1990-1996, indicating that the government continued to be a strong contender when it came to credit allocation (see Appendix A: Table 5.14 for data). This trend was reversed from 1996 onwards, when ratios of government credit to domestic credit began to fall. This reduction in ratio continued to the end of 2003.

5.5.3. Ratio of Credit to Government to Total Credit in Poland

Figure 1.15

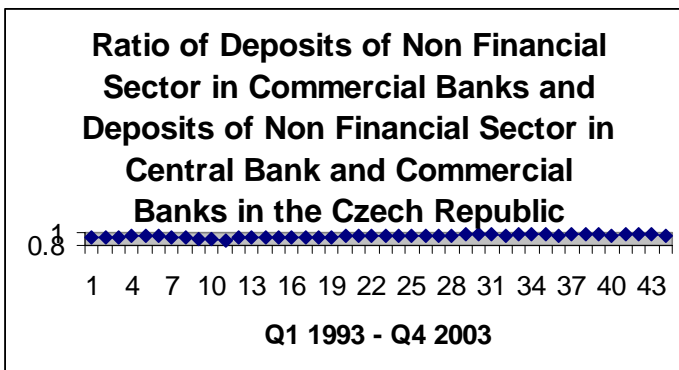


The ratio increased up to 1995 when it then began to reduce. This trend downwards continued to 2002, when the ratio began to fluctuate slightly and leveling off (see Appendix B: Tables 5.15 for data). The lowering rates in the mid to late nineties and later, indicate the stronger position of the private sector market in getting access to credit, with the government supply of credit being lowered.

5.6 Ratios of Deposits of Non Financial Sector in Commercial Banks to Deposits of Non Financial Sector in Central Bank and Commercial Banks

5.6.1. Ratio of Deposits of Non Financial Sector in Commercial Banks to Deposits of Non Financial Sector in Central Bank and Commercial Banks in the Czech Republic

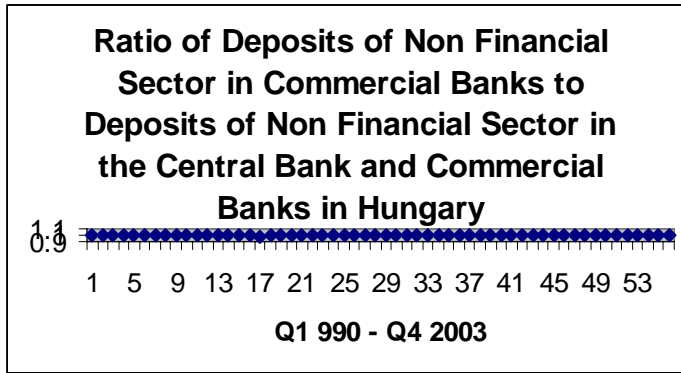
Figure 1.16



The ratio of domestic credit issued by deposit banks, to domestic credit issued by deposit banks and the central bank, measures the role of the central bank in lending activities (see Appendix B: Table 5.16 for data). Here the ratio increased slightly overall, over the time period. Generally a lower amount of loans issued by the Central Bank is deemed as preferable, as commercial banks are assumed to be able to select higher return projects.

5.6.2. Ratio of Deposits of Non Financial Sector in Commercial Banks to Deposits of Non Financial Sector in Central Bank and Commercial Banks in Hungary

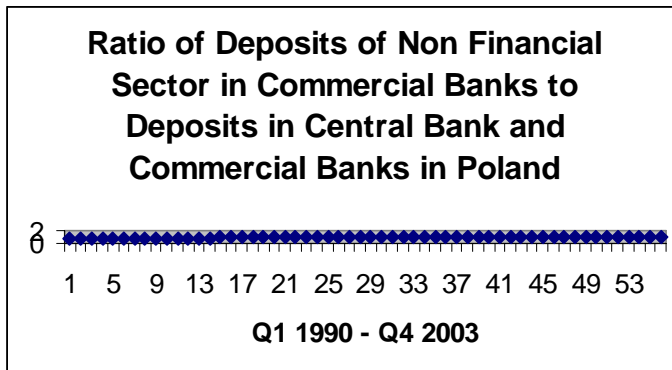
Figure 1.17



The ratio remained steady for Hungary with a dip at the beginning of 1994 (see Appendix B: Table 5.17 for data). It indicates that the central bank remained a strong contender in lending activities throughout the period.

5.6.3. Ratio of Deposits of Non Financial Sector in Commercial Banks to Deposits of Non Financial Sector in Central Bank and Commercial Banks in Poland

Figure 1.18

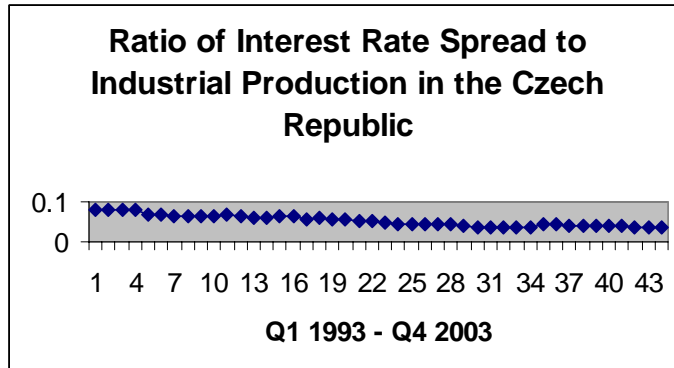


There was steady ratio up until 1998 when it increased slightly (see Appendix A: Table 5.18 for data). This increase continued until the end of the time period covered, indicating the strong presence of the central bank in lending activities.

5.7 Ratios of Interest Rate Spread to Industrial Production

5.7.1. Ratio of Interest Rate Spread to Industrial Production in the Czech Republic

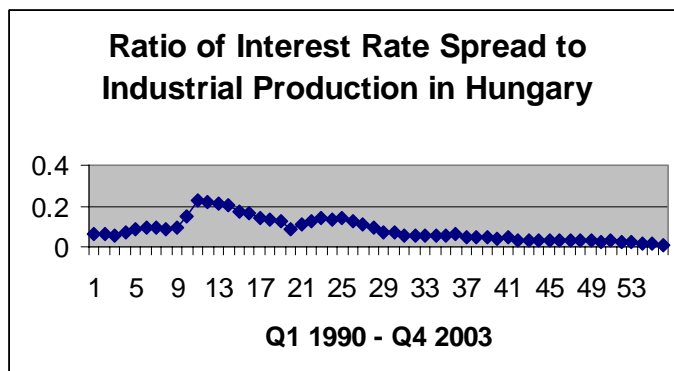
Figure 1.19



Overall the ratio reduced considerably over the time period to more than half the figure in 1993 (see Appendix B: Table 5.19 for data). The reduction in interest rate spread indicates the reduction in resources absorbed by the banking sector. This shows increasing efficiency of the banking sector after financial liberalization.

5.7.2. Ratio of Interest Rate Spread to Industrial Production in Hungary

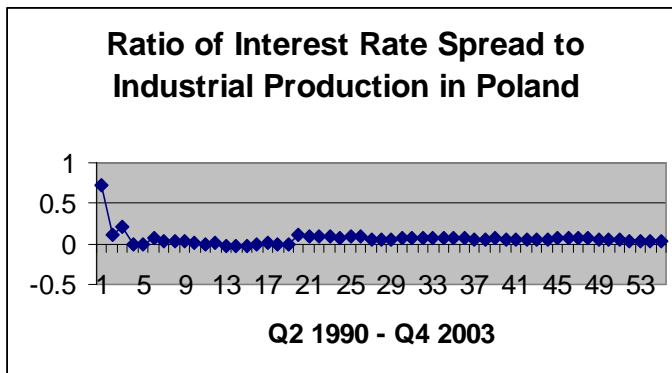
Figure 1.20



There was an initial increase in the ratio up to 1992 (see Appendix B: Table 5.20 for data). This was followed by ongoing reduction with final figures ending just above zero. This indicated stronger efficiency of Hungarian banks.

5.7.3. Ratio of Interest Rate Spread to Industrial Production in Poland

Figure 1.21



High interest rates at the beginning of the 1990's quickly led to rates falling dramatically to reflect the increased competitiveness and efficiency in the Polish banking system (see Appendix A: Table 5.21 for data).

5.8 Ratios of Total Exports and Imports to Nominal GDP

5.8.1. Ratio of Total Exports and Imports to Nominal GDP in the Czech Republic

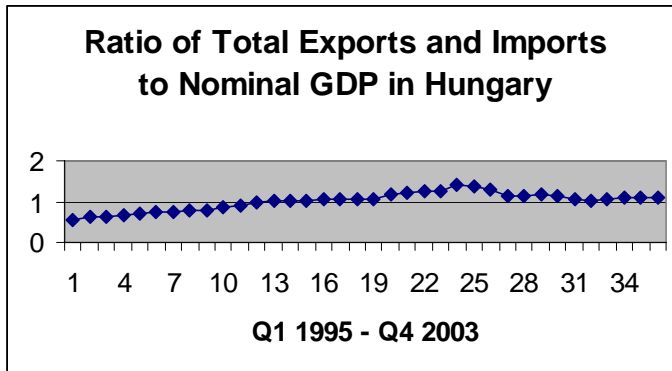
Figure 1.22



The ratio showed an overall increase over the time period (see Appendix B: Table 5.22 for data). This indicates an increased openness in the Czech economy, after financial liberalisation.

5.8.2. Ratio of Total Exports and Imports to Nominal GDP in Hungary

Figure 1.23



The ratio increased in Hungary up to 2000 with some falls over the next two years. 2003 recorded an increase in the ratio (see Appendix A: Table 5.23 for data). This indicates that overall the Hungarian economy increased its openness after financial deregulation.

5.8.3. Ratio of Total Exports and Imports to Nominal GDP in Poland

Figure 1.24



There was an increase over the time period, showing that openness of the economy increased after financial liberalization (see Appendix A: Table 5.24 for data). In 2003 the highest records of open trade were recorded for the Polish economy.

6.0 Analysis of Bank Profitability

In this section the profitability (returns) of banks during 1990-2003 are examined, after financial deregulation. Operational efficiency or profitability, is described by Akyuz⁴⁹ as the cost efficiency in producing finance, in the process of intermediation between final lenders and borrowers, which depends on the efficiency of the use of resources in financial activities. Financial ratios are used. With ratio analysis there is debate over the choice of benchmark to use. See Al-Shimmari⁵⁰ who states precisely this, and also adds

⁴⁹ Akyuz, Y (1992) "On Financial Deepening and Efficiency", United Nations Conference on Trade and Development, Geneva

⁵⁰ Al-Shimmari, M. and Alimi, A. "Modelling the Operating Efficiency of Banks: a Nonparametric Methodology", Logistics Information Management, Volume 11, Issue 1, 1998, pp5-17

that a single ratio does not provide sufficient information about the performance of a firm. To overcome this, widely recognized benchmarks adopted in EU countries are used, namely:

- i) Profitability ratios to measure the earnings ability of a firm:
 - a) ROE – return on equity. This compares net income after tax to equity capital. It shows the rate of return shareholders receive from investing their capital. The higher the ratio, the higher the return.
 - b) ROA – return on assets. We divide net income by total assets. It shows the banks’ capability in increasing earnings from its assets. The higher the ratio, the better the management of assets.
 - c) EM – equity multiplier. We divide total assets by equity capital. This measures the banks’ financial leverage. The higher the multiplier, the greater the probability of insolvency as equity must be used to absorb losses on the banks’ assets.
- ii) Efficiency ratios to measure effectiveness of banks:
 - d) Non-Interest Earnings to Total Assets
 - e) Total Expenses to Total Assets

The data is limited, due to difficulties in getting financial reports in English for the time period. Nonetheless the results indicate the openness of financial deregulation on bank allocational efficiency (profitability) and operational efficiency. Thirteen banks were used: size in the Czech Republic, three in Hungary and four in Poland. They represent one thousand, nine hundred and ninety nine DMU’s (decision making units), which are averaged over the time period.

6.1 Return on Equity

We use ROE which compares net income after tax to equity capital. It measures the rate of return shareholders received from their investment,

Table 3.0
Average Returns on Equity for the Czech Republic⁵¹

1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
-0.423	0,018	5.892	-.0592	-4.119	0.262	0.652	3.046	4.595	4.106

Czech banks saw a rise in ROE up to 1996, and then experienced a sharp fall in 1997-1998. Returns began to rise in 1999 and 2000. 2001 saw an increase which continued into 2002. There was a small drop in 2003 but overall there was an increase in return on

⁵¹ Banks: Ceska Sporitelna A.S. 2002-2003. Vseobecni Stavebni Sporitelni Komerčni Banka A.S. 1999-2003, CMHB 1994-2003, Komerčni Banka 1996-2002, Czech Export Bank 1995-2003, KOBP 1997-1998

equities from the nineties onwards. This represented a positive position for shareholders, as the higher the ratio the greater the return they received on their investment. (See Appendix B: Figure 5.73 for graph)

Table 3.1
Average Returns on Equity for Hungary⁵²

1996	1997	1998	1999	2000	2001	2002	2003
29.65	29.97	22.30	6.135	6.280	7.633	7.694	7.526

Table 3.2
ROE (National Bank of Hungary, before adjustment for non-performing loans)
Real Figures

	1988	1989	1990
	%	%	%
Large Banks	30.0	27.8	18.0
Small and Medium Banks	12.6	11.6	18.0
Savings Banks	138.7	167.2	81.4
Special Finance Institutions	-0.8	-6.5	-7.5

Hungarian banks ROE fell during the mid nineties and dropped dramatically in 1999. There was some recovery from 2000 onwards but figures were well below those at the beginning of the period. Figures released by the NBH show that overall ROE fell for all sectors between 1988-1990: large banks, small and medium banks, savings banks and special finance institutions. Investors received falling returns on their investment, thus forcing investors to look elsewhere for higher return projects. (See Appendix B: Figure 5.74 for graph).

Table 3.3
Average Return on Equity for Poland⁵³

1990	1991	1992	1993	1994	1995	1996	1997	1998	99	00	01	02
40.9	70.1	0.47	0.59	0.87	2.30	2.60	2.62	1.86	.86	.08	.11	-.04

Polish banks' ROE saw a dramatic fall in 1992. There was some recovery up to 1995 which continued up to 1997. Returns began to fall and continued to fall up to 2002. Investment in Polish banks would not have been an attractive proposition for prospective investors. (See Appendix B: Figure 5.75 for graph).

6.2 Return on Assets

Here there is examination of banks' ability to increase earnings from its assets. There is division of net income by total assets. The higher the ratio, the better the management of a bank.

⁵² Banks: CIB, 1996-2003, OTB 1999-2000, Altalanos Erket 1999-2003

⁵³ Banks: Banka Slaski 1990-1999, Bank Rozwoju Eksportu 1990-2002, WestLB Bank Polsk 1998-2002

Table 3.4

Average Return on Assets in the Czech Republic⁵⁴

1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
-.034	.013	1.283	-.016	-.801	-.0565	-.003	.774	.784	.825

The Czech Republic's ROA had mixed fortunes. There were increases in 1995-1996. Return fell from 1997 onwards, with figures moving from negative to positive figures in 2001 though returns were relatively low. This indicated reduced earnings and an inability to strengthen this position by Czech banks. (See Appendix B: Figure 5.76 for graph).

Table 3.5

Average Return on Assets in Hungary⁵⁵

1996	1997	1998	1999	2000	2001	2002	2003
3.32	3.18	2.22	1.916	1.896	1.355	27.73	1.160

Table 3.6

ROA (National Bank of Hungary, before adjustment for non-performing loans)

Real Figures

	1988	1989	1990
	%	%	%
Large Banks	3.4	4.4	4.4
Small & Medium Banks	7.0	7.1	6.4
Savings Banks	2.3	3.8	3.6
Special Financial Institutions	6.2	3.4	6.3

Hungary's ROA fell during the late nineties, and they experienced a large rise in 2002. The figures released by the NBH show steady returns from 1988-1990/ (See Appendix B: Figure 5.77 for graph).

Table 3.7

Average Returns on Assets in Poland⁵⁶

1990	1991	1992	1993	1994	1995	1996	1997	1998	99	00	01	02
.096	.013	.031	.054	.06	.058	.049	.032	.039	.034	.006	.009	-.023

Polish banks showed decreasing ROA over the period 1990-2002. While there were some small increases in the early to mid nineties, overall returns fell during the period reflected. (See Appendix B: Figure 5.78 for graph).

⁵⁴ Banks: Ceska Sportelna 1992-2002, VSSKB 1999-2003, CMHB 1994-2003, Komerčni Banka 1996-2002, Czech Export Bank 1995-2003, KOBP 1997-1998

⁵⁵ Banks: CIB 1996-2002, OTP 1999-2000, Altalanos Erket 1999-2003

⁵⁶ Banks: Bank Slaski 1990-1999, Bank Rojwoju Eksportu 1990-1996, Bre Bank, 1997-1998, Nordea 1999-2002, WestLB Polska 1998-2002

6.3 Equity Multiplier

There is measurement of the banks' financial leverage which is found by dividing total assets by equity capital. The higher the multiplier, the greater the probability of insolvency, as equity must be used to absorb losses on the bank's assets.

Table 3.8
Average Equity Multiplier in the Czech Republic⁵⁷

1994	1995	1996	1997	1998	1999	00	01	02	03
12.351	10.358	21.034	34.985	36.353	56.441	56.158	33.392	62.176	47.776

The Czech's EM increased overall over the time period. There were increases between 1996-1999, with a large fall in 2001. There was a further increase in 2002 with a fall in 2003. The overall increase represents a deteriorating position for the Czech Republic as more and more equity was needed to clear up losses incurred. (See Appendix B: Figure 5.79 for graph).

Table 3.9
Average Equity Multiplier in Hungary⁵⁸

1996	1997	1998	1999	2000	2001	2002	2003
9.363	8.929	8.194	81.046	77.740	18.358	20.843	22.999

The Hungarian EM experienced a large rise in 1999-2000. There was a fall in 2001 with small increases in 2002-2003. Hungary's position had stabilized by 2001, which indicates the bank's willingness to address losses incurred in the previous period. (See Appendix B: Figure 5.80 for graph).

Table 3.10
Average Equity Multiplier in Poland⁵⁹

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	00	01	02
642	28.1	38.1	28.4	15.5	75.5	96.4	143	259	183	18.5	28.4	22

Poland's EM fell in 1991 though there was a recovery in 1995-1998. Large reductions were experienced in 2000-2002, indicating increased responsiveness by banks in monitoring loss making areas of activity. (See Appendix B: Figure 5.81 for graph).

7.0 Analysis of Bank Efficiency

In this section bank efficiency is examined over the period 1990-2003 in the three countries. Financial ratio analysis of bank efficiency indicates the competitiveness of banks, in that it shows the cost of transforming bank liability and assets in earning assets.

⁵⁷ Banks: Ceska Sporitelna 1992-2002, Vseobecna Stavebni Sporitelna Komerčni Banka, A.S. 1999-20003, CMHB 1994-2003, Komerčni Bank 1996-2000, Czech Export Bank 1995-2003, KOB 1997-1998

⁵⁸ Banks: CIB 1996-2003, OTB 1999-2003, Altalanos Erket 1999-2003

⁵⁹ Banks: Bank Slaski 1990-1999, Bank Rojwoju Eksortu 1990-1996, Bre 1997-1998, Nordea 1999-2002, WestLB Bank Polska 1998-2002

Akyuz⁶⁰ defines allocative efficiency as allocating scarce savings to investors, with the most socially productive use for them. Allocative efficiency and operations efficiency are related in the following way: when financial institutions decide on interest rates for borrowers (assuming ceiling rates are not in operation), they determine this rate based on the possibility of default. Financial institutions decide where to invest in order to receive the maximum return. This expected rate of return must be high enough to cover the borrower's risk and the rate of interest received by the lender, which is determined by the borrower's risk as well as the lender's risk. When the financial institutions are involved in the lender's investment, they will be in a better position to judge the likely success of the venture and the risk involved. When this is not the case, the possibility of default increases. This increases the lender's risk and the cost of finance. Here allocative inefficiency increases the cost (productive) inefficiency. The productive efficiency of the financial sector is related to the stability of the financial system and its ability to reduce the risk needed to cover the capital-value uncertainty. The search for greater allocative efficiency through financial liberalisation may reduce the productive efficiency of the financial system by increasing financial instability, and increasing the cost of finance to investors.

7.1 Average Non-Interest Expenses to Assets Ratio⁶¹

Table 3.11

Czech Republic (average figures)

1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
0.023	-0.331	-0.688	4.440	0.042	3.070	3.064	1.544	5.493	2.827

This ratio showed increases in 1997, 1999-2000 and 2002. All these increases were followed by reductions in following years, indicating mixed results. (See Appendix B: Figure 5.82 for graph).

Table 3.12

Hungary (average figures)⁶²

1998	1999	2000	2001	2002	2003
0.005	0.053	0.068	0.028	0.051	0.056

Hungary experienced a rising ratio when then fell in 2001. It began to rise again, indicating that assets were being utilized more effectively. (See Appendix B: Figure 5.83 for graph)

⁶⁰ Op. Cit. 1992

⁶¹ Banks: Ceska Sporitelna A.S. 1992-2002, Vseobecni Stavebni Sporitelna Komerčni Banka A.S. 1999-2003, CMHB 1994-2003, Komerčni Banka 1996-2002, Czech Export Bank 1995-2003, KOBP 1997-1998

⁶² Banks: CIB 1998-2003, OTB 199-2000, Artalanos Erket 1999-2003

Table 3.13
Poland (average figures)⁶³

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	01	02
0.30	0.58	0.29	0.47	0.52	0.16	0.05	0.05	0.07	0.13	0.10	0.09	.07

Poland's ratio had mixed results, with rises and falls up to 1995. This was followed by falling ratios during the late nineties, indicating that assets were not being used as efficiency as previously. (See Appendix B: Figure 5.84 got graph)

7.2 Total Expenses to Total Assets

Table 3.14
Czech Republic (average figures)⁶⁴

1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
-0.12	-0.16	-0.04	-0.17	-0.17	-0.16	-0.13	-0.12	-0.16	-0.14

The Czech Republic's ratio preformed badly in 1996, indicating that expenses were rising relative to assets. This leveled out in the late nineties, and from 2000-2003, showing that banks addressed high expense areas of activity. (See Appendix B: Figure 5.85 for graph)

Table 3.15
Hungary (average figures)⁶⁵

1998	1999	2000	2001	2002	2003
-0.093	-7.099	-4.763	-0.045	-0.030	-0.036

Hungarian banks had a falling ratio up to 2001, with the ratio leveling off in the final two years, indicating rising expenses. (See Appendix B: Figure 5.86 for graph)

Table 3.16
Poland (average figures)⁶⁶

90	91	92	93	94	95	96	97	98	99	00	01	02
-.10	-2.6	-.31	-1.5	-.19	-.16	-.11	-.22	-.24	-.21	-.10	-.06	-.07

Poland had an increased, then a reduced ratio from 1990-1993, when the ratio leveled off. This showed that banks expenses were being monitored to ensure that excessive levels were not reached. (See Appendix B: Figure 5.87)

⁶³ Banks: Bank Slaski 1990-1999, Bank Rojzwoju Eksportu 1990-1998, Nordea 1999-2002, WestLB Bank Polski 1998-2002

⁶⁴ Banks: Ceska Sportelna A. S. 1992-2002, Vseobecni Stavebni Sportelna Komerčni Banka A.S. 1999-2003, CMHB, 1994-2003, Komerčni Banka 1996-1999

⁶⁵ Banks: CIB 1998-1999, OTB 1999-2000, Altalanos Erket 1999-2003

⁶⁶ Banks: Banks Slaski 1990-1999, Bank Rojzwoju Eksportu 1990-1996, Bre 1997-1998, Nordea 1999-2002, WestLB Bank Polska 1998-2002

8.0 Bad Loans as a Percentage of Overall Loans

Table 3.17

Czech Republic (average figures)⁶⁷

1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
3.108E-05	1.058E-03	8.839E-03	0.063	0.075	0.016	0.027	0.020	0.024	2.202E-02

The bad loan problem for the Czech Republic improved in 1995, though the figure increased in 1996. The mid nineties saw an improvement with a large fall in the figure in 1999. By 2003 the figure had risen again, though not to the same proportions as experienced in the mid nineties. The Czech Republic had previously been viewed as one that took a soft view of bad loans, as the NBF gave handouts and the KOB took on transferred bad loans. Bankruptcy proceedings were slow and uncertain for creditors. Since 2001 the CNB Banking Supervision had taken an active role in terminating banking licenses for various misdemeanors, such as weakening financial conditions and non-compliance with prudential rules. (See Appendix B: Figure 5.88 for graph)

Table 3.18

Hungary (average figures)⁶⁸

1998	1999	2000	2001	2002
0.036	0.108	0.069	0.032	0.013

Hungary saw an increase in the bad loan ratio in 1999, though the figure fell up to 2002. Hungary has addressed its bad loan problem, to a large degree. Though the State has had to intervene on many occasions in the past, to clear the bad loan problem, strengthened banking regulations have led to bad loans falling. Credit limits were put on lending to individuals/firms and new standards were applied to define loan losses. (See Appendix B: Figure 5.89 for graph)

Table 3.19

Poland⁶⁹

1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
0.712	0.739	0.150	0.366	0.046	0.026	0.001	0.008	0.021	0.041

Poland's bad loan ratio fell dramatically by 1995, it rose in 1996 and then began to fall again up to 2000. 2001 saw an increase in the bad loan problem, which rose again in 2002. Poland took many steps to address the situation – conciliation proceedings were used by banks to deal with bad debtors. Weaker banks were put under mandatory control. This helped the loan problem to reduce to manageable proportions. Unfortunately a declining economic climate in 2001 led to household finance falling, with a knock on effect on the loan situation. (See Appendix B: Figure 5.90 for graph)

⁶⁷ Banks: CMHB 1994-2000, CEB 2002-2003, Ceska Sporitelna 1995-2003, KOBP 1997-1998, 2002-2003

⁶⁸ Banks: Altalanos 199-2003, OTP 1999-2000, CIB 1998-2001, Komerčni Banka 1998-1999

⁶⁹ Banks: Bank Slaski 1990-1999, Bank Rojzwoju Eksportu 1990-1996, Nordea 1995-2002, Bre 1996-1998

Table 3.20

Ratio of Irregular Claims to Gross Claims on Non-Financial Customers (%)				
	Total	Substandard	Doubtful	Loss
Banking Sector				
1993	30.1	7.3	6.1	16.7
1994	27.9	5.8	5.4	16.7
1995	20.4	5.2	3.4	11.8
1996	12.7	3.9	1.6	7.2
1997	10.2	3.8	1.2	5.2
1998	10.5	3.9	1.9	4.7
1999	13.3	5.1	3.4	4.8
2000	15.0	4.4	5.1	5.5
2001	17.9	4.6	5.1	8.2
2002	20.1	4.8	5.8	9.5
Commercial Banks				
1993	31.0	7.5	6.4	17.1
1994	28.5	5.9	5.7	26.9
1995	20.9	5.4	3.5	12.0
1996	13.2	4.1	1.7	7.4
1997	10.5	3.9	1.2	5.4
1998	10.9	4.0	2.0	4.9
1999	13.7	5.3	3.6	4.8
2000	15.5	4.5	5.4	5.6
2001	18.6	4.8	5.3	8.5
2002	21.0	5.0	6.1	9.9
Cooperative Banks				
1993	24.4	5.5	4.1	14.8
1994	21.3	3.8	2.4	15.1
1995	11.7	1.9	1.1	8.7
1996	5.3	1.2	0.4	3.7
1997	3.7	1.1	0.4	2.2
1998	3.5	1.2	0.5	1.8
1999	3.6	1.4	0.5	1.7
2000	4.5	1.7	0.7	2.1
2001	6.2	2.0	1.1	3.0
2002	6.5	2.2	1.2	3.2
Central Bank of Poland 2003				

The Central Bank's figure show that bank loans, resulting in losses for the commercial banking sector, fell up to 2000 but then began to rise in 2002. This indicates the banks' dependence on a strong economic climate in order to be able to maintain credible and quality loan portfolios.

9.0 Summary of Results and Theoretical Relationship between Financial Sector Development and Economic Growth

The regulation debate is strongly defended by Arestis⁷⁰, who states that low real interest rates do not prevent economic growth. This scenario is also supported when financial deregulation is in place. It is backed up by figures from the Czech Republic, Hungary and Poland (see Tables 5.19 – 5.21 for interest rate spreads and industrial production). In the three countries, as the spread of interest rates fell from a high of almost 8% in the Czech Republic to between 3-4%, from 5% to 2% in Hungary and 1758% to minus figures in Poland, (while inflation also fell) industrial production increased over time. Data for the three countries back up Shaw's⁷¹ assertion that financial liberalisation increases the monetary sector – see Tables 5.1-5.6 for M0 and M2 after 1989. It also contradicts Stiglitz⁷² who claims that government intervention leads to improved quality of loan applications. For all three countries, state involvement in banks was reduced continuously since 1989, and for all three countries bad loans fell over the time period 1990-2003 (though the Czech Republic saw an increase in bad loans in 2003 for the bank surveyed – see Table 3.17). Industrial Production increased for the three countries, supporting Everett⁷³ and Kelly's view that financial liberalisation supports growth. Greater financial intermediation is seen with the growth of M2 over time in the three countries. This supports King and Levine's studies⁷⁴, that banking sector development contributes to economic growth and leads to faster growth. It also adds to Barth's view⁷⁵ that state involvement with banks leads to poorly developed banks. In these three countries, once the state reduced its role in banking activities, financial markets and financial instruments increased and developed.

10. Conclusion

In this section the questions posed at the beginning of the chapter are answered, namely:
i) does financial deregulation lead to financial development in the Czech Republic, Hungary and Poland?

⁷⁰ Arestis, P. and Demetriades, P. "On Financial Repression and Economic Development: the case of Cyprus", Department of Economics and Management Science, Working Paper, 91-23, October 1991, pp1-22

⁷¹ Shaw, Edward S. *Financial Deepening in Economic Development*, Chapter 1: Financial Deepening, New York, Oxford University Press, 1973, pp9

⁷² Stiglitz, J. and Weiss, A. "Credit Rationing in Markets with Imperfect Information", American Economic Review, 1981, 77, (3), pp393-410

⁷³ Kelly, John and Everett, Mary. "Financial Liberalisation and Economic Growth in Ireland", Quarterly Bulletin, Central Bank, Autumn 2004, pp91-112

⁷⁴ King, R.G. and Levine, R. "Finance and Growth: Schumpeter Might be Right", Quarterly Journal of Economics, 1993a, 108, pp717-738

⁷⁵ Barth, J.R. Caprio, G. and Levine, R. "Banking Systems Around the Globe: Do Regulation and Ownership Affect Performance and Stability?", Finance Department, Auburn University and Capital Studies Division, Milken Institute, 2000, pp1-63

For all three countries, the monetary base M0 and M2 increased over the time period studied, indicating an increased supply of broad money and an increased degree of intermediation

ii) does financial development lead to economic growth in the three countries?

Hungary experienced an increase in the ratio of private sector credit overall, which is a major instrument for economic growth. The Czech Republic had steady credit for most of the time period, while Poland showed increases from the mid nineties onwards. Overall indicators indicate that increased development of financial markets led to economic growth.

iii) is causality established between financial deregulation/financial development and economic growth?

Results show a causal relationship between M0/M2/Deposits of Non Financial Sector in Commercial Banks/and the Central Bank/Exports and Imports/ and Industrial Production for all three countries. There is also a relationship between Credit to Government and Industrial Production for the Czech Republic and Hungary, between Credit to the Private Sector/Non Financial Sector and Industrial Production, for Hungary and Poland.

iv) what direction does it take?

Czech Republic

There is bi-directional causality between M0 and Industrial Production. Credit to Government causes Industrial Production, M2, Deposits of Non Financial Sector in Commercial Banks, Deposits of Non Financial Sector in Commercial Banks and the Central Bank, and Exports and Imports are caused by Industrial Production.

Hungary

There is bi-directional causality between Credit to the Private Sector, Credit to Non Financial Sector, Credit to Government, Deposits of Non Financial Sector in Commercial Banks, Deposits of Non Financial Sector in Commercial Banks and the Central Bank, Exports and Imports, and Industrial Production. There is also uni-directional causality between M0 and M2 and Industrial Production i.e. M0 and M2 cause Industrial Production.

Poland

There is bi-directional causality between all financial variables – M0, M2, Credit to Private Sector, Credit to Non Financial Sector, Deposits of Non Financial Sector in Commercial Banks, Deposits of Non Financial Sector in Commercial Banks and the Central Bank, Exports and Imports, and Industrial Production.

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