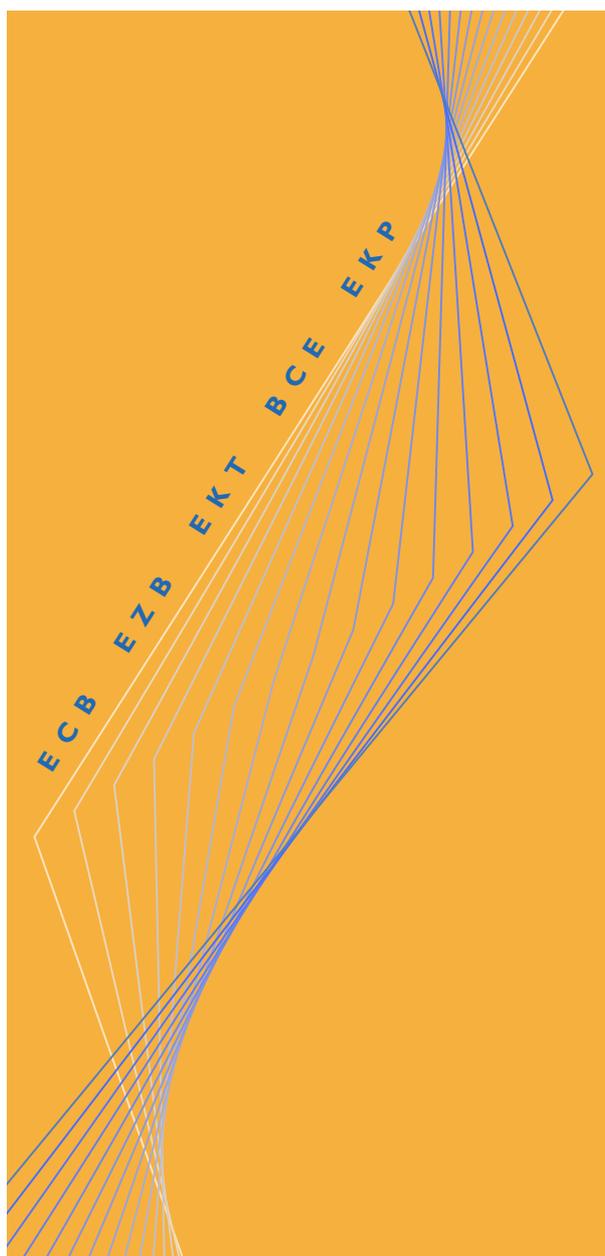


EUROPEAN CENTRAL BANK
WORKING PAPER SERIES



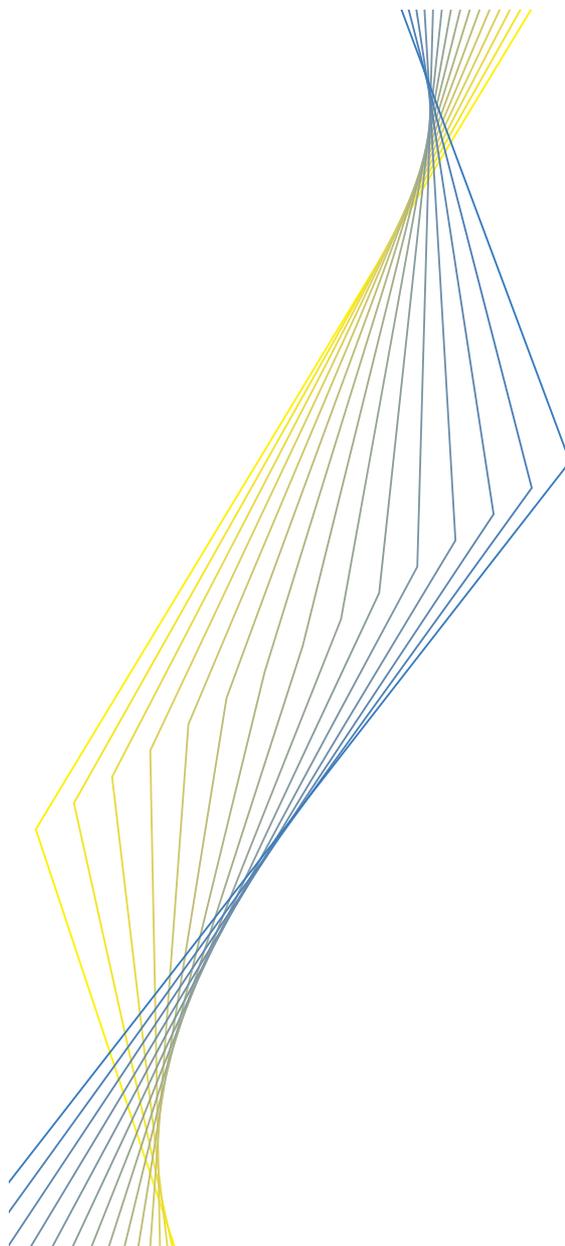
WORKING PAPER NO. 266

**FINANCE AND GROWTH
IN THE EU: NEW EVIDENCE
FROM THE LIBERALISATION
AND HARMONISATION
OF THE BANKING INDUSTRY**

BY DIEGO ROMERO DE ÁVILA

September 2003

EUROPEAN CENTRAL BANK
WORKING PAPER SERIES



WORKING PAPER NO. 266

**FINANCE AND GROWTH
IN THE EU: NEW EVIDENCE
FROM THE LIBERALISATION
AND HARMONISATION
OF THE BANKING INDUSTRY¹**

BY DIEGO ROMERO DE ÁVILA²

September 2003

¹ I would like to thank Reint Gropp, Philipp Hartmann, Thorsten Koeppel, Benoit Mojon, Cyril Monnet, Rolf Strauch, Philip Vermeulen, Simon Wren-Lewis, Luigi Zingales, an anonymous referee and the editorial board for helpful comments and discussions. I also thank DG-Research for providing a stimulating working environment and DG-Legal Services for helping me with the data on banking harmonisation at early stages. Many thanks also go to seminar participants at the ECB and Exeter University for fruitful comments. The usual disclaimer applies. The opinions expressed are not necessarily those of the ECB. This paper can be downloaded without charge from <http://www.ecb.int> or from the Social Science Research Network electronic library at http://ssrn.com/abstract_id=457534.

² School of Business and Economics, University of Exeter, Streatham Court - Rennes Drive, Exeter EX4 4PU, UK, E-mail: D.Romero-de-Avila-Torrijos@ex.ac.uk.

© **European Central Bank, 2003**

Address	Kaiserstrasse 29 D-60311 Frankfurt am Main Germany
Postal address	Postfach 16 03 19 D-60066 Frankfurt am Main Germany
Telephone	+49 69 1344 0
Internet	http://www.ecb.int
Fax	+49 69 1344 6000
Telex	411 144 ecb d

All rights reserved.

Reproduction for educational and non-commercial purposes is permitted provided that the source is acknowledged.

The views expressed in this paper do not necessarily reflect those of the European Central Bank.

ISSN 1561-0810 (print)

ISSN 1725-2806 (online)

Table of Contents

Abstract	4
Non-technical summary	5
1. Introduction	7
2 Existing Evidence on the Finance-Growth Nexus	8
3 Institutional Background	10
3.1 Deregulation Process	11
3.2 Harmonisation Process	12
4 Data and Methodology	19
4.1 Data Construction	19
4.2 Descriptive Statistics	22
5 Empirical Analysis	23
6 Further Robustness Checks	30
7 Transmission Channels from Financial Policies to Changes in Output Growth	32
7.1 Discussion of Results	37
8 Conclusions	38
References	41
Appendixes: Additional Tables and Graphs	45
European Central Bank working paper series	49

ABSTRACT

This paper analyses the link between finance and growth by studying the effect that the process of financial deregulation and harmonisation of banking laws at the EU level has brought about on growth over the last 40 years. Our main findings point to the existence of a positive long-run growth impact from the liberalisation of capital controls and the harmonisation of banking legislation. Both policy changes affect growth even after controlling for other pro-growth policies implemented around the same time and they are robust to business cycle effects that could spuriously drive the relation. The analysis of the main channels through which our policy changes may have affected growth indicates that the harmonisation process has impacted growth through the increase in the level and efficiency of financial intermediation and the liberalisation of capital controls has mainly affected growth through improvements in the degree of efficiency **in** financial intermediation.

J.E.L. Classification: G21, G28, O5.

Keywords: Financial Development, Banking Deregulation, European Union, Economic Growth.

Non-technical Summary

Over the last couple of decades most of the regulations and constraints imposed on banks by national authorities have been gradually dismantled. In the context of the Single Market, it was felt necessary to remove most of the legal barriers imposed to banks with the aim of generating more competitive pressure and in turn a better allocation of resources.

The liberalisation of the financial services industry has taken place gradually through two important moves. On the one hand, Member States have made a pre-emptive movement to deregulate national banking sectors in the advent of the creation of a single market, lifting any restrictions on quantities and prices. On the other, there has been a process of approaching the different EU banking legislations so as to harmonise regulations governing the banking industry across Europe, providing a level playing field for all credit institutions operating in different Member States and ensuring that competition is not distorted.

This study aims at analysing the link between finance and growth by studying the effect that these institutional changes may have exerted on economic growth over the last 40 years. The experience of the EU may constitute an ideal scenario to analyse the finance-growth nexus and an opportunity to try to shed some light on the unresolved issue of causality between finance and growth. To the extent that Member States have adopted the regulatory changes imposed by the EU Authorities through the introduction of Directives that have the character of binding laws at the national level, we can argue that any significant statistical link between these policy changes and growth may not merely reflect a contemporaneous correlation, but a causal link.

To measure the process of banking deregulation and harmonisation in the EU, we assemble a data set consisting of the implementation dates of the main EU Directives affecting the financial services industry. We also construct an index of deregulation which covers the liberalisation of capital controls and full deregulation of interest rates. We find evidence that the process of capital controls lifting and the harmonisation of banking laws at the EU level have brought about important benefits in terms of increases in the growth rate of the economy. The growth impact from the liberalisation of capital controls is found to be at least of 0.6% per year which is equivalent to 0.21% of the unconditional averaged growth rate of per capita output experienced in the EU over 1960-2001. The estimates of the growth effect from the harmonisation of banking regulations entail that the implementation of Directives

equivalent to 10 points (of 20 that the harmonisation can take) has brought about an increase in output growth by at least 1% per year. These results appear robust to the inclusion of other pro-growth policy changes implemented around the same time and are not driven by business cycle effects.

We further investigate the mechanisms through which these policy changes may have influenced the growth performance of EU economies. We consider two main channels: 1) the increase in the level of financial intermediation measured by the rise in the ratio of private credit to GDP and 2) the improvement in the quality and efficiency of the financial intermediation process proxied by the fall in the growth rate of the ratio of nonperforming loans to total loans. On this regard, we find that while the harmonisation process has impacted growth through the increase in the level and efficiency of financial intermediation, the liberalisation of capital controls has primarily affected growth through improvements in the degree of efficiency in financial intermediation. Furthermore, interest rate deregulation is found to affect the level of banking activity while not its efficiency.

Overall, the positive benefits in terms of economic performance resulting from the liberalisation of capital controls and the harmonisation of banking regulations accord well with the expectations by the EU Authorities and Member States. The creation of a Single European Banking Market has opened domestic banking sectors, created more cross-border activity and in turn more competition, which have been all translated into greater banking activity and efficiency in the allocation of resources to productive use by decreasing the cost of capital. All these benefits have derived from the efforts made by the European and National Authorities who envisaged the need to couple the liberalisation of interest rates, capital controls and entry restrictions with the strengthening of prudential, supervisory and accounting standards. This has ensured that excessive competition does not destabilise the financial services industry.

1 Introduction

In this paper we analyse the link between finance and growth by studying the effect that the process of financial deregulation and harmonisation of banking laws at the EU level has had on growth over the last 40 years. Since February 1986 when the Single European Act was implemented, the banking industry in the EU has been subject to a gradual process of deregulation and harmonisation in order to achieve a Single European Banking Market. The main objective of this process has been to open domestic banking sectors and create more cross-border activity as well as greater competition, with the aim of achieving a more efficient banking sector across the EU. Simultaneous to this deregulation process, there has been an expansion of the banking sector across the EU as a result of the increase in price competition as well as in the scope of activities credit institutions can engage in.

The finance-growth nexus has received a great deal of attention both theoretical and empirically. Early authors such as Joseph Schumpeter (1911), Gerschenkron (1962), Patrick (1966) and Hicks (1969) emphasised the important role accomplished by banks in the process of industrialisation and innovation by mobilising large amounts of funds to long-term investment projects. However, there has not been any consensus on the importance of the financial sector in affecting economic performance or on the transmission channels through which financial development may increase economic growth. Lucas (1988) asserted that economists “badly over-stress” the role of the financial sector and Joan Robinson (1952) stated that financial systems passively follow economic growth. Goldsmith (1969) argues that financial deepening brings about higher productivity and efficiency in the use of capital while McKinnon (1973) and Shaw (1973) find the increase in savings rates leading to a higher volume of investment as the main channel from finance to growth. De Gregorio and Guidotti (1995) find that around 75% of the finance-growth nexus takes place through the increase in the efficiency of investment, which appears corroborated by Díaz-Alejandro (1985).

Recently, a number of theoretical papers on finance and growth have emerged following the insights of the early endogenous growth models by Romer (1990), Grossman and Helpman (1991) and Lucas (1988)¹. Pagano (1993) highlights the three main channels through which finance may affect growth: 1) the increase in the rate of private savings, 2) the increase in the efficiency of the financial intermediation process

¹ See Bencivenga and Smith (1991), Greenwood and Jovanovic (1990) and Saint-Paul (1992) for endogenous growth models that analyse the joint emergence and development of financial systems and the process of sustained growth.

and 3) the rise in the social productivity of capital. In sum, this strand of the literature advocates that financial markets can affect growth in the long-run by accomplishing the following functions: provision of liquidity and agile mobilisation of funds from savers to investors, monitoring and screening of firms and managers, facilitating risk management and exchange, and exerting corporate control in order to align the interest of shareholders and managers.

The experience of the EU may constitute an ideal scenario to analyse the finance-growth nexus and an opportunity to try to shed some light on the unresolved issue of causality between finance and growth. Arguably, if banking deregulation and harmonisation policy measures affect growth even after controlling for the level of development of the banking sector and to the extent that these policy changes have been exogenously imposed by the EU Authorities at the national level, we can argue that there may exist a causal link between financial markets and growth. To measure the process of banking deregulation and harmonisation in the EU, we assemble a data set consisting of the implementation dates of the main EU Directives affecting the financial services industry. We also construct an index of deregulation which covers the liberalisation of capital controls and full deregulation of interest rates.

The rest of the paper is organised as follows. Section 2 presents the main avenues that have been taken with the aim of shedding some light on the direction of causality between finance and growth. Section 3 describes in detail the institutional background behind the EU banking deregulation and harmonisation process upon which the regulatory indices constructed in Section 4 are based. The main findings on the link between banking deregulation and harmonisation of banking legislation and growth are presented in Section 5 and 6. Section 7 analyses the specific transmission channels through which the policy changes considered here may affect output growth. Section 8 puts forward some policy recommendations and then concludes.

2 Existing Evidence on the Finance-Growth Nexus.

The positive link between financial development (both in terms of banks and stock markets) and real investment and growth has been well documented². Less consensus however has been reached on the direction of causality characterising the relationship.

² See Levine (1997) for an authoritative survey on the theory and empirics of the relation between banks and stock markets with the real economy.

King and Levine (1993) claim to find a causal link between finance and growth since initial levels of banking development are correlated with future output and productivity growth as well as physical capital accumulation. However, Rajan and Zingales (1998) argue that the initial level of financial development may be just a leading indicator rather than a causal factor, since financial intermediaries may increase their lending in anticipation to faster economic growth in the future.

As a way through the causality debate, some effort has been devoted to find factors that are closely related to financial development while unrelated to growth. La Porta et al. (1997, 1998) claim that legal origin is a crucial factor that has conditioned the degree of development and sophistication of both banks and stock markets over time. They note that those countries with French legal origin following a civil-law tradition show a systematically lower degree of development of financial systems. By contrast, those countries with an Anglo-Saxon legal origin based on jurisprudence following a common-law tradition show more developed and sophisticated financial systems, while those with German legal origin would fall in between. To the extent that legal origin has been exogenously imposed through colonialism and conquest, it could be used to shed some light on the unresolved issue of causality in the finance-growth nexus.

Nevertheless, Rajan and Zingales (2003) argue that the postulated link between legal origin and the degree of financial development does not accord well with the facts. They show that while legal origin does not change over time, the degree of financial development has experienced important reversals over the 20th century. They argue that there must be other factors behind the evolution of financial systems. They show that political factors such as the creation of interest groups opposed to the opening of domestic economies and the development of domestic financial systems (which would imply more competition) may be an alternative explanation of how financial systems have evolved over time.

In this paper we investigate an alternative mechanism to help us shed some light on the supply-leading hypothesis that implies a direction of causality going from finance to growth, i.e. the lifting of capital and interest rate controls and the harmonisation of banking regulations that can be conceived as policy measures to influence banking sector conduct and the allocation of resources, which in turn may have a significant impact on investment and growth. To the extent that Member States have adopted the regulatory changes imposed by the EU Authorities through the introduction of Directives that have the character of binding laws at the national level,

we can argue that any significant statistical link between these policy changes and growth may not merely reflect a contemporaneous correlation, but a causal link.

Some favourable evidence for the existence of a positive causal link between banking deregulation and growth has been provided by Jayaratne and Strahan (1996). They analyse the effect that the relaxation of bank branch restrictions in the United States may have had on growth at the state level. Their results point to a positive growth effect resulting from intrastate branch reform through the transmission channel of greater quality of bank lending.

3 Institutional Background

Over the last couple of decades most of the regulations and constraints imposed on banks by national authorities have been gradually dismantled. In the context of the Single Market, it was felt necessary to remove most of the legal barriers imposed on banking activity with the aim of generating more competitive pressure and in turn a better allocation of resources³.

As documented by Economic Research Europe Ltd, (1996), in a study for the European Commission, until the mid-eighties most EU banking systems were highly regulated. Interest rate regulations were common across EU countries with the exception of Germany and the Netherlands that fully deregulated them in 1981 and the United Kingdom in 1979. Controls on the free movement of capital were still in place by that time in Belgium, France, Greece, Ireland, Italy, Portugal and Spain. In addition, while branching restrictions were only in place in France, Italy and Portugal, in most countries there was a capital requirement at the branch level, which made competition through branching less efficient. In countries like Belgium, France, Italy, Portugal and Spain, banks were not allowed to be members of their domestic stock exchanges and the range of activities banks could engage in, was generally limited with clear restrictions on insurance and securities dealing.

The liberalisation of the financial services industry has taken place gradually through two important moves. On the one hand, Member States have made a pre-emptive movement to deregulate national banking sectors in the advent of the creation of a single market, lifting any restrictions on interest rates. On the other, there has been a process of approaching national banking legislations so as to harmonise regulations governing the banking industry across Europe, providing a level playing field for all

³ In the Cecchini report, 1988, it was estimated that the expected fall in banking prices would be up to 34% in most financial services once the EC internal market is completed.

credit institutions operating in different Member States and ensuring that competition is not distorted.

3.1 Deregulation Process

3.1.1 Restrictions on Quantities and Prices

As mentioned above, interest rate regulatory measures such as ceilings and floors were widespread across EU countries in the 70's and 80's. These restrictions were particularly important in Austria, Belgium, France, Greece and Portugal, where monetary authorities, shaping the degree of efficiency of credit institutions, established most interest rates including rates on loans. These measures were normally accompanied by investment coefficients (and high reserve coefficients) by which credit institutions were compelled to devote some share of their liquid resources to finance government deficits by purchasing public bonds. As pointed out by Vives (1991), many countries also allowed coordinating movements and "cartel-type" tacit agreements that led deposit rates to be underpriced. These collusive practices were common in Belgium, France, the Netherlands and Spain.

Quantitative restrictions on assets and liabilities were also in place in many EU countries up to the early nineties. As described by Vives (1990), reserve requirements remained with such high levels that banks in some Member States could not behave competitively with respect to some of their EU counterparts. In 1990, Spanish commercial and saving banks were compelled to posit 19% of a subset of their liabilities in the Bank of Spain. These excessive reserve coefficients were also widespread in Greece, Sweden, France and Italy. In Belgium these restrictions essentially affected saving and public banks, while only building societies in the United Kingdom⁴.

3.1.2 Liberalisation of Capital Controls

With regard to the liberalisation of capital flows, article 67(1) of the original EEC Treaty was explicit by requiring that during the transition towards a common European market, Member States should progressively abolish all restrictions on the movement of capital across Member States, removing also any discriminatory restriction based on nationality. However, the Treaty did not specify the transactions to

⁴ For further details on the regulatory environment in the EU see Gual and Neven (1993). See also Dixon (1990) for detailed information on Greece and Italy, Englund (1990) for the case of Sweden, Vives (1991) for Spain and Melitz (1990) for France.

be liberalised, calling for liberalisation but up to “the extent necessary to ensure the proper functioning of the common market”.

Some progress was made with the First and Second Council Directives covering article 67 of the Treaty. Essentially, these Directives divided capital movements into several categories to which a different degree of liberalisation was applied, thereby separating out those transactions that need not be liberalised at all from the rest. Most remarkably, the cross-border opening of deposit and current accounts and the granting of personal loans were not liberalised which constituted a clear obstacle to the development of cross-border retail banking.

More stringent measures were laid down by Directive 88/361 inspired by the Single European Act, which established the basic principle of freedom of capital movement as to reach the character of binding law for Member States by July 1990, except in Greece, Ireland, Portugal and Spain that were given an extension until 1992 to adopt the Directive⁵. Without giving an exhaustive list of transactions, Directive 88/361 conceived capital to include among others: direct investment, investment in real estate, operations with securities taking place in regulated capital markets, operations involving units of collective undertakings, deposit and current accounts, credit and loans for both a commercial and financial purpose, personal transfers of capital and physical transfers of financial assets. Therefore, this Directive helped lift some of the remaining legal barriers associated with both wholesale and retail banking.

With the adoption of the Treaty on the European Union in November 1993, article 67 of the Treaty of Rome was replaced by article 73 of the Maastricht Treaty that applies the principle of full freedom of capital movements.

3.2 Harmonisation Process

3.2.1 Basic Legislation

The first important step in the harmonisation process of approaching national legislations was given in 1973 through the adoption of Council Directive 73/183, by which the restrictions on freedom of establishment and provision of financial services by credit institutions in other Member States were removed. In addition, credit institutions operating in the same country would be subject to equal prudential and supervisory rules (national treatment principle). In practice, this Directive did not have much impact since in most Member States there still remained many restrictions on the

⁵ Council Directive 92/122 gave authorisation to Greece to defer the liberalisation of certain capital movements until 1995. Portugal was extended until 1995 also because of adjustment difficulties.

free movement of capital in addition to the requirement for branches to maintain a minimum level of capital.

Another important piece of legislation was the First Banking Directive on the Coordination of Laws, Regulations and Administrative Provisions Relating to the Taking Up and Pursuit of Credit Institutions (Directive 77/780), which defined a credit institution as “an undertaking whose business is to receive deposits and other repayable funds from the public and to grant credit for its own account”.

Important progress was made with the adoption of the Second Banking Directive (Directive 89/646, SBD hereafter) that was inspired in the White Paper signed in 1985 by the European Commission by which there was a shift from detailed harmonisation of rules to a system that effectively combines minimum harmonisation of rules with the principle of mutual recognition and home country control. The principle of mutual recognition implies that any credit institution and certain financial institutions authorised to operate in their home country are granted a “single passport”, being able to open branches and provide services in any other EU country without the need of further authorisation from host country authorities. By replacing the responsibility of supervising banks from the host to the home country, the SBD ensured that the same Member State that grants a charter to a credit institution under the “Single Banking Licence” agreement would be the one controlling and supervising its activities independent of its place of operation⁶.

The principle of minimum harmonisation entails the harmonisation of uniform prudential standards in all Member States to the extent to ensure the stability and soundness of the banking industry as well as the existence of similar competitive conditions for all credit institutions operating in different Member States. Though Member States are allowed to set more stringent prudential and regulatory standards, by virtue of the principle of mutual recognition no Member State will tend to deviate from those minimum standards since that would act against the interest of its national credit institutions operating under competitive disadvantage in less restrictive Member States. Likewise, the SBD opened up a process of competitive deregulation (what has been often called “a race to the bottom”) in the range of banking activities permitted in EU

⁶ Host country supervisory authorities continue having the discretionary power to intervene in matters concerning liquidity, monetary policy and when it is in the public’s interest.

countries, leading to the adoption by all Member States of the Universal Banking model⁷.

The SBD set some minimum prudential standards such as a minimum capital requirement of EUR 5 millions for credit institutions and clear limitations on their participations in non-financial firms as well as shifting the capital requirement from the branch to the bank level, reducing in turn the cost of opening new offices⁸.

The liberalisation of capital flows and the application of the principle of mutual recognition were expected to trigger cross-border banking activity, bringing about intensified competition among banks, which could lead some institutions to take excessive risks in order to remain in the industry. The SBD thus called for more Directives on setting further prudential standards, on improving the disclosure of information by credit institutions and measures to protect the interest of consumers of financial services. This is in part why the EU harmonisation of banking regulations has been considered as a re-regulatory move aimed at maintaining the stability and soundness of the banking industry, but posing some costs to the financial services industry. Indeed, the process of regulatory harmonisation has implied tighter regulation for some countries while deregulation for some others such as Germany and Luxembourg that have generally imposed more stringent capital requirements. As noted above, by virtue of the principle of mutual recognition Member States will not have the incentive to set prudential standards above EU levels, since that would act in detriment of domestic institutions. So deregulatory competition will lead prudential standards to converge towards the EU benchmark.

3.2.2 Prudential Measures

Directive 83/350 further amended by Directive 92/30 introduced the principle of supervision at the consolidated level, leading credit institutions to adopt accounting rules with the aim of presenting consolidated accounts for the whole group. Other Directives regulating prudential standards are those governing the own funds⁹, large exposures and the application of the solvency ratio^{10,11}.

⁷ The banking model precognised by the SBD is the Universal Banking Model, which allows banks to carry on traditional activities such as deposit acceptance and the granting of loans in addition to investment activities such as money brokering, portfolio management and securities underwriting.

⁸ As documented by Economic Research Europe Ltd (1996), there was a 58% increase in cross-border branching in the three years following the SBD.

⁹ Directive 89/299 in addition to Directives 91/633 and 92/16, which both amend the former.

¹⁰ The main Solvency Ratio Directive is Directive 89/647; which is amended several times. See Table 1 below.

The own funds of a credit institution comprise those items that can be used to absorb losses. The Own Funds Directive uses a two-tier classification by dividing the own funds into tier-1 capital that comprises mainly equity and reserves and tier-2 capital that involves those funds the credit institution can dispose of for a limited period such as subordinated debt. The solvency ratio constitutes the legal instrument that ensures a sufficient degree of capitalisation of credit institutions and expresses own funds as a proportion of risk-adjusted assets and off-balance-sheet items. The risk-weights are assigned by differentiating between three main categories: central banks, central governments and credit institutions and on the basis of the precedence of the borrower. This allows a reliable assessment of the financial health and solvency of financial institutions. The minimum solvency ratio of a credit institution will be 8% of the risk-adjusted own funds¹².

The Directive on the control of large exposures regulates the assets and off-balance-sheet items so that a large exposure may not exceed 40% of the own funds of a credit institution and overall cannot exceed 800% of the own funds of the institution¹³.

3.2.3 Accounting and Disclosure Regulatory Measures

Directive 86/635 on Annual Accounts and Consolidated Accounts of Credit Institutions and Directives 83/349, 90/604 and 90/605 on Annual Accounts aim at making it feasible for creditors, borrowers, owners and the public to have access to comprehensive and comparable information on the accounts of credit institutions operating in different Member States. This is achieved by laying down uniform rules as well as the terminology used by credit institutions when presenting the balance sheet and the profit-and-loss account.

Two other Directives govern the accounting obligations of branches. More specifically, Directive 89/117 rules the way branches established in a Member State of credit and financial institutions having their heads outside that Member State should publish their annual accounts. The eleventh Council Directive 89/666 concerns the disclosure requirements of branches opened in a Member State by certain types of company governed by the law of another Member State. Through these Directives, branches opened in EU countries do not have any longer to publish separate accounts

¹¹ These Directives are largely based on the 1988 Capital Accord of the Basel Committee on Banking Supervision signed by the G10 that shifted the emphasis from conduct regulations to prudential regulatory measures such as more stringent capital requirements.

¹² For further details on the different aspects in the calculation of the solvency ratio, see Usher (2000).

¹³ A large exposure is assumed to equal or exceed 15% of the credit institution's own funds.

from those of their head offices. Rather, the whole financial group will have to consolidate their accounts.

3.2.4 Measures to Protect Consumers and to Fight against Fraud

Directives 91/308 and 2001/97 on Money Laundering aim at strengthening international cooperation and the exchange of information in order to prevent the use of the financial system to commit fraud. Direct measures to protect consumers include Directive 94/9 on Deposit Guarantee Schemes that establishes a mandatory insurance guarantee scheme with the aim of maintaining consumers' confidence. This Directive sets a minimum coverage per depositor equal to 90% of the deposits with the limit of EUR 20.000.

Directives 87/102 and 90/88 on the approximation of laws concerning consumer credit have the objective of ensuring that consumers are provided with appropriate information about the terms and conditions of any credit obtained from a credit institution. Directive 93/13 deals with the issue of unfair contracts not only in the area of financial services but also in other fields.

3.2.5 Regulatory Measures on the Payment System

The European Authorities have stressed the need to regulate payment systems, since the introduction of the euro was expected to trigger the rise in the number of cross-border transfers of funds and transactions involving capital. Two main Directives have been adopted on that regard. Directive 97/5 on cross-border credit transfers is concerned with the approximation of domestic and cross-border payment systems, so that individuals and firms could transfer funds from one Member State to another more reliably, quickly and at a lower cost¹⁴.

Directive 98/26 on settlement finality in payment and securities settlement systems puts forward a common set of rules to protect participants in payment systems in the event that one member has gone insolvent so that his collateral can be enforced by the other participants.

¹⁴ In July 2001 the European Council adopted the Regulation on Cross-Border Payments in Euro. The Regulation covers cross-border payments of up to 12.500 euros, requiring credit institutions to charge the same commissions and fees for cross-border and domestic card payments and withdrawals from cash dispensers.

3.2.6 Measures to Harmonise the Activities of Non-Bank Financial Institutions

As recognised in the literature¹⁵, the SBD has followed a criterion based on the institutional definition of an undertaking rather than on the functions it carries out when granting the “single passport”. The combination of this narrow definition of institutions with its wide functional scope of application is clearly beneficial to those countries with a universal banking system. In order to provide a level playing field for non-bank institutions that carry on any functions covered by the SBD but whose definition does not match that of credit institution, the European Authorities have extended the principle of mutual recognition in two ways: 1) by allowing non-bank subsidiaries of banks and 2) by means of further Directives applied to investment firms and collective units of transferable securities.

Directive 93/6 regulates the investment services and securities brokerage business carried on by investment firms and those credit institutions authorised by the SBD¹⁶. The Investment Services Directive (ISD hereafter) follows the philosophy of the SBD in that the principles of single passport, mutual recognition and home country control are applied. The ISD also called for the tightening of prudential standards to cover market risks associated with securities brokerage and measures to protect the interest of investors. The Capital Adequacy Directive requires those undertakings covered by the ISD to reserve a proportion of their funds to insure against any contingency associated with open market positions. Directive 97/9 on Investor Compensation Scheme is the instrument used to protect the interest of investors in the case of failure of an investment firm. It covers for at least 90% of any loss, with the upper limit of EUR 20.000.

Directive 85/611 amended by Directive 88/220, regulates the undertakings for collective investment in transferable securities. The main activity of these UCITS, whose units can be re-purchased or redeemed out of their assets, is to invest in transferable securities of capital raised from individual investors with the aim of diversifying risks. The UCITS Directives apply the same basic principles to UCITS than the SDB did for credit institutions. Nonetheless, UCITS will have to comply with host country rules on marketing under the “general good clause”. Another drawback of the UCITS Directive is that managers and depositories of UCITS are not entitled to be

¹⁵ See for instance, Carossio (1990).

¹⁶ The list of investment services includes: the placing, brokerage and underwriting of securities and services associated with portfolio management and the provision of advice and expertise. These services can be applied to transferable securities, money market instruments and exchange and interest rate instruments.

granted “the single passport” and they need to be authorised in each Member State they want to operate¹⁷.

3.2.7 Late Measures for the Completion of Regulatory Harmonisation and Financial Integration

Recently Directive 2000/12 amended by Directive 2000/28 has coded in a single text seven Directives alongside their corresponding amendments with the aim of providing a comprehensive and unified code covering all the Directives on the taking up and pursuit of business of credit institutions, avoiding any overlapping among them¹⁸. The adoption of the “Banking Code” is one of the many initiatives that the Financial Services Action Plan endorsed in 1999 has put forward in order to achieve a single market for wholesale financial services and secure the retail financial sector along with the adoption of state-of-the-art prudential rules and supervisory procedures by 2005.

Further impetus to these initiatives has been imparted by the ECOFIN that established the Committee of Wise Men in July 2000, who recognised the benefits that could be reaped from a fully integrated financial industry. They claim that “the EU has no divine right to the benefits of an integrated financial market. It has to capture those benefits by building an integrated European market in many areas starting from a very low level. If this does not succeed, economic growth, employment and prosperity will be lower”.

The Report of the Committee of Wise Men also notes that the current regulatory system based mainly on Directives has a number of drawbacks: it is too slow and too rigid to quickly adapt to changes in market conditions, it produces too much ambiguity in the implementation process, being also unable to distinguish between essential principles and practical rules. The Wise Men Committee has proposed a shift from the use of Directives to that of Regulations, which are binding laws and take automatic precedence over national laws without further need of passing implementing legislation at the national level.

¹⁷ In December 2001, the European Council adopted two Directives amending the UCITS Directive. Directive 2001/108 called “Product Directive” removes barriers to cross-border marketing of units of funds and widens the number of assets UCITS can invest in by including bank deposits, money market instruments, the units of other non-UCITS collective investment undertakings and options and futures among others. The “Manager Directive” (2001/107) allows managers of UCITS to be granted “the single passport”.

¹⁸ The “Banking Code” comprises Directive 73/183 on Freedom of Establishment, The First and Second Banking Directives, the Solvency Ratio and Own Funds Directives, Directive 92/30 on the Supervision of Credit Institutions on a Consolidated Basis and Directive 92/121 on Large Exposures.

All in all, important progress has been made in the process of harmonisation of the financial services industry. The process of full integration of wholesale markets can be seen as complete while the retail-banking sector is in the process of realisation. However, there may be natural barriers that may impede the full integration of the retail banking industry such as the existence of reputation effects, the cost of the establishment of a network of branches or the existence of switching costs to be incurred by consumers when changing from one bank to another.

4 Data and Methodology

4.1 Data Construction

In this section we explain the indexes constructed to proxy for the process of banking deregulation and harmonisation of banking laws in the EU outlined in the previous section. We distinguish between both processes since they may have a different impact on growth.

The deregulation index (DERI) is based on the dates when the total liberalisation of capital controls and interest rates took place, which are provided by Gual (1999). Accordingly, DERI is the sum of a capital control and an interest rate indicator of deregulation. Each indicator assigns a value of 1 to the dates where full liberalisation is in place. So the deregulation index can take a maximum value of 2.

The harmonisation index is constructed on the basis of the implementation dates of the main Council Directives affecting the banking activity. We build on the work by Gual (1999) that created a data set with the implementation dates of some banking Directives over the period 1981-1995 for twelve EU countries. We extend the data set by including the EFTA countries that joined the EU in January 1995, i. e. Austria, Finland and Sweden, and by extending the implementation period from the sixties to the present. We also consider a more exhaustive list of Directives covering a much wider range of aspects of the banking industry that have been subject to harmonisation. We diverge from Gual (1999) in that we distinguish between strict deregulatory measures and harmonisation measures, thus constructing two separate indexes. As shown in table (1) our harmonisation index is constructed on the basis of six indicators covering all the Banking Directives implemented in the EU since the sixties until 2001¹⁹.

The Basic Indicator is based upon the three pillar Directives. Each Directive is assigned a value of one from the year of implementation at the national level until 2001.

¹⁹ The latest Directives are not included in the index, since they have not been generally implemented at the national level by the end of the period under scrutiny.

The second indicator is based on those Directives regulating the prudential standards of credit institutions. Four main Directives regulate the prudential standards in the EU: the Directive on Consolidated Surveillance and the Directives governing the own funds, the solvency ratio and the large exposures of credit institutions. We assign to each of these main four aspects a value equal to one of which 0.5 goes to the first Directive regulating the issue and the rest for its subsequent amendments²⁰. By proceeding in this way, we put more weight on the first directive than on each subsequent amendment that in many cases just slightly modifies the former.

The third indicator is based on those Directives governing the accounting and disclosure obligations of credit institutions and their branches. It takes a value of two since it builds on the Annual and Consolidated Accounts Directive (86/635) and the Directive governing the accounting obligations of branches opened within the EU. The fourth indicator regulates the pursuit of investment and securities firms and builds on four main Directives: the UCITS Directive, the Investment Services Directive, the Capital Adequacy Directive and the Investor Compensation Scheme Directive. The fifth indicator covers those Directives aimed at protecting consumers of financial services and fighting against financial fraud and is based upon five main Directives. The last indicator covers the Directives pursuing the approximation of payment systems in the EU.

The overall harmonisation index sums over the six indicators. The maximum value in a given period can be 20 and would correspond to a period when all banking Directives considered had been yet implemented. Therefore, this index is expected to take a value closer to 20 by the end of the period covered in the study²¹. It should also be noticed that sometimes the actual national implementation of a Council Directive is earlier than the publication of the Council Directive. This stems from the fact that a particular national law already in place at the time when the Directive is published may be more stringent than the EU counterpart. Sometimes, it happens that some Directives are gradually implemented as reflected by subsequent national laws adopted over several years²².

²⁰ For instance, we assign a value of 0.5 to the Solvency Ratio Directive (89/647), and the rest half a point is divided among all the subsequent Directives amending Directive 89/647.

²¹ Therefore, those countries adopting EU Directives early will have a harmonisation index that reaches its maximum value earlier than in those countries where the adoption took place later. In some cases the harmonisation index may take on a value lower than 20 by 2001 if some of the Council Directives have not been yet implemented.

²² In this case, we deviate slightly from Gual in the way we compute the indicator. For instance, The SBD was adopted in Belgium through several laws that were implemented in 1990, 1993 and 1994. While we

TABLE 1: HARMONISATION INDEX

DIRECTIVE	DIR. CODE	WEIGHT	OBJECTIVE
BASIC INDICATOR (I1)			
FREEDOM OF ESTABLISHMENT DIRECTIVE	73/183	1	BASIC INDICATOR
FIRST BANKING DIRECTIVE	77/780	1	BASIC INDICATOR
SECOND BANKING DIRECTIVE	89/646	1	BASIC INDICATOR
		3 POINTS	
PRUDENTIAL HARMONISATION INDICATOR (I2)			
CONSOLIDATED SURVEILLANCE DIRECTIVE	83/350	0.5	PRUDENTIAL
MODIF CONS. SURVEILLANCE DIRECTIVE	92/30	0.5	PRUDENTIAL
OWN FUNDS DIRECTIVE	89/299	0.5	PRUDENTIAL
MODIF. OWN FUNDS DIRECTIVE	91/633	0.25	PRUDENTIAL
MODIF. OWN FUNDS DIRECTIVE	92/16	0.25	PRUDENTIAL
SOLVENCY RATIO DIRECTIVE	89/647	0.5	PRUDENTIAL
MODIF. TO SOLVENCY RATIO DIRECTIVE	94/7	0.1	PRUDENTIAL
MODIF. TO SOLVENCY RATIO DIRECTIVE	91/31	0.1	PRUDENTIAL
MODIF. TO SOLVENCY RATIO DIRECTIVE	95/15	0.1	PRUDENTIAL
MODIF. TO SOLVENCY RATIO DIRECTIVE	98/32	0.1	PRUDENTIAL
MODIF. TO SOLVENCY RATIO DIRECTIVE	98/33	0.1	PRUDENTIAL
LARGE EXPOSURES DIRECTIVE	92/121	1	PRUDENTIAL
		4 POINTS	
ACCOUNTING AND DISCLOSURE INDICATOR (I3)			
ANNUAL AND CONSOLIDATED ACCOUNTS DIRECTIVE	86/635	0.5	ACCOUNTING
NATIONAL ACCOUNTS OF CERTAIN FIRMS DIRECTIVE	78/660	0.1	ACCOUNTING
CONSOLIDATED ACCOUNTS DIRECTIVE	83/349	0.1	ACCOUNTING
MODIF. 78-660 AND 83/349 W.R.T. TO SMES	90/604	0.1	ACCOUNTING
MODIF. 78-660 AND 83/349 W.R.T. TO SCOPE OF DIR.	90/605	0.1	ACCOUNTING
MODIF. 78-660 W.R.T. THE AMOUNTS EXPRESSED IN ECUS	94/8	0.1	ACCOUNTING
BRANCH ESTABLISHMENT & HEAD OFFICES OUTSIDE THE EU	89/117	0.5	ACCOUNTING
BRANCHES OPENED IN ANOTHER MEMBER STATE	89/666	0.5	ACCOUNTING
		2 POINTS	
OTHER NON-BANK FINANCIAL INSTITUTIONS INDICATOR(I4)			
UCITS DIRECTIVE	85/611	0.5	LEVEL PLAYING
MODIF. TO UCITS DIRECTIVE	88/220	0.25	LEVEL PLAYING
INVESTMENT SERVICES DIRECTIVE (ISD)	93/22	0.75	LEVEL PLAYING
CAPITAL ADEQUACY OF INV FIRMS AND CREDIT INST. (CAD)	93/6	0.5	PRUDENTIAL
MODIF. TO CAPITAL ADEQUACY DIRECTIVE	98/31	0.25	PRUDENTIAL
MODIF. TO UCITS, ISD, CAD AND SOLVENCY RATIO DIRECTIVE.	95/26	0.75	LEVEL PLAY.& PRUD.
INVESTOR COMPENSATION SCHEME DIRECTIVE.	97/9	1	PRUDENTIAL
		4 POINTS	
CONSUMER PROTECTION INDICATOR (I5)			
MONEY LAUNDERING DIRECTIVE	91/308	1	FINANCIAL FRAUD
CONSUMER CREDIT DIRECTIVE	87/102	1	CONSUMER PROT.
CONSUMER CREDIT DIRECTIVE	90/88	1	CONSUMER PROT.
UNFAIR TERMS IN CONSUMER CONTRACTS DIRECTIVE	93/13	1	CONSUMER PROT.
DEPOSIT GUARANTEE SCHEME DIRECTIVE	94/19	1	CONSUMER PROT.
		5 POINTS	
PAYMENT SYSTEM INDICATOR (I6)			
CROSS-BORDER CREDIT DIRECTIVE	97/5	1	PAYMENT SYSTEM
PAYMENT AND SEC. SETTLEMENT SYSTEM DIRECTIVE	98/26	1	PAYMENT SYSTEM
		2 POINTS	

The proxy we use for the level of banking activity is the ratio of private credit by deposit money banks (DMB) to GDP and represents claims on the private sector made

assign a value of one third to each of those specific years, Gual assigns a value of 0.2 to each year covering the period 1990-1994.

by DMB. Note that this variable excludes credit allocated to the public sector as well as claims made by the Central Bank since we are trying to capture the efficiency in the allocation of credit. We follow Demirgüç-Kunt and Levine (2001) in deflating the ratio of private credit to GDP. They note that credit granted by DMB represents a stock variable and GDP can be seen as a flow variable. Since stock variables are measured at the end of the period and flow variables are measured relative to the whole period, we deflate private credit with the end of the year consumer price index (normally the CPI of December) and GDP is deflated using the annual CPI. We use the following expression to compute the private credit to GDP ratio at time t .

$$\frac{0.5 * \left(\frac{CREDIT_t}{CPI_{e,t}} + \frac{CREDIT_{t-1}}{CPI_{e,t-1}} \right)}{\frac{GDP_t}{CPI_{a,t}}}$$

where the subscript e , a relates to end of the period and average value respectively²³. Data for real GDP per capita in constant 1995 PPP prices used to compute output growth were obtained from the Economic Outlook published by the OECD²⁴.

4.2 Descriptive Statistics

The national implementation of EU Directives has taken place gradually and has differed across countries. In figures 1 and 2 presented in the appendix, we depict the evolution of the harmonisation and deregulation indexes from 1960 to 2001. Over the seventies there were few important moves towards the harmonisation of banking legislations. By 1985 the harmonisation index normally takes on a value lower than 2, with the exception of France, Germany, the Netherlands and the United Kingdom. With regard to the deregulation of interest rates and liberalisation of capital controls, Germany, the Netherlands and the United Kingdom had dismantled any restrictions by 1981. Therefore, we can consider these three countries and to a less extent France as early deregulators relative to the rest. By 1990 the harmonisation index reaches a value greater than four in the early deregulators as well as in Denmark and Spain that quickly began lifting constraints on branching, capital controls and interest rates during the eighties. The interval going from 1990-1995 constituted the period of faster adoption of Council Directives at the national level. By 1995 the harmonisation index takes on a

²³ The data were retrieved from the International Financial Statistics Database (IMF). Line 99b relates to gross domestic product in LCU and line 64 for CPI. For bank credit to the private sector, we use line 22d.

²⁴ See table (A1) in the appendix for the definition of the data used in the study along with the data sources.

value greater than 12 in all Member States with the exception of Italy and Luxembourg. By that time all restrictions on interest rates and capital controls had also been lifted. According to our harmonisation index, the proportion of Directives adopted by the end of 2001 varies across Member States. The percentage appears equal or greater than 85% in all countries apart from Italy, Denmark, Sweden and the United Kingdom. In Belgium, Germany, Greece, the Netherlands, Portugal, and Luxembourg the percentage of adoption is greater than 90%. Spain appears as the Member State that has implemented more Directives with a percentage of adoption equal to 99.5%²⁵.

Simultaneous to this process of harmonisation of banking regulations, there has been a steady increase in banking activity. The ratio of private credit to GDP has steadily increased in all countries since the early sixties with the notable exception of Denmark, Finland and Sweden, where there has been a reversal in the trend as a result of the bank insolvency episodes taking place in the early nineties.

5 Empirical Analysis

In this section we estimate the impact that the process of financial liberalisation and harmonisation of banking legislation in the EU may have exerted on growth over the period 1960-2001. Considering that the pace of adoption of Council Directives has differed across countries and over time, the use of panel data techniques should allow us to take advantage of the within and between variability of the data. A further advantage over standard cross-section regressions is that panel techniques can better control for omitted factors by including country-specific effects and for business cycle effects through time dummies²⁶. Nevertheless, the inclusion when unnecessary of such country-specific and year-specific effects takes away the between and within variability of the data. As a result, we will carry out an ANOVA analysis of the variance for each regression in order to determine whether to include country or time-specific effects or both. We perform the analysis of variance test for common means across individuals, across time, or both applied to the residuals from the regression across the entire data set.

²⁵ The harmonisation index should give a good idea of the pace of harmonisation of banking legislation in the EU as well as of the effort made by Member States to transcribe Council Directives to National Laws. Nonetheless, in exceptional cases the fact that a country has not adopted a specific Directive by the end of the period, may not reflect any disadvantage in relation to a country that has adopted it. Italy that did not adopt Directive 73/183 on Freedom of Establishment constitutes a clear example since once the First Banking Directive came into place, Directive 73/183 lost relevance.

²⁶ The inclusion of country-specific effects may also help controlling for the convergence of income levels that has taken place in the EU in the post-war period. See Barro and Sala-i-Martin (1992).

A further concern in the models we are estimating of growth on the financial policy changes given by banking deregulation and the harmonisation of regulatory standards of the financial services industry in the EU, is that our indicators could be proxying for some other specific episodes taking place during the period under consideration. More specifically, we are concerned about the episodes of systemic banking crises that have occurred in the EU over the last 30 years as a result of fast financial deregulation without having sufficiently strengthened the regulatory and supervisory framework of financial institutions. In the aftermath of the crises these countries took important steps to strengthen their prudential and accounting standards by adopting BIS capital adequacy standards and better accounting and disclosure measures.

Therefore, once we control for these major episodes of banking insolvencies, we should capture the effect that the institutional changes have had on growth beyond their effect on any major banking crisis. Caprio and Klingebiel (1996a) have documented major bank insolvency episodes in Spain over 1977-1985 and in 1994 with Banesto, Sweden in 1991, Finland over the period 1991-1993, France during 1994-1995 and some episodes of borderline crises in Germany during the late 1970s and in 1989, and in the United Kingdom from 1974 to 1976. We thus construct a variable called CRISIS that takes on a value of unity for those countries and those years when a major banking crisis was in place.

Model 1 estimates the basic growth regression controlling for the variable CRISIS and the harmonisation index (that we denote henceforth by HI). The test for common means in the time and cross-section dimensions are easily rejected at the 1% significance level, which points to the need of controlling for time and country-specific effects. HI appears significant and with a positive sign. The variable CRISIS shows the expected sign and implies a decrease in growth at the EU level of around 1.5% as a result of episodes of financial distress. Model 2 estimates the same model but allowing for a heterogeneous slope on the CRISIS variable for each country suffering a major banking crisis since it may be reasonable to consider that country-specific episodes of financial distress affected mainly the country suffering it. We tested for the restriction implied by the CRISIS variable, rejecting slope homogeneity at the 6% confidence level. Therefore, from now on we allow for a heterogeneous slope on the crisis indicator. The crisis dummy appears highly significant in Finland, France, Spain and Sweden while insignificant in Germany and the UK. The size of the coefficients gives a good idea of the detrimental effect of each banking crisis. The financial crisis in Finland

appears to have reduced growth by almost 5%. Indeed, the real growth rate of output per capita in 1991 was -7.5%. In Sweden, the 1991 crisis reduced growth by almost 2.5%. In France and Spain growth dropped by almost 1% and 1.8% respectively²⁷. Once we allow for heterogeneous slopes on the CRISIS variable, HI reduces in magnitude by around 30% with respect to model 1 and remains significant at 5%. Still the coefficient on HI implies that the adoption of Directives equivalent to 10 points (of 20 that the index can take) has brought about a 1.65% increase in output growth, which is equivalent to around 55% of the unconditional mean of per capita output growth in the EU over the period 1960-2001.

Following Jayaratne and Strahan (1996), we test for the existence of regional business cycles that could drive a spurious positive relation between HI and output growth²⁸. We split the sample in four main regions on the basis of the patterns followed in the deregulation and harmonisation process. We consider a group of early deregulators formed by the Netherlands, Germany, the UK and France. A second group consisting of the EFTA countries (Austria, Sweden and Finland) that joined the EU in 1995 and quickly implemented many of the Directives already in place in other Member States. A third group consists of the Southern European countries (Greece, Portugal and Spain) and Ireland that have experienced both fast economic growth over the nineties and a quick implementation of Banking Directives in that period. This group may be particularly influential in obtaining a spurious positive coefficient on HI for the panel as a whole. The fourth group consists of Belgium, Denmark, Italy and Luxembourg. Therefore, we again estimate model 2 but allowing for region-specific time effects, being unable to reject the null of homogeneous time effects for the whole EU even at 10%. We also experimented with a model that allows for region-specific time effects for early deregulators, the Southern group and a residual group containing the rest and we could not reject the null of homogeneous time effects. Therefore, we dismiss the possibility of region-specific business cycles driving the finance-growth relation²⁹. In model 3 we further estimate model 2 but allowing for a different slope on HI for each region. The coefficients on the HI terms are significant at least at 10%, but we are

²⁷ This estimated detrimental growth impact from major banking crises should not come as a surprise since as documented by Caprio and Klingebiel (1996a) the rescue costs amounted to 8% of GDP in Finland and to 6.4% of GDP in Sweden. In Spain the estimated losses incurred by banks were equal to 16.8% of the gross national product.

²⁸ The model with regional time effects would be: $growth_{i,t} = \theta_{j,t} + \alpha_i + \beta * HI_{i,t} + \sum \gamma_j * CRISIS_{i,t} + \varepsilon_{i,t}$ for j equal to 4 in our case, as opposed to the model without regional time dummies given by $growth_{i,t} = \theta_i + \alpha_i + \beta * HI_{i,t} + \sum \gamma_j * CRISIS_{i,t} + \varepsilon_{i,t}$. The cost in terms of degrees of freedom is thus 120.

²⁹ The F-statistics are presented at the bottom of table (2).

unable to reject the homogeneity hypothesis. This suggests that our model with a homogeneous coefficient on HI for the whole EU is unlikely to be misspecified.

Considering that the harmonisation index covers several aspects that may exert a different impact on growth, model 4 controls for the six indicators upon which HI is based, which may induce multicollinearity problems. We thus run separate regressions controlling for only one indicator at a time.

Model 4 renders a negative growth effect from the indicator measuring the prudential and supervisory regulations imposed on credit institutions in order to maintain the stability and soundness of the banking industry³⁰. This finding may reflect that the harmonisation of prudential standards across the EU for some Member States has constituted a movement to tightening regulation. That has made the financial intermediation process more costly as suggested by Gual (1999), with a negative impact on the efficiency in the allocation of resources to productive use. By contrast, the indicator on accounting and disclosure standards renders a significantly positive coefficient in line with other studies such as La Porta et al. (1998) and Levine (1998) who find that an index of accounting standards can condition the degree of development of financial markets, affecting in turn growth. The indicators on consumer protection and payment systems are significantly positive at 10%. Models 5 to 10 represent growth regressions with one indicator at a time. Again, models 7 and 9 yield a significantly positive coefficient on the accounting indicator and consumer protection indicator respectively.

Table (3) presents the results on the growth effect of the deregulation of interest rates and the liberalisation of capital controls. Model 11 renders an insignificant coefficient on the banking deregulation index (DERI). In models 12 to 15 we analyse separately the growth impact of interest rate deregulation (IRI) and capital controls liberalisation (CCI). No significant effect arises from interest rate deregulation. In contrast, the liberalisation of capital controls appears to positively affect growth. Model 14 renders a coefficient on CCI implying that the lifting of capital controls in the EU has brought about an increase in long-run output growth by almost 0.6%, which is equivalent to around 21% of the unconditional mean of per capita output growth experienced in the EU during 1960-2001³¹. In model 15 we tried to estimate the separate growth effects of HI and CCI, but both coefficients were insignificant due to

³⁰ See Table (A1) in the appendix for the notation of each variable used in the regressions.

³¹ As a robustness check, we tested for the existence of regional time effects in model 14, but we did not find statistical evidence supporting it. We also tested for the existence of region-specific time effects in the group of early deregulators, the group that includes Southern EU countries and Ireland and a residual

TABLE 2: GROWTH AND THE HARMONISATION PROCESS

MODEL	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
HI	0.240*** (2.822)	0.165** (1.970)								
CRISFIN		-4.969*** (-2.741)	-4.980*** (-2.743)	-4.847*** (-2.381)	-5.293*** (-2.945)	-5.660*** (-2.978)	-4.757*** (-2.536)	-5.364*** (-3.010)	-5.262*** (-2.968)	-5.403*** (-3.037)
CRISFRA		-0.973*** (-3.035)	-0.895*** (-2.729)	-0.831** (-2.214)	-1.092*** (-3.371)	-1.038*** (-3.140)	-1.266V (-3.682)	-1.102*** (-3.523)	-0.946*** (-2.850)	-1.106*** (-3.461)
CRISGER		0.371 (0.747)	0.349 (0.700)	0.290 (0.558)	0.345 (0.656)	0.429 (0.809)	0.553 (1.074)	0.468 (0.900)	0.500 (0.967)	0.500 (0.955)
CRISESP		-1.850*** (-3.499)	-1.830*** (-3.383)	-1.696*** (-2.976)	-1.945*** (-3.648)	-2.158*** (-4.308)	-1.919*** (-3.756)	-2.082*** (-4.171)	-2.096*** (-4.186)	-2.067*** (-4.151)
CRISWE		-2.493*** (-4.217)	-2.501*** (-4.234)	-1.818*** (-2.838)	-2.740*** (-4.967)	-2.613*** (-5.086)	-2.158*** (-3.429)	-2.687*** (-4.918)	-2.332*** (-3.924)	-2.708*** (-4.959)
CRISUK		-0.374 (-0.381)	-0.417 (-0.426)	-0.334 (-0.344)	-0.345 (-0.352)	-0.377 (-0.380)	-0.283 (-0.285)	-0.359 (-0.361)	-0.464 (-0.467)	-0.364 (-0.367)
REG1HI			0.151* (1.708)							
REG2HI			0.159* (1.751)							
REG3HI			0.168** (1.977)							
REG4HI			0.165* (1.913)							
I1				0.259 (1.338)	0.171 (0.916)					
I2				-0.594* (-1.890)		-0.405 (-1.434)				
I3				1.041*** (2.795)			0.978*** (2.528)			
I4				0.228 (1.330)				0.054 (0.370)		
I5				0.257* (1.762)					0.298* (1.933)	
I6				0.342* (1.751)						0.240 (1.239)
CRISIS	-1.556*** (-3.434)									
ANOVA										
INDIV	4.234***	4.500***	2.659***	5.610***	5.635***	4.119***	3.878***	3.537***	4.787***	3.910***
TIME	16.57***	16.315***	16.12***	16.84***	17.01***	15.196***	15.70***	13.175***	14.993***	9.462***
JOINT	13.37***	13.252***	12.63***	13.92***	14.06***	12.324***	12.63***	10.676***	12.347***	8.023***
R²	0.746	0.751	0.751	0.754	0.750	0.751	0.752	0.750	0.751	0.750
UsableObs	615	615	615	615	615	615	615	615	615	615

F(5,553)= 2.184 with Significance Level 0.0546. Null of homogeneity of CRISIS versus country-specific CRISIS variables.

F(120,433)= 0.993 with Significance Level 0.507. Null of homogeneity of time dummies versus regional time effects

F(80,473)= 1.108 with Significance Level 0.258. Null of homogeneity of time dummies versus heterogeneous regional time effects in the early deregulators group and Southern countries and a residual category with the rest.

F(3,550)= 0.078 with Significance Level 0.972. Null of homogeneity of slope of HI versus heterogeneous slopes across regions.

The dependent variable is the growth rate of per capita PPP-adjusted output. See table (A1) for the notation of the regressors. *, ** and *** imply the significance of the coefficient at the 10%, 5% and 1% levels of significance respectively. The coefficients reported are estimated in a model with the deterministic components indicated by the ANOVA analysis. Heteroskedastic-consistent t-statistics are given in parenthesis. The analysis of variance tests for

category. Again, we could not reject the null of homogeneous time effects for the EU as a whole. As a last check, we also allowed for a different slope on CCI for each regional group, not being able to reject the null of a homogeneous slope on CCI as in model 14.

the null hypothesis of common means, across individuals, across time, or both applied to the residuals from a regression without fixed and time effects. *, ** and *** imply the rejection of common means across individuals, across time, or both at the 10%, 5% and 1% levels of significance respectively. The variables REG1HI, REG2HI, REG3HI and REG4HI relate to the regional groups defined in the text.

the high correlation between them³². This may indicate that we do not have enough variability in the data for a too detailed decomposition of institutional factors surrounding the process of the opening of the financial industry in the EU. Therefore, considering that harmonisation and the deregulation of domestic financial systems have been rather simultaneous and may have reinforced each other, we estimate the growth effect of these institutional changes by computing an overall index (DREG) as the sum of HI, CCI and IRI³³. Model 16 provides strong evidence of a positive overall growth effect from the institutional changes considered here.

Thus far, we have found consistent evidence that both the lifting of capital controls and the harmonisation of banking legislation positively affect growth. However, skeptics could still argue that our policy indexes may be capturing the effect of some other omitted policy factors from the regression. One particular set of policies that have been actively implemented in the EU over the last twenty years are fiscal policies aimed at improving the infrastructure endowment and the softening of taxation levels in order to create more employment and investment and in turn more output growth³⁴. Therefore, we control in our regressions for the investment rate in public capital as well as for the ratio of total direct taxation to GDP (which comprises personal and corporate capital income taxation). Models 17 and 19 show that the coefficients on HI and CCI are of similar size to earlier models and statistically significant. As far as the growth impact of fiscal policies is concerned, direct taxation appears to adversely affect growth while public investment enters insignificant.

This preliminary evidence lends support to the existence of a positive growth impact from the policy changes implied by the harmonisation of banking legislation at the EU level and the liberalisation of capital controls, even after controlling for other pro-growth policies implemented around the same time. We could not find though, a significant impact from interest rate deregulation. This may indicate that ceilings on deposit rates and caps on lending rates did not have an apparent direct impact on

³² Both series correlate with a correlation coefficient of 0.77.

³³ As noted by Wyplosz (1999), restrictions on quantities and prices of domestic banking sectors in Europe have been normally accompanied by the imposition of capital controls, since the former would otherwise be easily evaded if there existed the possibility of lending or borrowing from abroad. For similar reasons, once domestic controls begin to be lifted, the need to maintain restrictions on capital movements decreases.

³⁴ See Romero de Ávila and Strauch (2003).

growth. Even though these domestic restrictions could not be easily circumvented through transferring funds on a cross-border dimension due to the existence of exchange controls, financial intermediaries made the effort to compensate for the decrease in banking activity that such measures brought about by expanding the branch network with the aim of attracting clients³⁵.

TABLE 3: GROWTH REGRESSIONS AND DEREGULATION OF INTEREST RATES AND CAPITAL CONTROLS

	BASIC GROWTH MODEL					MODEL AUGMENTED WITH FISCAL POLICIES				
MODEL	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
HI			0.173** (2.001)		0.132 (1.501)		0.170** (2.118)			
DERI	0.209 (1.203)									
IRI		0.011 (0.037)	-0.121 (-0.380)					-0.1677 (-0.543)		
CCI				0.578* (1.911)	0.473 (1.491)				0.524* (1.685)	
DREG						0.144** (2.138)				0.135** (2.09)
CRISFIN	-5.451*** (-3.029)	-5.382*** (-3.025)	-4.941*** (-2.734)	-5.527*** (-3.069)	-5.172*** (-2.814)	-5.070*** (-2.799)	-5.083*** (-2.894)	-5.497*** (-3.221)	-5.665*** (-3.246)	-5.220*** (-2.97)
CRISFRA	-1.153*** (-3.591)	-1.125V (-3.521)	-0.960*** (-2.973)	-1.170*** (-3.626)	-1.042*** (-3.208)	-1.013*** (-3.164)	-0.839*** (-2.618)	-0.992*** (-3.122)	-1.080*** (-3.363)	-0.904*** (-2.859)
CRISGER	0.415 (0.784)	0.479 (0.915)	0.356 (0.724)	0.257 (0.493)	0.212 (0.421)	0.3416 (0.678)	0.521 (0.971)	0.6173 (1.101)	0.431 (0.762)	0.5027 (0.918)
CRISESP	-2.070*** (-4.149)	-2.093*** (-4.229)	-1.844*** (-3.485)	-2.051*** (-4.094)	-1.865*** (-3.498)	-1.866*** (-3.576)	-1.510*** (-2.808)	-1.803*** (-3.499)	-1.726*** (-3.317)	-1.542*** (-2.879)
CRISWE	-2.598*** (-4.687)	-2.690*** (-4.886)	-2.457*** (-4.047)	-2.309*** (-3.879)	-2.223*** (-3.609)	-2.456*** (-4.173)	-2.864*** (-4.700)	-3.031*** (-5.246)	-2.703*** (-4.327)	-2.831*** (-4.65)
CRISUK	-0.248 (-0.250)	-0.361 (-0.364)	-0.405 (-0.414)	-0.187 (-0.189)	-0.228 (-0.231)	-0.293 (-0.298)	0.079 (0.079)	0.0827 (0.082)	0.211 (0.210)	0.1326 (0.133)
LTDIR							-1.695*** (-3.150)	-1.737*** (-3.242)	-1.830*** (-3.395)	-1.712*** (-3.197)
LPI							-0.034 (-0.086)	-0.088 (-0.220)	0.090 (0.220)	0.0178 (0.045)
ANOVA										
INDIV	7.186***	6.446***	4.561***	7.680***	5.620***	4.876***	3.123***	3.607	3.443***	3.161***
TIME	14.553***	13.667***	16.320***	14.190***	16.399***	16.400***	6.626***	6.734	6.759***	6.641***
JOINT	12.643***	11.795***	13.271***	12.502***	13.605***	13.413***	5.850***	6.051	6.026***	5.869***
R²	0.750	0.750	0.751	0.751	0.752	0.7513	0.748	0.746	0.747	0.747
Usable Observ.	615	615	615	615	615	615	544	544	544	544

F(120,433)= 0.99 with Significance Level 0.49. Null of homogeneity of time dummies versus regional time effects.

F(80,473)= 1.108 with Significance Level 0.258. Null of homogeneity of time dummies versus different regional time effects in the early deregulators group and southern countries differentiated from the rest.

F(3,550)= 0.121 with Significance Level 0.95. Null of homogeneity of slope of CCI versus heterogeneous slopes across regions

See Table (2).

³⁵ As noted by Wyplosz (1999), quantitative restrictions such as credit ceilings did not bind either, since the wide range of exemptions to such measures allowed financial intermediaries to get around them. In addition, the presence of interest rate restrictions in the presence of information asymmetries and moral hazard in the banking industry can lead to the increase in the franchise value of banks, thereby encouraging prudent behaviour when lending funds (See Hellmann et al., 2000).

6 Further Robustness Checks

In the previous section we have dealt with the issue of business cycles by including time effects that control for any common shocks affecting all countries in a given period such as the 1973 oil shock. We also tried to control for the possibility of regional business cycles, but we statistically rejected the inclusion of regional time effects. Still it could be argued that individual countries liberalised capital controls and approximated banking legislation in anticipation to future investment opportunities and in turn better growth prospects. This possibility would derive from the existence of country-specific shocks that would trigger the process of banking deregulation in the expectation of an upturn in the national business cycle.

We deal with this possibility by detrending the output series using the Hodrick-Prescott filter. In Hiebert et al. (2002) we noted that this method may be preferable to five-year averaging the output series as commonly done in the literature in order to remove any cyclical fluctuations from the data. The value of the detrending parameter λ used to detrend the output series are set to 30 and 100³⁶. We use data on PPP-adjusted output until 2003 (where 2002 and 2003 values are predictions) in order to generate our series of potential output. Then we remove the data from 2001 onwards, since the procedure tends to bias the final observations. This approach is also preferable to the way Jayaratne and Strahan (1996) deal with the issue of national business cycles. They essentially introduced lagged values of the dependent variable as regressors. However, the correlation between lagged output growth and the country-specific effects leads to inconsistent estimates as demonstrated by Nickell (1981) and Kiviet (1995)³⁷. Table (4) presents the estimation results using as a dependent variable the growth rate of potential output computed with $\lambda=30$ ³⁸. It is reassuring that, if anything, the link between CCI and growth is strengthened even after controlling for fiscal policy changes while IRI appears marginally significant when we do not control for fiscal policies. It is also interesting that once we filter the output series, the crisis indicators fall by about half of the size of the estimates shown in tables (2) and (3). This is a clear indication that the long-run growth effect of major banking insolvencies is not as high as found in growth

³⁶ We consider the case of $\lambda=30$ following Bouthevillain et al. (2001) who examined cyclical adjustment methodology applied to public finances in the EU, finding that business cycles normally last for eight to ten years.

³⁷ Judson and Owen (2001) found that even in the case of a time dimension as large as 30, the bias was as large as 20% of the true value of the coefficient.

³⁸ The results that follow when we use trend growth computed with $\lambda=100$ are similar in nature since both filtered series of output growth correlate with each other with a correlation coefficient of 0.99 and are available from the author upon request.

models estimated with unfiltered data. The negative growth impact of the Finnish and Swedish crises amounts to around 2% and 1% respectively, while approximately to 1% and 0.5% in Spain and France.

TABLE 4: SHORT-RUN SENSITIVITY WITH HP GROWTH WITH LAMBDA =30

	BASIC MODEL			MODEL WITH FISCAL POLICIES				
HI	0.137**			0.140***			0.103*	
	(2.399)			(2.722)			(1.929)	
CCI		0.840***			0.637***		0.560***	
		(5.544)			(3.986)		(3.257)	
IRI			0.3239*			0.2325		
			(1.791)			(1.400)		
DREG							0.144***	
							(3.758)	
CRISFIN	-1.711***	-2.267***	-2.078***	-1.606***	-2.147***	-1.972***	-1.866***	-1.648***
	(-4.281)	(-6.518)	(-6.073)	(-4.441)	(-6.931)	(-6.609)	(-4.886)	(-4.731)
CRISFRA	-0.492*	-0.686***	-0.637***	-0.458**	-0.689***	-0.618***	-0.576**	-0.488**
	(-1.953)	(-2.707)	(-2.607)	(-2.116)	(-3.200)	(-2.988)	(-2.550)	(-2.306)
CRISGER	0.501***	0.282*	0.6196***	0.657***	0.514**	0.767***	0.475**	0.613***
	(2.912)	(1.686)	(2.992)	(3.346)	(2.579)	(3.276)	(2.580)	(3.195)
CRISESP	-1.326***	-1.459***	-1.506***	-1.136***	-1.278***	-1.347***	-1.122***	-1.101***
	(-4.925)	(-5.849)	(-6.144)	(-3.644)	(-4.267)	(-4.484)	(-3.617)	(-3.559)
CRISWE	-0.920***	-0.543*	-1.161***	-1.224***	-0.965***	-1.425***	-0.891***	-1.140***
	(-2.790)	(-1.859)	(-4.094)	(-3.982)	(-3.292)	(-5.252)	(-2.915)	(-3.723)
CRISUK	0.259	0.522**	0.3435	0.824***	0.971***	0.884***	0.938***	0.873***
	(1.177)	(2.357)	(1.498)	(3.202)	(3.809)	(3.373)	(3.693)	(3.426)
LTDIR				-0.500*	-0.645**	-0.480*	-0.620**	-0.509*
				(-1.813)	(-2.335)	(-1.749)	(-2.210)	(-1.859)
LPI				-0.671***	-0.510**	-0.679***	-0.503**	-0.602***
				(-2.911)	(-2.129)	(-2.927)	(-2.100)	(-2.627)
ANOVA								
INDIV	13.980***	22.641***	18.558**	8.313***	8.632***	9.274***	8.386***	8.345***
TIME	35.441***	28.277***	25.988***	5.415***	5.554***	5.610***	5.501***	5.427***
JOINT	29.772***	26.788***	24.026***	6.544***	6.717***	6.936***	6.615***	6.559***
R²		0.896	0.899	0.895	0.897	0.898	0.895	0.898
Usable								
Observ.		600	600	600	529	529	529	529

The dependent variable is the growth rate of per capita PPP-adjusted output filtered with Hodrick-Prescott filter with a detrending parameter equal to 30. See Table (2) for the rest.

As an additional robustness check we tested for the existence of structural changes across time in the coefficients on HI and CCI included one at a time as in models 2 and 14 shown above. Table (5) presents the results of the structural change tests for five different experiments, not rendering evidence of a statistically different growth impact of our policy changes across periods. This indicates that the growth impact of capital controls liberalisation and the harmonisation of banking laws is not driven by a specific period where there was a combination of fast output growth and a

fast rate of adoption of financial liberalisation measures. Rather, the growth impact of these policies seems to be of a long-term nature³⁹.

TABLE 5: SUMMARY STRUCTURAL BREAK TESTS

EXPERIMENT	1	2	3	4	5
F-TEST FOR THE CHANGE IN SLOPE IN HI	0.647	0.533	0.009	1.014	1.527
Prob. of rejection.	(0.63)	(0.59)	(0.92)	(0.31)	(0.22)
F-TEST FOR THE CHANGE IN SLOPE IN CCI	1.226	0.950	0.689	0.950	0.048
Prob. of rejection.	(0.33)	(0.30)	(0.41)	(0.33)	(0.83)

Test for the null hypothesis of a homogeneous slope over the whole period versus heterogeneous slopes across periods.

1 We allow for a different slope for each of the five periods: 1960-1980, 1981-1985, 1986-1990, 1991-1995 and 1996-2001.

2 We split the sample in three periods: 1960-1985, 1986-1995 and 1996-2001.

3 We split the sample in two periods: 1960-1980 and 1981-2001.

4 We split the sample in two periods: 1960-1985 and 1986-2001.

5 We split the sample in two periods: 1960-1990 and 1991-2001.

*, ** and *** imply the rejection of a common slope on the coefficient of interest at the 10%, 5% and 1% levels of significance respectively .

7 Transmission Channels from Financial Policies to Changes in Output Growth

Once we have determined the existence of a robust positive link between the policy changes under consideration and output growth, it may be interesting to analyse the exact channels through which HI and CCI may have affected growth. As argued in the introduction, two main mechanisms through which financial policies may affect growth have been emphasised in the literature, i.e. the increase in the level of banking activity and the improvement in the efficiency of financial intermediation.

In table (6) we show the estimates of some regressions with the dependent variable trying to proxy for the transmission channels through which our policy changes may affect growth. In models 21 to 23, we use as dependent variable the credit granted by deposit money banks to the private sector as a share of GDP expressed in natural logs. This variable should proxy for the level of financial intermediation. The coefficient on HI in model 21 implies that the adoption of Council Directives equivalent to 10 points of HI has caused the credit to GDP ratio to increase by 1%. As far as the effect of CCI on banking activity is concerned, considering that the average of the ratio of private credit to GDP equals 55.293 for the EU over the whole period, model 22 indicates that such figure would be equal to 50.33 if no liberalisation of capital controls

³⁹ Some informal evidence supporting these claims is that during the period 1990-1995 when the biggest push towards the deregulation and harmonisation of the banking industry has taken place, if anything, output growth has been steady or even decreased in most of the countries with respect to other periods.

had taken place⁴⁰. Furthermore, model 23 renders a significantly positive effect of interest rate deregulation on the extent of financial intermediation. This preliminary evidence lends support to the increase in banking activity as a result of the lifting of interest rates and capital controls and harmonisation of banking legislation in the EU.

A second channel we would like to investigate is the improvement in the quality and efficiency in financial intermediation. As mentioned by Jayaratne and Strahan (1996), to accurately measure the efficiency in the allocation of financial resources to productive use, one would need specific information on the productivity of individual investment projects financed by financial intermediaries. That would indicate how efficiently the monitoring and screening of individual projects have been carried out. However, such data are not available on a EU-wide basis. Instead, we use the growth rate of the ratio of total provisions on loans to total loans obtained from the balance sheet information provided by credit institutions, which may capture the change in the quality of bank portfolios as a result of the institutional changes considered here⁴¹. We obtain this data from the Bank Profitability Statistics (2000 edition) published by the OECD. The time span covered is quite short and data are not available for Luxembourg. Overall, only 150 usable observations can be counted. Model 24 gives some indications that the process of harmonisation of banking legislation may have reduced the percentage of nonperforming loans. The impact appears important, implying that the adoption of Banking Directives equivalent to 10 points has led to a decrease in the growth rate of the ratio of non-performing loans to total loans by almost 0.6% per year.

We now run some growth regressions that control for the changes in the quantity and quality of financial intermediation in order to determine whether HI and CCI still retain their significance as well as to give some indications of the relative importance of each transmission mechanism to growth. Since in these regressions we introduce as an additional control the ratio of private credit to GDP that is likely to be correlated with growth over the cycle, we make use of the filtered output growth series that should ameliorate the extent of reverse causality in the finance-growth relation.

⁴⁰ This is computed according to Halvorsen and Palmquist (1980) who provide a formula to interpret the coefficients on dummy variables in semi-logarithmic equations. If we subtract the coefficient on CCI from the logarithm of 55.293, this renders a value of 3.91 which is the natural log of 50.33.

⁴¹ Jayaratne and Strahan (1996) have warned that changes in the ratio of non-performing loans to total loans can be caused by factors different from deregulation such as changes in bank loan portfolios associated with a lower risk-taking on the part of banks.

**TABLE 6: TRANSMISSION CHANNELS FROM CAPITAL CONTROLS
LIBERALISATION AND HARMONISATION OF BANKING LEGISLATION**

MODEL	(21)	(22)	(23)	(24)	(25)	(26)
DEP.						
VAR.	LCREDY	LCREDY	LCREDY	DLPROV	DLPROV	DLPROV
HI	0.102*** (5.790)			-0.590* (-1.777)		
CCI		0.094** (2.010)			-5.199 (-1.350)	
IRI			0.128*** (2.639)			0.1719 (1.327)
CRISFIN	0.652*** (5.967)	0.373*** (5.350)	0.385*** (5.790)			
CRISFRA	0.373*** (4.605)	0.274*** (3.210)	0.273*** (3.187)	-0.042 (-1.020)	-0.060 (-1.515)	0.079 (0.554)
CRISGER	-0.080* (-1.852)	-0.050 (-1.128)	-0.003 (-0.063)	0.365 (1.296)	0.399 (1.413)	0.325 (0.787)
CRISESP	0.218*** (4.001)	0.077 (1.609)	0.074 (1.601)	0.008 (0.055)	0.003 (0.024)	-0.015 (-0.094)
CRISWE	0.184** (1.989)	0.117 (1.156)	0.027 (0.286)			
CRISUK	-0.263** (-2.214)	-0.226** (-2.012)	-0.222** (-1.980)			
ANOVA						
INDIV	21.363***	17.089***	10.826***	0.284	0.283	0.280
TIME	113.171***	21.308***	25.224***	1.446	1.507*	1.516*
JOINT	91.047***	20.396***	21.761***	0.987	1.028	1.042
R²	0.996	0.995	0.995	0.027	0.018	0.240
Usable						
Observ.	619	619	619	150	150	150

The dependent variables are the log-levels of the ratio of private credit to GDP (LCREDY) and the growth rate of the ratio of non-performing loans to total loans (DLPROV). See Table (2) for the rest.

In table (7) we present the estimation results using trend growth computed with $\lambda=30^{42}$. In model 27 we control for the logarithm of private credit to GDP, which is found to significantly correlate with growth with a coefficient of 0.312. A 1% increase in the ratio of private credit to GDP would bring about an increase in per capita output growth by 0.31%. Model 28 further controls for HI rendering the coefficient on private credit insignificant, giving some indication that the harmonisation of banking legislation in the EU has affected output growth in part through the increase in banking activity. The fact that HI is significant, further indicates that it has affected growth beyond its effect on the expansion and deepening of banking activity, probably through the efficiency channel. The coefficient on HI of around 0.1 implies that the adoption of Directives equivalent to 10 points (50% of the maximum value of HI) has brought about

⁴² The results that follow when using trend growth computed with $\lambda=100$ are similar and available from the author upon request.

an increase in growth of around 1%, which is equivalent to 35% of the unconditional mean of output growth in the EU over the period under scrutiny.

Model 29 shows that CCI also affects growth beyond its effect on the level of financial intermediation. The coefficient on private credit retains its significance at 10%, but reduces in magnitude by 18% with respect to model 27. This may indicate that the efficiency channel is more important in explaining the influence of capital controls liberalisation on growth than the increase in the investment volume.

Model 31 shows that our efficiency proxy is significantly correlated with growth at 10%. The coefficient equals -0.18, entailing that a 1% decrease in the growth rate of non-performing to total loans may bring about an increase in output growth by 0.18%. Model 33, which further controls for CCI, renders the coefficient on the efficiency proxy insignificant, while CCI remains significant. While these latter findings may not be conclusive given the limited number of observations, they corroborate the findings from model 29 that the main channel through which capital controls liberalisation may enhance growth has been by improving the quality of bank portfolios and in turn the efficiency in the allocation of financial resources to productive use. The reason that our efficiency proxy is driven insignificant when we control for CCI, could simply be that such policy change may be better proxying for the change in banking efficiency than the ratio of non-performing loans to total loans, which could be decreasing after the lifting of capital controls due to factors completely unrelated to the policy change.

As regards the process of harmonisation of banking legislation, the fact that HI positively correlates with the ratio of private credit to GDP (model 21), which in turn is positively related to output growth (model 27) and is driven insignificant once we control for HI (model 28), indicates that one channel through which HI has influenced growth is the increase in banking activity and in turn in the level of investment. Furthermore HI affects output growth beyond its effect on the level of financial intermediation, rendering some tentative evidence that the channel associated with improvements in the quality of financial intermediation may be also important in explaining the link between harmonisation and growth. This is further corroborated by model 32 that controls for the efficiency proxy, which becomes insignificant once we introduce HI in the regression, since as argued for the case of CCI, HI may be indeed better proxying for the change in the competitive conditions and in efficiency following

the harmonisation of the banking industry than the ratio of non-performing loans to total loans⁴³.

TABLE 7: TRANSMISSION CHANNELS FROM FINANCIAL POLICIES TO GROWTH MODELS WITH HP GROWTH WITH PARAMETER EQUAL TO 30

MODEL	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)
HI		0.109* (1.812)				0.093*** (2.444)		
CCI			0.802*** (5.269)				0.339* (1.751)	
IRI				0.276 (1.559)				0.060 (0.403)
LCREDY	0.312** (2.238)	0.224 (1.528)	0.255* (1.890)	0.288** (2.151)				
DLPROV					-0.180* (-1.840)	-0.087 (-1.052)	-0.101 (-1.224)	-0.102 (-1.236)
CRISFIN	-2.185*** (-6.543)	-1.878*** (-4.517)	-2.367*** (-6.652)	-2.197*** (-6.294)				
CRISFRA	-0.711*** (-2.931)	-0.587** (-2.319)	-0.762*** (-3.033)	-0.721*** (-2.969)	-0.329*** (-3.498)	-0.276** (-2.189)	-0.291*** (-2.372)	-0.323*** (-2.603)
CRISGER	0.586*** (3.137)	0.512*** (2.933)	0.290* (1.726)	0.609*** (3.027)	0.068 (0.225)	0.215 (0.507)	0.047 (0.112)	0.190 (0.480)
CRISESP	-1.552*** (-6.211)	-1.393*** (-5.035)	-1.492*** (-5.835)	-1.540*** (-6.109)	-1.311*** (-5.201)	-1.564*** (-5.621)	-1.684*** (-6.048)	-1.767*** (-6.257)
CRISWE	-1.123*** (-3.915)	-0.981*** (-2.966)	-0.597** (-2.045)	-1.182*** (-4.152)				
CRISUK	0.328 (1.423)	0.305 (1.371)	0.564*** (2.557)	0.393* (1.709)				
ANOVA								
INDIV	14.250***	14.225***	11.057***	10.489***	11.99***	16.893***	17.735***	10.057***
TIME	14.208***	11.842***	10.042***	10.028***	1.216	10.587***	3.179***	3.591***
JOINT	14.252***	12.542***	10.361***	10.206***	6.211***	15.165***	10.096***	5.965***
R²	0.895	0.895	0.898	0.894	0.951	0.970	0.970	0.968
Usable								
Observ.	593	593	593	593	150	150	150	150

The dependent variable is the growth rate of per capita PPP-adjusted output filtered with the Hodrick-Prescott filter with a detrending parameter equal to 30. See Table (2) for the rest.

Regarding the growth impact of the deregulation of interest rates, model 30 shows that IRI enters insignificant once we control for the ratio of private credit to GDP. Thus interest rates deregulation only affects growth by increasing banking activity. This contrasts with HI and CCI that affect growth partly through the efficiency channel. Since harmonisation and the lifting of capital controls are policies implemented with the aim of increasing cross-border activity, bringing about greater competition and hence efficiency improvements, we will directly test this implication by regressing our policy changes on foreign penetration measures after controlling for

⁴³ Gual (1999) constructed an index with the implementation dates of some Banking Directives in order to proxy for the degree of competition in the EU financial services industry after deregulation.

banking crisis episodes. The foreign bank share is computed as the ratio of foreign bank assets to total banking sector assets and is obtained from Demirgüç-Kunt, and Levine (2001) that used Bankscope as the primary source. The results point to a highly significant positive impact from harmonisation and capital control lifting on foreign bank penetration, whereas interest rate deregulation entered insignificant. This further corroborates our earlier findings that only harmonisation and the liberalisation of capital movements raise the efficiency of financial intermediation⁴⁴.

7.1 Discussion of Results

These findings accord quite well with the facts and with some existing evidence. Since capital controls usually prevent domestic financial institutions to operate in foreign markets, these institutions tend to have a less diversified portfolio. This entails a lower degree of efficiency in the allocation of resources since credit institutions are more prone to be adversely affected by domestic shocks, making them more vulnerable to episodes of financial distress⁴⁵.

With regard to the process of harmonisation of banking legislation across the EU which is found to increase the level and efficiency of the financial services industry, there is also some indirect evidence that partly back up our findings. Jayaratne and Strahan (1996) document that the relaxation of branching restrictions in the United States has caused an increase in growth through improvements in bank lending quality, which may derive from greater competition brought about by the entry of new banks and cross-state consolidation that helps removing less efficient banks. They note that the increase in bank size may also lead to a more diversified portfolio as found in Demsetz and Strahan (1995) and the opening of the banking industry may create a disciplining mechanism for managers not to deviate from the value maximisation of the institution as a result of increased takeover threat.

In the European context, we note that the existence of interest rate regulations and capital controls along with entry and branching restrictions affected the financial services industry by reducing competition and in turn its degree of efficiency. By lifting restrictions on interest rates, capital movements and foreign bank entry, European markets have experienced intensified competition coming from abroad. As documented

⁴⁴ I thank an anonymous referee for suggesting this exercise. The results are available from the author upon request.

⁴⁵ See Caprio and Klingebiel (1996b) for an extensive discussion on the role played by microeconomic factors such as prudential regulatory measures of the banking industry and macroeconomic factors in shaping the degree of efficiency of the banking industry.

by Economic Research Europe Ltd. (1996), the intensified competition in the deposit and credit markets has led to important reductions in deposit and loan rates across the EU and particularly in Greece, Italy and Spain. The wholesale markets have been associated with greater falls in prices than the retail sector. This has been translated into a decrease in the cost of borrowing at the corporate level, which has given incentive for more investment and growth.

A study by the ECB (1999) has documented that the number of banks in the EU has considerably decreased by around 26% from 1990 to 1997, which may give a further indication that the process of financial integration in the EU has served as a mechanism to remove inefficient banks. Indeed, the adoption of the Second Banking Directive gave rise to a wave of mergers and acquisitions across Europe, since financial institutions envisaged the need to operate on a bigger scale within an integrated European market in order to reap scale economies benefits at the EU level. As noted by Cabral et al. (2002), the process of financial integration has made banks more efficient since they can enjoy scale economies at the industry level by operating in a bigger wholesale market for corporate services in the EU.

As regards the disciplining mechanism implied by increased takeover or merger threat following a deeper and more integrated market, no clear evidence has emerged. Indeed, one may expect this mechanism not to be fully operating since the Takeover Directive has not been yet implemented, and each Member State can pose barriers to cross-border mergers and acquisitions resorting to the “general good clause” with the aim of sheltering domestic institutions from foreign competition.

All in all, the process of banking deregulation has brought about intensified competition that has been accompanied with the harmonisation of prudential and supervisory rules aimed at limiting the risk-taking of credit institutions and ensuring the soundness and stability of the financial services industry. This has brought about an improvement in bank lending quality, leading in turn to greater efficiency in the allocation of resources to productive use and to greater growth.

8 Conclusions

In this study we have analysed the link between finance and growth by studying the effect that the process of financial deregulation and harmonisation of banking laws at the EU level may have exerted on growth over the last 40 years. We argue that the experience of the EU may constitute an ideal scenario to shed some light on the unresolved issue of causality in the finance-growth nexus, since Member States have

adopted Council Directives on the liberalisation of capital movements and on the harmonisation of banking regulations imposed by the EU Authorities with the aim of increasing the volume and efficiency of the financial services industry.

Throughout the analysis, we find that the process of capital control lifting and the harmonisation of banking laws at the EU level have brought about important benefits in terms of increases in the growth rate of the economy. The growth impact from the liberalisation of capital controls is found to be at least of 0.6% per year which is equivalent to 21% of the unconditional averaged growth rate of per capita output experienced in the EU over 1960-2001. The estimates of the growth effect from the harmonisation of banking regulations entail that the implementation of Directives equivalent to 10 points has brought about an increase in output growth by at least 1% per year. Therefore, the maximum increase in output growth from the harmonisation of banking regulations can reach about 2%. These results appear robust to the inclusion of other pro-growth policy changes implemented around the same time and are not driven by business cycle effects. We also tested for the existence of structural changes in the coefficients of interest in case there was a specific period experiencing fast growth and fast adoption of deregulatory measures that could drive the results. We could not find evidence of structural change, which suggests that the growth impact estimated is not of a short-run nature.

We further investigated the mechanisms through which these policy changes may have influenced the growth performance of EU economies. We considered two main channels: 1) the increase in the level of financial intermediation measured by the rise in the ratio of private credit to GDP and 2) the improvement in the quality and efficiency of the financial intermediation process proxied by the fall in the growth rate of the ratio of non-performing to total loans. On this regard, we found that while the harmonisation process has impacted growth through the increase in the level and efficiency of financial intermediation, the liberalisation of capital controls has primarily affected growth through improvements in the degree of efficiency in financial intermediation. Furthermore, interest rate deregulation was found to affect the level of banking activity while not its efficiency.

Overall, the positive benefits in terms of economic performance resulting from the liberalisation of capital controls and the harmonisation of banking regulations accord well with the expectations by the EU Authorities and Member States. The creation of a Single European Banking Market has opened domestic banking sectors, created more cross-border activity and in turn more competition, which have been all

translated into greater banking activity and enhanced efficiency in the allocation of resources to productive use by decreasing the cost of capital. All these benefits have derived from the efforts made by the European and National Authorities who envisaged the need to couple the liberalisation of interest rates, capital controls and entry restrictions with the strengthening of prudential, supervisory and accounting standards. This has ensured that excessive competition does not destabilise the financial services industry.

Nonetheless, the EU Authorities have been cautiously optimistic over the last years and have put forward more initiatives through the Financial Services Action Plan of 1999 with the aim of stepping up in the process of financial integration in Europe. As already acknowledged, some further work needs to be done since the Takeover Directive has not been adopted yet. This may undermine the process of cross-border consolidation, which may be necessary for credit institutions to enjoy economies of scale at the EU level.

References

- Barro, R. J. and X. Sala-i-Martin, 1992, “Convergence”, *Journal of Political Economy*, 100(2): 223-251.
- Bencivenga, R. and B. D., Smith, 1991. “Financial Intermediation and Economic Growth”, *Review of Economics Studies*, 58: 195-209.
- Bouthevillain C., P. Cour-Thimann, G. van den Dool, P. Hernández de Cos, G. Langenus, M. Mohr, S. Momigliano and M. Tujula, 2001, “Cyclically adjusted budget balances: An alternative approach”, *European Central Bank Working Paper No. 77*.
- Cabral, I., Dierick, F. and Vesala, J., 2002, “Banking Integration in the Euro Area”, Occasional Working Paper N. 6, European Central Bank, Frankfurt.
- Carosio, G., 1990, “Problems of Harmonisation of the Regulation of Financial Intermediation in the European Community”, *European Economic Review*, 34: 578-586.
- Caprio, G., Klingebiel, D., 1996a, “Bank Insolvency: Bad Luck, Bad Policy, or Bad Banking. In: Annual Conference on Development Economics. The World Bank, Washington, DC, pp. 79–104.
- Caprio, G., Klingebiel, D., 1996b, “Bank Insolvencies: Cross-Country Experience”, Policy Research Working Paper 1620. World Bank, Washington, D.C.
- De Gregorio, J. and Guidotti P. (1995). “Financial Development and Economic Growth”, *World Development*, 23(3): 433-447.
- Demirgüç-Kunt, A. and Levine, R. (2001), *Financial Structure and Economic Growth: A Cross-Country Comparison of Banks, Markets, and Development*, MIT Press.
- Demsetz, R., and P. E. Strahan, 1995, “Diversification, Size and Risk in Bank Holding Companies”, Federal Reserve Bank of New York, Working Paper N. 9506.
- Dermine, J., 2003, “European Banking: Past, Present and Future”, in V. Gaspar, P. Hartmann and O. Sleijpne (eds), *The Transformation of the European Financial System*, Proceedings of the 2nd ECB Central Banking Conference, ECB, Frankfurt.
- Díaz-Alejandro, C. 1985, “Good-Bye Financial Repression, Hello Financial Crash”, *Journal of Development Economics*, 19(1-2): 1-24.
- Dixon, R., 1991, *Banking in Europe: The Single Market*, London : Routledge, 1991.

- Economic Research Europe Ltd, 1996, “A Study on the Effectiveness and Impact of Internal Market Integration on the Banking and Credit Sector”. Report for the European Commission.
- Englund, P., 1990, “Financial Deregulation in Sweden”, *European Economic Review*, 34: 385-393.
- European Central Bank, 1999, “Possible Effects of EMU on the EU Banking Systems in the Medium to Long-Term”, February, Frankfurt.
- Gerschenkron, A. (1962). *Economic Backwardness in Economic Perspective*, Cambridge, Massachusetts, Harvard University Press.
- Goldsmith, R. W., 1969, *Financial Structure and Development*, New Haven: Yale University Press.
- Greenwood, J. and Jovanovic, B., 1990, “Financial Development, Growth, and the Distribution of Income”, *Journal of Political Economy*, 98: 1076-1107.
- Grossman, G.N. and E. Helpman, 1991, *Innovation and Growth in the Global Economy*, The MIT Press, Cambridge, Massachusetts.
- Gual, J. and D., Neven, 1993, “Deregulation of the European Banking Industry”, *European Economy/Social Europe*, 3: 153-183.
- Gual, J., 1999, “Deregulation, Integration and Market Structure in European Banking”, *Journal of the Japanese and International Economies*, 13(4): 372-396.
- Helmann, T.F., K. C. Murdock and J.E. Stiglitz, 2000, “Liberalization, Moral Hazard in Banking, and Prudential Regulation: Are Capital Requirements Enough?”, *American Economic Review*, 90: 147-165.
- Hicks, J., 1969, *A Theory of Economic History*, Oxford: Clarendon Press.
- Jayaratne, J and P. E. Strahan, 1996, “The Finance-Growth Nexus: Evidence from Bank Branch Deregulation”, *Quarterly Journal of Economics*, 111: 639-670.
- Judson, R.A. and A. Owen, 1999, “Estimating Dynamic Panel Data Models: A Guide for Macroeconomists”, *Economic Letters*, 65, 9-15.
- King, R. and R., Levine, 1993, “Finance and Growth: Schumpeter Might Be Right”, *Quarterly Journal of Economics*, 108 :717-737.
- Kiviet, Jan F., 1995, “On Bias, Inconsistency, and Efficiency of Various Estimators in Dynamic Panel Data Models”, *Journal of Econometrics*, 68: 53-78.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A. and Vishny, R.W. (1997). “Legal Determinants of External Finance”, *Journal of Finance*, 52: 1131-1150.
- La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R.W. Vishny, 1998, “Law and Finance”, *Journal of Political Economy*, 106: 1113-1155

- Levine, R., 1997, “Financial Development and Economic Growth: Views and Agenda”, *Journal of Economic Literature*, 35: 688-726.
- Levine, R. (1998). “The Legal Environment, Banks, and Long-Run Economic Growth”, *Journal of Money, Credit, and Banking*, Vol. 30, pp. 596-620.
- Lucas, R. E., 1988, “On the Mechanics of Economic Growth”, *Journal of Monetary Economics*, 22 :3-42.
- McKinnon, R. I., 1973, *Money and Capital in Economic Development*, Washington.
- Melitz, J. 1990, “Financial Deregulation in France”, *European Economic Review*, 34: 394-402.
- Nickell, S., 1981 “Biases in Dynamic Models with Fixed Effects”, *Econometrica*, 49: 1417-1426.
- Pagano, M., 1993, “Financial Markets and Growth: An Overview”, *European Economic Review* 37: 613-622.
- Patrick, H. (1966). “Financial Development and Economic Growth in Underdeveloped Countries”, *Economic Development and Structural Change*, 14: 174-189.
- Rajan, R. G. and L. Zingales, 1998, “Financial Dependence and Growth”, *American Economic Review*, 88: 559-586.
- Rajan, R.G., and L. Zingales, 2003, “The Great Reversals: The Politics of Financial Development in the 20th Century”, *Journal of Financial Economics*, 69: 5-50.
- Robinson, J., 1952, “*The Generalisation of the General Theory*”, *The Rate of Interest and Other Essays*, London: Mcmillan, pp. 67-146.
- Romer, P. M., 1990, “Endogenous Technological Change”, *Journal of Political Economy*, 98(5): S71-S102.
- Romero de Avila, D. and R. Strauch (2003), “Public Finances and Long-Term Growth: Evidence from a Panel Data Analysis”, ECB Working Paper N. 246, Frankfurt.
- Saint-Paul, G., 1992, “Technological Choice, Financial Markets and Economic Development”, *European Economic Review*, 36(4): 763-781.
- Schumpeter, J. A., 1934, *The Theory of Economic Development*, 1912, translated by Redvers Opie, Harvard University Press, Cambridge.
- Shaw, E., 1973, *Financial Deepening in Economic Growth* , New York: Oxford University Press.

- Usher, J. A., *The Law of Money and Financial Services in the EC*, Oxford, Oxford University Press, 2000.
- Vives, X., 1990, “Deregulation and Competition in Spanish Banking”, *European Economic Review*, 34: 403-411.
- Vives, X. 1991, “Regulatory Reform in European Banking”, *European Economic Review*, 35: 505-515.
- Wyplosz, C. 1999, “Financial Restraints and Liberalisation in Postwar Europe”, CEPR Working Paper N. 2253.

Appendix: Additional Tables and Graphs

TABLE A1: DATA AND SOURCES

VARIABLE	SOURCE
HI	HARMONISATION INDEX COMPUTED AS AN UNWEIGHTED SUM OF THE SIX HARMONISATION INDICATORS AUTHOR'S ELABORATION. EUROPEAN COMMISSION DATA BASE CELEX.
I1	BASIC INDICATOR AUTHOR'S ELABORATION. EUROPEAN COMMISSION DATA BASE CELEX.
I2	PRUDENTIAL HARMONISATION INDICATOR AUTHOR'S ELABORATION. EUROPEAN COMMISSION DATA BASE CELEX.
I3	ACCOUNTING AND DISCLOSURE INDICATOR AUTHOR'S ELABORATION. EUROPEAN COMMISSION DATA BASE CELEX.
I4	OTHER NON-BANK FINANCIAL INSTITUTIONS INDICATOR AUTHOR'S ELABORATION. EUROPEAN COMMISSION DATA BASE CELEX.
I5	CONSUMER PROTECTION INDICATOR AUTHOR'S ELABORATION. EUROPEAN COMMISSION DATA BASE CELEX.
I6	PAYMENT SYSTEM INDICATOR AUTHOR'S ELABORATION. EUROPEAN COMMISSION DATA BASE CELEX.
CCI	CAPITAL CONTROLS LIBERALISATION INDICATOR GUAL (1999)
IRI	INTEREST RATE DEREGULATION INDICATOR GUAL (1999)
DERI	DEREGULATION INDEX COMPUTED AS THE UNWEIGHTED SUM OF CCI AND IRI AUTHOR'S ELABORATION
DREG	OVERALL INSTITUTIONAL INDEX COMPUTED AS THE SUM OF HI, CCI AND IRI. AUTHOR'S ELABORATION
GROWTH	GROWTH RATE OF P.C. GDP EXPRESSED IN 1985 PPP PRICES ECONOMIC OUTLOOK N.72. OECD
HPGR30	GROWTH RATE OF P.C. GDP EXPRESSED IN 1985 PPP PRICES ECONOMIC OUTLOOK N.72. OECD
LCREDY	FILTERED USING POTENTIAL OUTPUT SERIES OBTAINED VIA HP WITH $\lambda=30$ RATIO OF CREDIT BY DMBs TO THE PRIVATE SECTOR OVER GDP IN LOGS INTERNATIONAL FINANCIAL STATISTICS, SEPTEMBER 2002, IMF
DLPROV	GROWTH RATE OF THE RATIO OF NONPERFORMING LOANS TO TOTAL LOANS BANK PROFITABILITY STATISTICS 2000, OECD.
CRISFIN	INDICATOR VARIABLE FOR THE FINNISH BANKING CRISIS OF 1991-1993. CAPRIO AND KLINGEBIEL (1996a)
CRISFRA	INDICATOR VARIABLE FOR THE FRENCH CRISIS OF 1994-1995. CAPRIO AND KLINGEBIEL (1996a)
CRISGER	INDICATOR VARIABLE FOR THE GERMAN CRISIS OF 1978-1980 AND 1989. CAPRIO AND KLINGEBIEL (1996a)
CRISPES	INDICATOR VARIABLE FOR THE SPANISH CRISIS OF 1977-1985 AND 1994. CAPRIO AND KLINGEBIEL (1996a)
CRISWE	INDICATOR VARIABLE FOR THE SWEDISH CRISIS OF 1991. CAPRIO AND KLINGEBIEL (1996a)
CRISUK	INDICATOR VARIABLE FOR THE BRITISH CRISIS OF 1974-1976. CAPRIO AND KLINGEBIEL (1996a)
LTDIR	THE LOGARITHM OF THE RATIO OF DIRECT TAXATION TO GDP AMECO STATISTICS-AUTUM 2002, EUROPEAN COMMISSION
LPI	THE LOGARITHM OF THE RATIO OF PUBLIC INVESTMENT TO GDP AMECO STATISTICS-AUTUM 2002, EUROPEAN COMMISSION

TABLE A2 : CORRELATION MATRIX

	HI	I1	I2	I3	I4	I5	I6	CCI	IRI	DERI	WTH	GRO	HPGR	CRED	DLPROV
HI	1.000														
I1	0.878	1.000													
I2	0.971	0.843	1.000												
I3	0.958	0.804	0.948	1.000											
I4	0.877	0.676	0.846	0.830	1.000										
I5	0.964	0.782	0.917	0.921	0.835	1.000									
I6	0.444	0.282	0.352	0.359	0.409	0.406	1.000								
CCI	0.772	0.797	0.762	0.725	0.643	0.699	0.239	1.000							
IRI	0.811	0.800	0.811	0.770	0.670	0.749	0.251	0.833	1.000						
DERI	0.824	0.821	0.830	0.784	0.689	0.743	0.259	0.938	0.934	1.000					
GROWTH	-0.071	-0.178	-0.083	-0.044	0.013	-0.042	0.050	-0.138	-0.169	-0.152	1.000				
HPGR30	-0.181	-0.309	-0.179	-0.116	-0.070	-0.152	-0.002	-0.209	-0.262	-0.235	0.673	1.000			
CREDY	0.493	0.487	0.444	0.472	0.389	0.448	0.327	0.474	0.481	0.475	-0.124	-0.197	1.000		
DLPROV	-0.179	-0.163	-0.191	-0.148	-0.128	-0.174	-0.076	-0.098	-0.049	-0.081	-0.302	-0.136	0.010	1.000	

See Table (A1) for the notation.

TABLE A3: DESCRIPTIVE STATISTICS

Series	Observations	Mean	Std. Error	Minimum	Maximum
HI	630	4.208	5.874	0.000	19.900
I1	630	1.117	1.204	0.000	3.000
I2	630	0.889	1.312	0.000	4.000
I3	630	0.481	0.762	0.000	2.000
I4	630	0.532	1.000	0.000	4.000
I5	630	1.082	1.723	0.000	5.000
I6	630	0.071	0.323	0.000	2.000
CCI	630	0.357	0.479	0.000	1.000
IRI	630	0.337	0.473	0.000	1.000
DERI	630	0.657	0.880	0.000	2.000
GROWTH	615	2.862	2.631	-9.164	11.553
HPGR30	600	2.860	1.599	-0.732	10.292
CREDY	619	55.293	27.504	8.255	145.470
DLCREDY	604	2.821	7.403	-38.049	47.987
DLPROV	150	-0.016	0.439	-1.930	1.413

See Table (A1) for the notation. The PPP-adjusted output series for Germany obtained from the Economic Outlook (OECD) shows a clear structural break in 1991. In order to correct for the structural break we use growth rates of output from the Penn World Tables to backward compute the approximate levels of output for the whole Germany for the period before the reunification.

Figure 1: Harmonisation Index

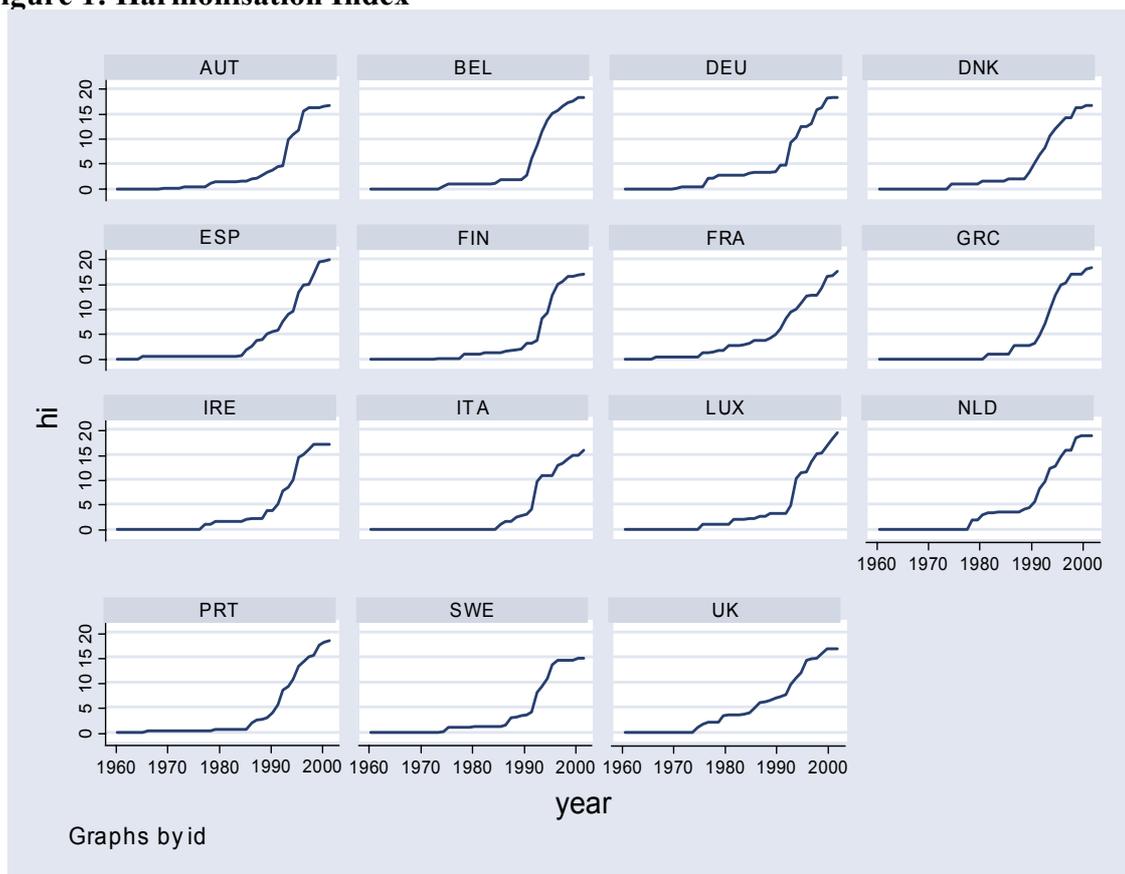


Figure 2: Deregulation Index

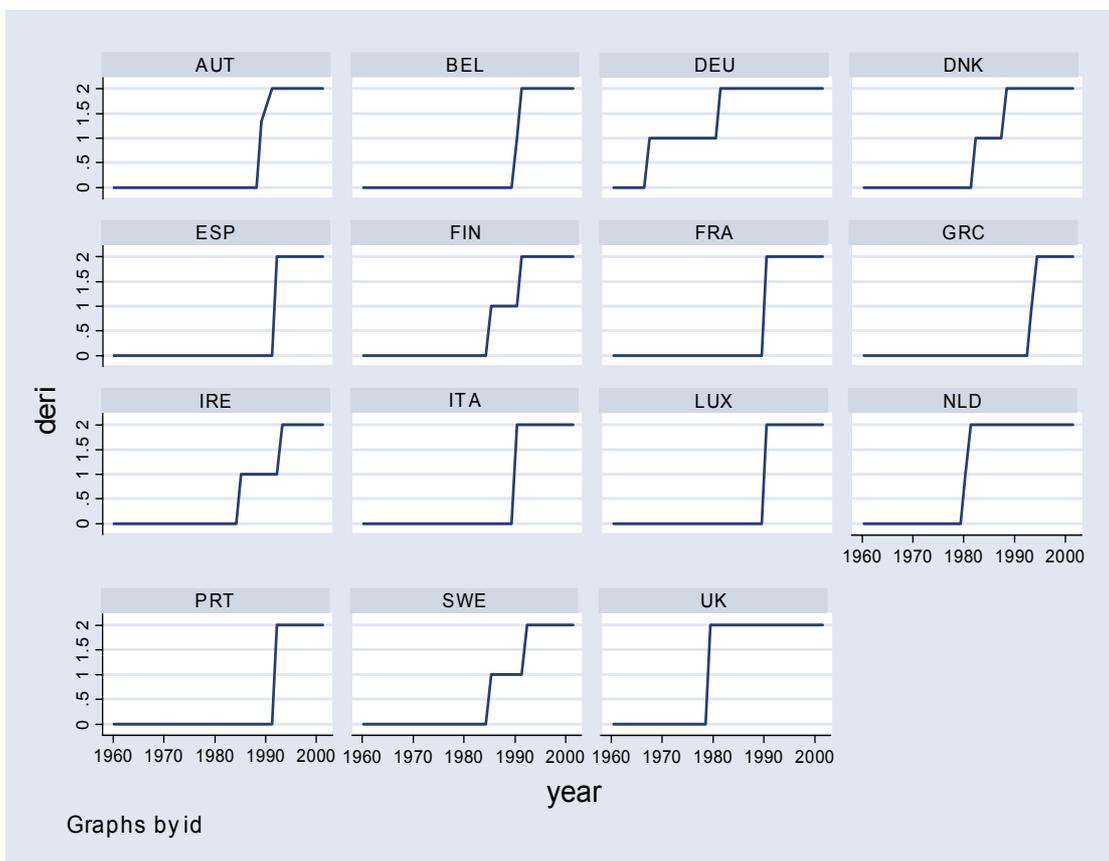


Figure 3: Ratio of Private Credit to GDP

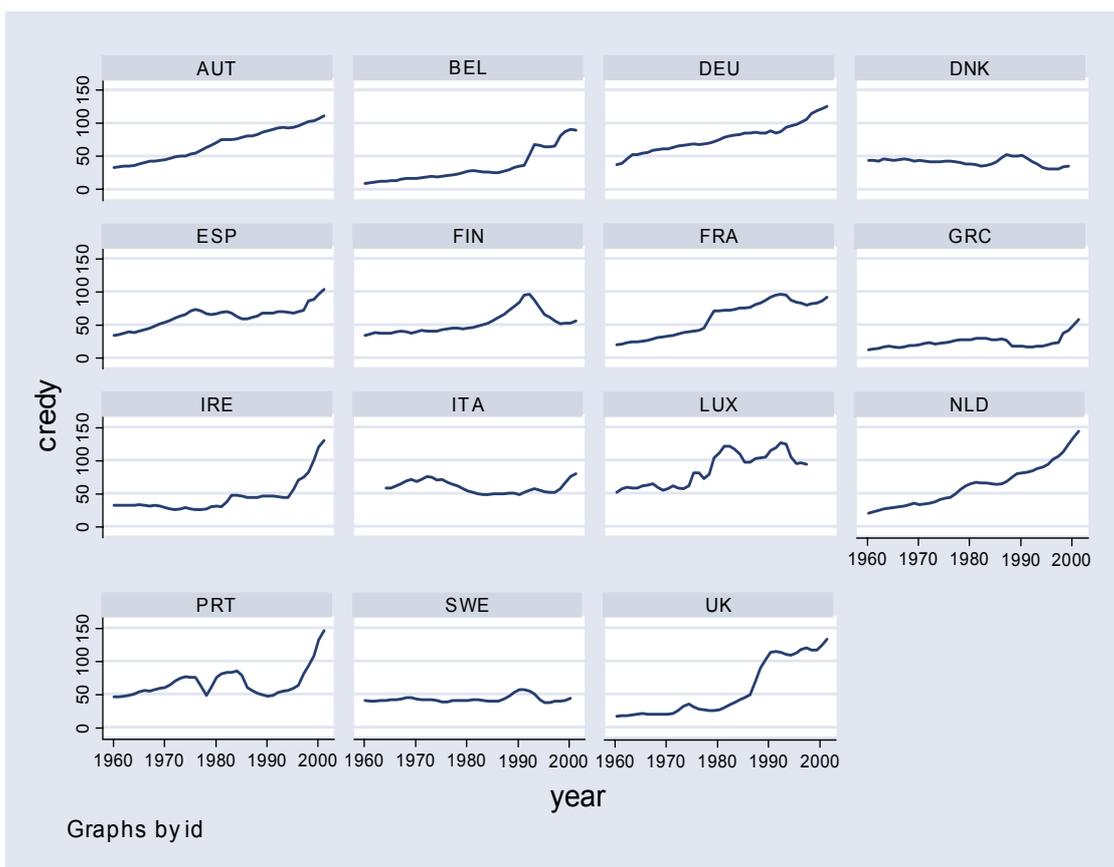
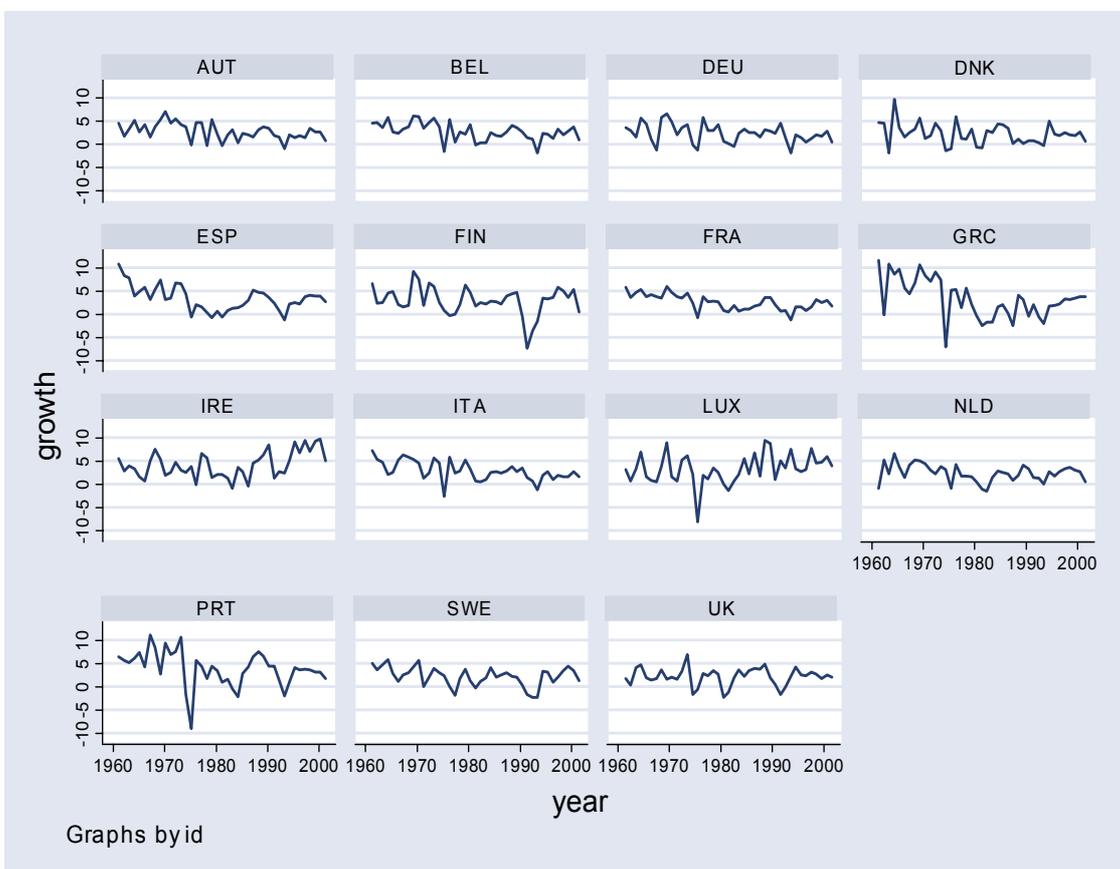


Figure 4: Growth Rates of Per Capita Output



European Central Bank working paper series

For a complete list of Working Papers published by the ECB, please visit the ECB's website (<http://www.ecb.int>).

- 202 "Aggregate loans to the euro area private sector" by A. Calza, M. Manrique and J. Sousa, January 2003.
- 203 "Myopic loss aversion, disappointment aversion and the equity premium puzzle" by D. Fielding and L. Stracca, January 2003.
- 204 "Asymmetric dynamics in the correlations of global equity and bond returns" by L. Cappiello, R.F. Engle and K. Sheppard, January 2003.
- 205 "Real exchange rate in an inter-temporal n-country-model with incomplete markets" by B. Mercereau, January 2003.
- 206 "Empirical estimates of reaction functions for the euro area" by D. Gerdesmeier and B. Roffia, January 2003.
- 207 "A comprehensive model on the euro overnight rate" by F. R. Würtz, January 2003.
- 208 "Do demographic changes affect risk premiums? Evidence from international data" by A. Ang and A. Maddaloni, January 2003.
- 209 "A framework for collateral risk control determination" by D. Cossin, Z. Huang, D. Aunon-Nerin and F. González, January 2003.
- 210 "Anticipated Ramsey reforms and the uniform taxation principle: the role of international financial markets" by S. Schmitt-Grohé and M. Uribe, January 2003.
- 211 "Self-control and savings" by P. Michel and J.P. Vidal, January 2003.
- 212 "Modelling the implied probability of stock market movements" by E. Glatzer and M. Scheicher, January 2003.
- 213 "Aggregation and euro area Phillips curves" by S. Fabiani and J. Morgan, February 2003.
- 214 "On the selection of forecasting models" by A. Inoue and L. Kilian, February 2003.
- 215 "Budget institutions and fiscal performance in Central and Eastern European countries" by H. Gleich, February 2003.
- 216 "The admission of accession countries to an enlarged monetary union: a tentative assessment" by M. Ca'Zorzi and R. A. De Santis, February 2003.
- 217 "The role of product market regulations in the process of structural change" by J. Messina, March 2003.

- 218 “The zero-interest-rate bound and the role of the exchange rate for monetary policy in Japan” by G. Coenen and V. Wieland, March 2003.
- 219 “Extra-euro area manufacturing import prices and exchange rate pass-through” by B. Anderton, March 2003.
- 220 “The allocation of competencies in an international union: a positive analysis” by M. Ruta, April 2003.
- 221 “Estimating risk premia in money market rates” by A. Durré, S. Evjen and R. Pilegaard, April 2003.
- 222 “Inflation dynamics and subjective expectations in the United States” by K. Adam and M. Padula, April 2003.
- 223 “Optimal monetary policy with imperfect common knowledge” by K. Adam, April 2003.
- 224 “The rise of the yen vis-à-vis the (“synthetic”) euro: is it supported by economic fundamentals?” by C. Osbat, R. Ruffer and B. Schnatz, April 2003.
- 225 “Productivity and the (“synthetic”) euro-dollar exchange rate” by C. Osbat, F. Visselaar and B. Schnatz, April 2003.
- 226 “The central banker as a risk manager: quantifying and forecasting inflation risks” by L. Kilian and S. Manganelli, April 2003.
- 227 “Monetary policy in a low pass-through environment” by T. Monacelli, April 2003.
- 228 “Monetary policy shocks – a nonfundamental look at the data” by M. Klaeffer, May 2003.
- 229 “How does the ECB target inflation?” by P. Surico, May 2003.
- 230 “The euro area financial system: structure, integration and policy initiatives” by P. Hartmann, A. Maddaloni and S. Manganelli, May 2003.
- 231 “Price stability and monetary policy effectiveness when nominal interest rates are bounded at zero” by G. Coenen, A. Orphanides and V. Wieland, May 2003.
- 232 “Describing the Fed’s conduct with Taylor rules: is interest rate smoothing important?” by E. Castelnuovo, May 2003.
- 233 “The natural real rate of interest in the euro area” by N. Giammarioli and N. Valla, May 2003.
- 234 “Unemployment, hysteresis and transition” by M. León-Ledesma and P. McAdam, May 2003.
- 235 “Volatility of interest rates in the euro area: evidence from high frequency data” by N. Cassola and C. Morana, June 2003.

- 236 “Swiss monetary targeting 1974-1996: the role of internal policy analysis” by G. Rich, June 2003.
- 237 “Growth expectations, capital flows and international risk sharing” by O. Castrén, M. Miller and R. Stiegert, June 2003.
- 238 “The impact of monetary union on trade prices” by R. Anderton, R. E. Baldwin and D. Taglioni, June 2003.
- 239 “Temporary shocks and unavoidable transitions to a high-unemployment regime” by W. J. Denhaan, June 2003.
- 240 “Monetary policy transmission in the euro area: any changes after EMU?” by I. Angeloni and M. Ehrmann, July 2003.
- 241 Maintaining price stability under free-floating: a fearless way out of the corner?” by C. Detken and V. Gaspar, July 2003.
- 242 “Public sector efficiency: an international comparison” by A. Afonso, L. Schuknecht and V. Tanzi, July 2003.
- 243 “Pass-through of external shocks to euro area inflation” by E. Hahn, July 2003.
- 244 “How does the ECB allot liquidity in its weekly main refinancing operations? A look at the empirical evidence” by S. Ejerskov, C. Martin Moss and L. Stracca, July 2003.
- 245 “Money and payments: a modern perspective” by C. Holthausen and C. Monnet, July 2003.
- 246 “Public finances and long-term growth in Europe – evidence from a panel data analysis” by D. R. de Ávila Torrijos and R. Strauch, July 2003.
- 247 “Forecasting euro area inflation: does aggregating forecasts by HICP component improve forecast accuracy?” by K. Hubrich, August 2003.
- 248 “Exchange rates and fundamentals” by C. Engel and K. D. West, August 2003.
- 249 “Trade advantages and specialisation dynamics in acceding countries” by A. Zaghini, August 2003.
- 250 “Persistence, the transmission mechanism and robust monetary policy” by I. Angeloni, G. Coenen and F. Smets, August 2003.
- 251 “Consumption, habit persistence, imperfect information and the lifetime budget constraint” by A. Willman, August 2003.
- 252 “Interpolation and backdating with a large information set” by E. Angelini, J. Henry and M. Marcellino, August 2003.
- 253 “Bond market inflation expectations and longer-term trends in broad monetary growth and inflation in industrial countries, 1880-2001” by W. G. Dewald, September 2003.

- 254 “Forecasting real GDP: what role for narrow money?” by C. Brand, H.-E. Reimers and F. Seitz, September 2003.
- 255 “Is the demand for euro area M3 stable?” by A. Bruggeman, P. Donati and A. Warne, September 2003.
- 256 “Information acquisition and decision making in committees: a survey” by K. Gerling, H. P. Grüner, A. Kiel and E. Schulte, September 2003.
- 257 “Macroeconomic modelling of monetary policy” by M. Klaeffling, September 2003.
- 258 “Interest rate reaction functions and the Taylor rule in the euro area” by P. Gerlach-Kristen, September 2003.
- 259 “Implicit tax co-ordination under repeated policy interactions” by M. Catenaro and J.-P. Vidal, September 2003.
- 260 “Aggregation-theoretic monetary aggregation over the euro area, when countries are heterogeneous” by W. A. Barnett, September 2003.
- 261 “Why has broad money demand been more stable in the euro area than in other economies? A literature review” by A. Calza and J. Sousa, September 2003.
- 262 “Indeterminacy of rational expectations equilibria in sequential financial markets” by P. Donati, September 2003.
- 263 “Measuring contagion with a Bayesian, time-varying coefficient model” by M. Ciccarelli and A. Rebucci, September 2003.
- 264 “A monthly monetary model with banking intermediation for the euro area” by A. Bruggeman and M. Donnay, September 2003.
- 265 “New Keynesian Phillips Curves: a reassessment using euro-area data” by P. McAdam and A. Willman, September 2003.
- 266 “Finance and growth in the EU: new evidence from the liberalisation and harmonisation of the banking industry” by D. Romero de Ávila, September 2003.