

INTERNATIONAL MONETARY FUND



# **Staff Country Reports**

## **Euro Area Policies: Selected Issues**

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# INTERNATIONAL MONETARY FUND

## EURO AREA POLICIES

### Selected Issues

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July 6, 2005

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## I. PRODUCT MARKET REGULATION AND THE BENEFITS OF WAGE MODERATION<sup>1</sup>

### A. Introduction

1. **Euro-area real wages have decelerated, particularly during the past decade, but this has not yet translated into visibly lower unemployment or higher growth.** The euro-area unemployment rate has decreased somewhat since the mid-1990s and has risen less than usual during the latest economic slowdown. Nonetheless, it still hovers around 9 percent. In addition, per capita business GDP growth in the last 10 years, averaging 1.9 percent a year, was lower than in the previous decade, when it reached 2.6 percent.

2. **Weak output growth after a beneficial cost shock is somewhat puzzling and has lead some to question the benefits of wage moderation.** In economies with high unemployment rates and wage hikes, lower labor cost growth should restore firms' profitability, cut unemployment, and raise output thanks to competition. However, a myriad of economic factors might be offsetting the effects of more job-friendly wage-setting on production and employment.

3. **This chapter identifies structural shifts in the relationship between wages and unemployment rates—a “wage curve”—in 20 industrial countries.** The underlying model assumes workers and firms bargain over wages while firms set employment unilaterally to maximize profits. The resulting wage curve may shift for several reasons, including when labor market reforms increase incentives to work. With well-known empirical estimates for the wage curve, these structural shifts can be identified, while cyclical effects are ignored.

4. **The key finding is that overly-regulated product markets in the euro area are undermining the effects of labor market reforms on output and employment.** Downward wage-curve shifts, i.e. “wage moderation,” do raise output and lower unemployment, but the size of the impact depends crucially on the degree of product market regulation. In more regulated product markets, weaker competition and barriers to entry allow incumbent firms to appropriate part of the improved labor supply conditions in the form of higher rents. The positive effect of reform-induced wage moderation on employment and output is therefore muted. Because product markets are more regulated in the euro area than in other OECD economies, wage moderation affects production and unemployment less strongly.

5. The next section reviews euro-area and cross-country developments in labor costs and their bivariate relationship with unemployment rates and business GDP. Section C describes the theoretical framework used to analyze the effect of changes in wage-setting behavior on economic performance. Section D documents the wide variation in wage-setting behavior within a sample of 20 OECD countries. It also presents econometric evidence on

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<sup>1</sup> Prepared by Marcello Estevão (EUR).

how product market regulations and other effects determine the sensitivity of output and unemployment to wage-setting shocks. Section E concludes with a discussion of policy implications.

## **B. Labor Cost Changes And Economic Performance In The Raw Data**

6. **In the euro area, real wages have decelerated since the 1970s but the unemployment rate has increased and per capita GDP growth has fallen.** Real hourly compensation growth in the business sector declined from about 6 percent at the beginning of the 1970s to 1 percent recently but the unemployment rate trended upward during the period (Figure I.1a). Unemployment rates have receded since the mid-1990s but bottomed out at a high level (around 8 percent) in 2001 before climbing again. Growth in per capita real business GDP also declined from an average of 3 percent in the 1970s to about 1.9 percent in the past 10 years (Figure I.1b). The lack of an output effect from improvements in costs is puzzling at first sight because, overall, firm profitability should have increased and production should have expanded. In fact, the share of labor income in business sector value added has declined markedly since the 1980s, leaving more income in the hands of capital owners (Figure I.1c). Turning to cross-country data for the euro area from 1983 to 2003, simple correlations suggest that there is a weak effect of wage moderation on unemployment rates but not on output: real wage growth is positively correlated with both the unemployment rate and GDP per capita growth (Figures I.2a and I.2b).<sup>2</sup> These results do not change when the sample is expanded to include other industrial countries (Figures I.2c and I.2d).

7. **However, the apparently weak effect of real wage deceleration on output could be the result of other economic factors.** Wage developments affect economic activity also by influencing workers' income and, thus, their consumption, which could cause a positive correlation between wages and output in the short run. In addition, the costs of being unemployed diminish during good times because of the higher probability of being hired by another business if fired. In this situation, workers would demand higher wages and a positive correlation between output growth and real wage growth may emerge. Lastly, other structural factors may have dampened productivity growth and, as a result, reduced wage and output growth.

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<sup>2</sup> The regression results shown in Figure I.2 exclude Ireland and Switzerland as outliers.

### Figure I.1. Euro Area: Labor and Product Market Developments

Figure I.1a. Unemployment Rate and Real Hourly Compensation Growth (In percent)

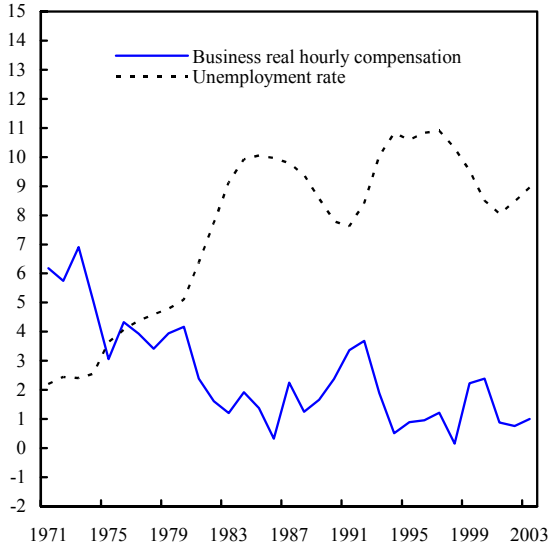


Figure I.1b. GDP per Capita and Real Hourly Compensation Growth (In percent)

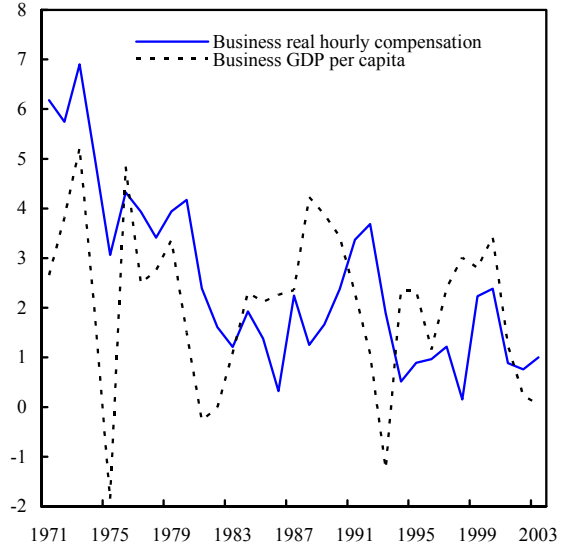
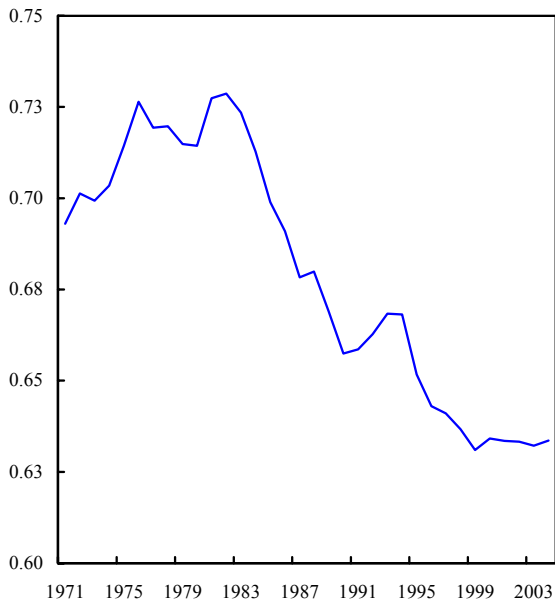


Figure I.1c. Labor Income as a Share of Business GDP



Source: OECD analytical database; and staff calculations.

Figure I.2. Euro Area: Change in Labor Costs and Real Variables

Figure I.2a. Real Hourly Compensation Growth and Unemployment Rate Changes 1/

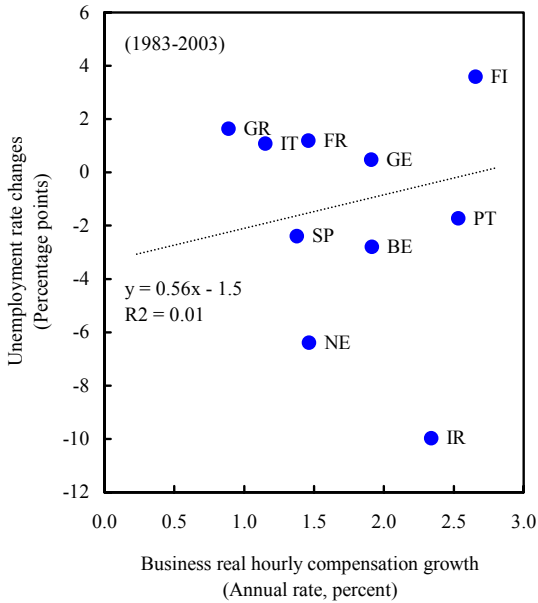


Figure I.2b. Real Hourly Compensation and GDP per Capita Growth 1/

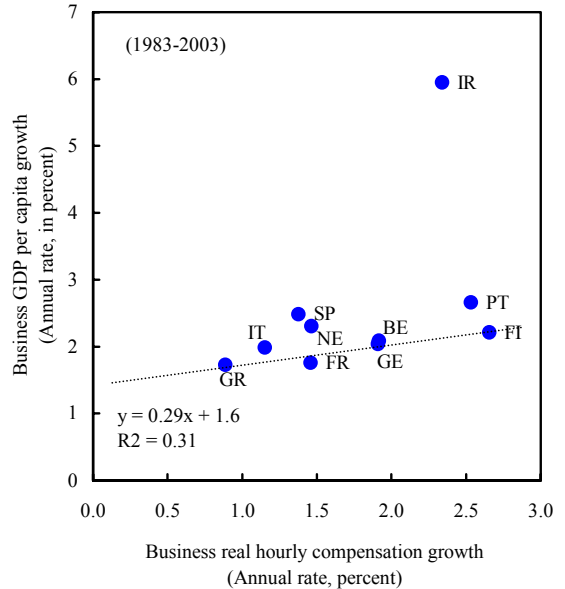


Figure I.2c. Real Hourly Compensation Growth and Unemployment Rate Changes in 20 OECD countries 2/

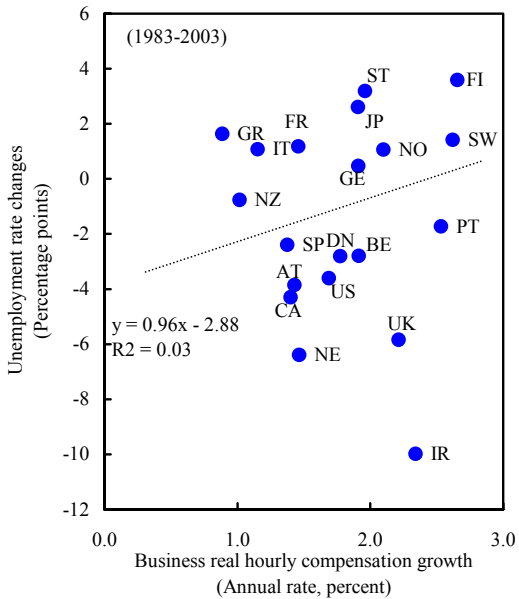
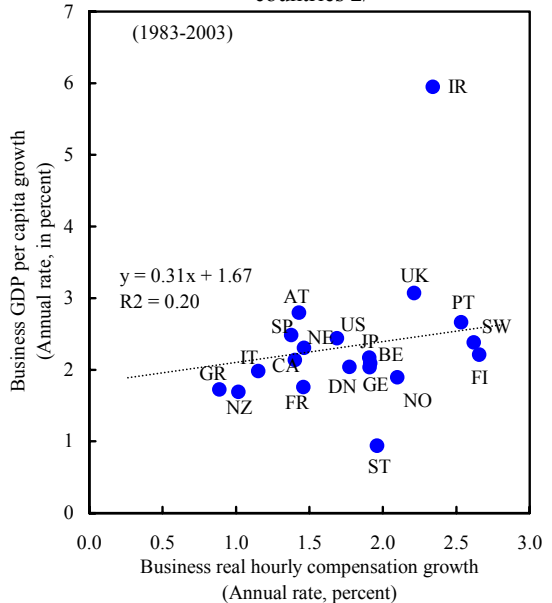


Figure I.2d. Real Hourly Compensation and GDP per Capita Growth in 20 OECD countries 2/



Sources: OECD; EC - AMECO; and staff calculations.

1/ Fitted curve excludes Ireland.

2/ Fitted curve excludes Ireland and Switzerland.

### C. Wage-Setting Behavior and Economic Performance

8. **Isolating structural changes in wage-setting behavior and their effects on production costs requires a structural labor market framework.** Assume that wages are bargained over by workers and firms, with the latter choosing employment to maximize profits. Equilibrium employment and wages are then determined by the intersection of a labor demand curve obtained from firms' profit-maximizing behavior and a labor supply-like curve relating wages to the unemployment rate—a “wage curve”.<sup>3</sup> Labor supply-like shocks are captured by shifts in the wage curve. Their final effect on employment and production will depend on the sensitivity of labor demand to changes in real wages.

9. **Under standard assumptions of profit maximization and marginal decreasing returns to labor, the short-run labor demand curve is negatively sloped.** Assuming that:

1. Firms operate in a market with imperfect competition where the product price,  $P$ , is a decreasing function of output,  $Y$ .
2. In the short run, returns to labor ( $N$ ) are diminishing, the capital stock ( $K$ ) is fixed, and technology ( $A$ ) is labor augmenting. Thus,  $Y = Y(AN)$ , and  $Y'(AN) > 0$  and  $Y''(AN) < 0$ .
3. Firms set output and labor to maximize profit,  $P(Y(AN)) * Y(AN) - W * N$ , where  $W$  is the bargained wage.

The first-order condition can be written as:

$$\frac{Y'(AN^*)}{\mu} = \frac{W/P}{A} = \frac{w}{A} \quad (1)$$

where,  $\mu$  is a markup over labor costs. This optimality condition states that firms choose employment by setting the marginal revenue product equal to the real wage in efficiency units (i.e., real wages divided by the technology parameter,  $A$ ). The markup captures the

---

<sup>3</sup> Layard and others (1991) is the standard reference for different bargaining models with empirical relevance. Several authors prefer using efficient bargaining models in which firms and workers bargain over employment and wages aiming at maximizing the surplus from their economic activity. In such framework, firms do not maximize profits and, therefore, are not on their labor demand curve. To ease interpretation and analysis (besides being more realistic according to many authors, e.g. Abowd and Kramarz (1993)), this chapter sticks to the bargaining model closest to the standard supply and demand framework.



slope of the product demand curve facing each firm. This slope is a function of product market characteristics.<sup>4</sup> Broadly speaking, more stringent limitations to product market competition will reduce the elasticity of product demand to price variations, limiting the effect of labor cost variations on employment and production. Thus, the labor demand curve will be steeper in less competitive markets. If no competitive pressures exist, cost changes could be fully absorbed by markup increases, leaving prices and quantities unchanged.<sup>5</sup>

**10. The wage curve results from the joint maximization of firms' and workers' utility functions, weighted by each party's bargaining power, given firms' labor demand equation.** As a result, the following relationship emerges,

$$\frac{w}{A} = f(m, b, \tau, u), \quad f_m > 0, f_b > 0, f_\tau > 0 \text{ and } f_u < 0, \quad (2)$$

where  $m$  is a structural parameter determining the position of the wage curve as a function of workers' relative bargaining power and relative preference for wages vis-à-vis employment,  $b$  stands for the income (in real terms) a worker would receive if unemployed, and  $\tau$  stands for the ratio of the fiscal wedge on labor income to the fiscal wedge on unemployment income. Unemployment ( $u$ ) has a dampening effect on wage demands because it raises the probability of long spells of joblessness and hence the associated risks and costs to workers. This establishes the upward sloping wage curve in the wage-employment diagram below, where employment is approximated by  $1-u$ .

---

<sup>4</sup> See Tirole (1988) for a deep discussion of the many models and basic mechanisms linking market structure, competition, and markup changes.

<sup>5</sup> Blanchard and Giavazzi (2003) develop a theoretical model and discuss the many effects of product deregulation on wages, employment, and, therefore, production. Even though the general intuition used here is valid, those authors present a more nuanced view of the effects of product markets deregulation on aggregate labor demand. For given wages, product market deregulation increases competitive pressures among incumbents, raising the elasticity of product demand, which lowers the markup. Thus, labor demand and output increase at the firm level. If the number of firms remain constant, this results in higher employment because aggregate labor demand increases. However, once firm turnover is accounted for, variations in the number of firms may dampen employment effects. If product market deregulation lowers entry costs, new entry increases aggregate demand elasticity and employment. The sensitivity of labor demand to entry costs is also a feature of matching models for the labor market, e.g. Ebell and Haefke (2004) and Kugler and Pica (2003).

11. **In this model, shifts in the wage curve capture structural wage-setting changes, whereas movements along the wage curve capture cyclical factors.** “Wage moderation” is viewed as a structural change and thus represented by a downward shift in the wage curve (WS). Many factors might be behind such a shift, including: (i) reductions in unemployment income,  $b$ —for example, following cuts in unemployment benefits—forcing workers to lower wage demands; (ii) reductions in the tax wedge,  $\tau$ —for example, resulting from lower labor income taxes—allowing firms to offer lower wages at a given unemployment rate as workers’ net wages improve; (iii) changes in workers’ bargaining power—for example, because of changes to wage bargaining systems from an expanding pool of available labor in a more globalized economy; and (iv) changes in unions’ preferences away from wages toward employment, as following the 1982 Wassenaar agreement in the Netherlands.<sup>6</sup>

12. **The equilibrium levels of unemployment and output will depend on the slope of the labor demand curve (LD).** Assuming that technology is about the same across the sample of countries considered here, equation (1) says that markup behavior will determine the different output effects of a given shift in the wage curve.

13. **Less competitive markets, partly reflecting product market regulations, dampen the output effect of wage moderation** (Equilibrium point  $E_2$  vis-à-vis  $E'_2$  in Diagram 1). Regulation could take many different shapes and operates through two main channels: (i) a short-run competition effect, by affecting firms’ pricing power; and (ii) a long-run market contestability effect. Direct government intervention in firms’ pricing is an example of the first channel. Barriers to entry are an example of the second channel and affect both potential outside competition and competition among incumbent firms. Furthermore, a large concentration of state-owned companies and other state interventions could distort market signals and slow output responses to cost shocks.

14. **Wage moderation generates higher profits prompting the entry of new firms and greater investment by existing firms, thus resulting in higher output** (Diagram 2). Downward shifts in the wage curve bring real wages in efficiency units below the user cost of capital, which is assumed to be determined exogenously (point  $E_2$  in Diagram 2). In this new equilibrium, profitability is higher and either potential competitors will enter in the market or incumbents will boost investment (or both) until wages in efficiency units equal the user cost of capital again. Graphically, because the user cost of capital is independent of the unemployment rate, the long-run labor demand curve is horizontal. In the long run, employment and output levels are larger (point  $E_3$ ) and, in a dynamic version of the model, the economy goes back to its long-run growth path.<sup>7</sup>

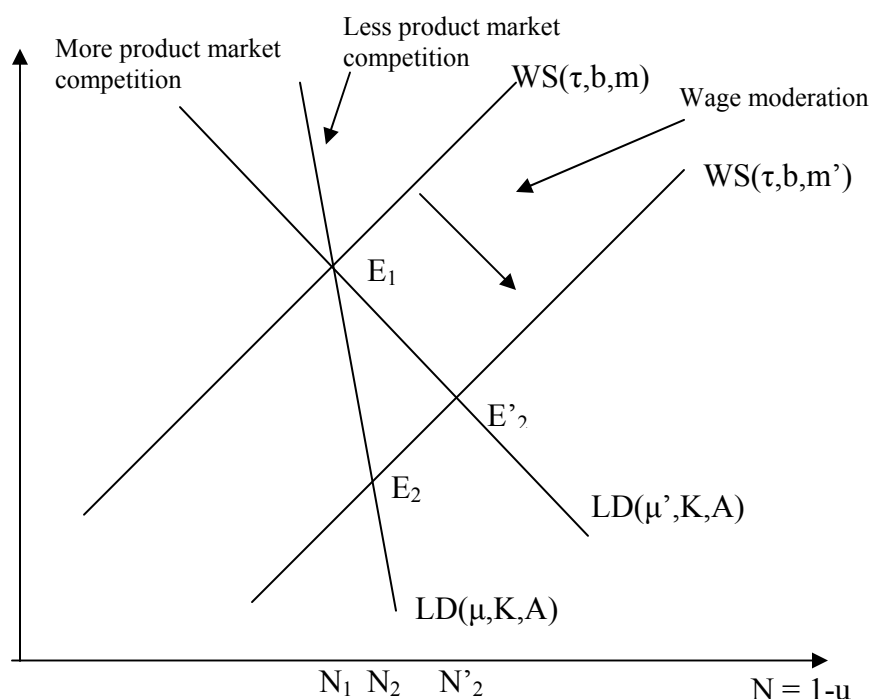
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<sup>6</sup> Several of these effects are discussed in Decressin and others (2001) and Estevão and Nargis (2005).

<sup>7</sup> In the short run, slower capital deepening (a reduction in the rate of growth of the capital-labor ratio) would imply temporarily lower labor productivity growth given unchanged

(continued...)

**Diagram 1. Structural Changes in Wage-Setting**

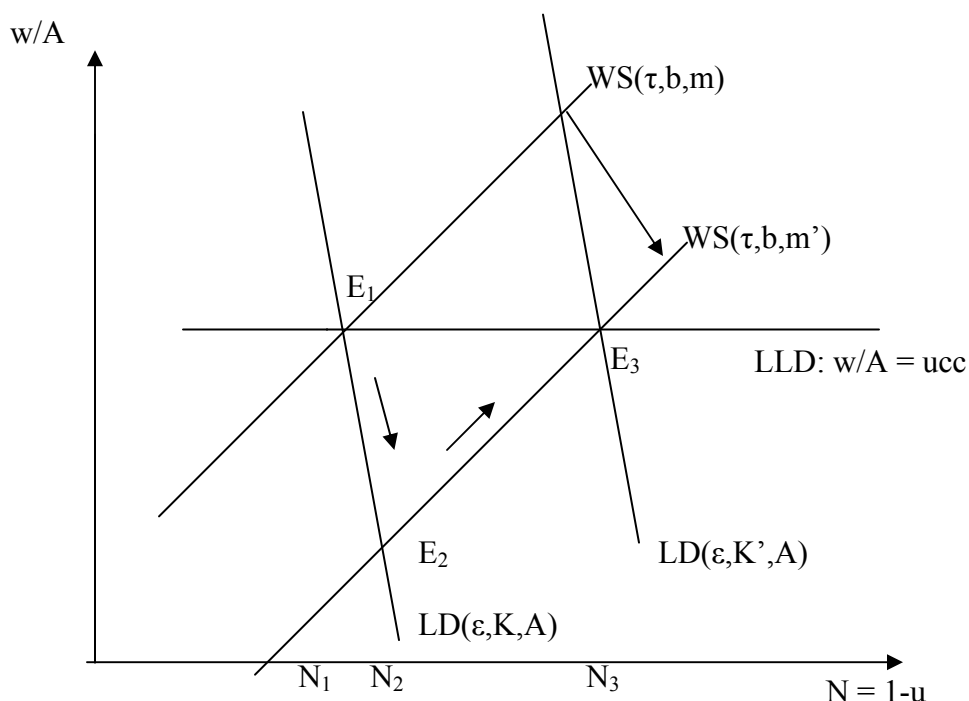


15. **Product market regulation could, however, delay adjustment—by stunting competition among existing firms or preventing entry—and influence the long-run equilibrium.** Thus, any empirical estimation should use a dynamic specification for the effects of wage moderation on output and unemployment, and allow for possible long-run effects of product market regulation on the transmission of wage shocks to employment and output.

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technological growth. In the long run, labor productivity growth would pick up until extra profits were dissipated by competition and/or higher investment rates by incumbents. A version of this model was discussed in Blanchard (1997) and used in Estevão (2004) to analyze labor productivity dynamics in the euro area.

**Diagram 2. Long-Run Adjustment**



#### **D. Measuring the Benefits of Wage Moderation**

16. **Measuring the effects of wage moderation requires interacting wage-curve shifts with information on product market regulation.** Wage-curve shifts will be constructed using well-established results in the literature on wage determination. Data on product market regulation come from the OECD.

##### **Measuring changes in wage-setting behavior**

17. **Shifts in the wage curve can be measured using a well-known empirical regularity about the elasticity of wages with respect to the unemployment rate.** The empirical wage curve is typically written as:

$$\ln \left[ \frac{W_{it}}{CP_{it} * A_{it}} \right] = \xi_{it} - \theta_i * \ln(u_{it}) \quad , \quad (3)$$

where  $\ln(\cdot)$  stands for the natural logarithm of a variable,  $i$  represents a country,  $t$  represents a year,  $W_{it}$  represents nominal hourly labor compensation,  $CP_{it}$  represents the deflator of private consumption expenditures,  $A_{it}$  represents labor-saving technology,  $u_{it}$  represents the unemployment rate, and  $\xi_{it}$  measures the position of the wage curve. Given  $\theta_i$ , shifts in the

wage curve,  $\Delta\zeta_{it}$  (where  $\Delta$  is the first-difference operator), can be measured using equation (3). Many papers estimating (3) have found values for  $\theta$  of around 0.1. This empirical regularity seems to be robust to changes in time period and valid for many different countries.<sup>8</sup> Here, again, an estimate of 0.1 is used.<sup>9,10</sup>

**18. The extent of wage moderation (shifts of the wage curve) has varied in intensity and timing across a sample of 20 OECD countries.** Figures I.3 and I.4 show the shifts in the wage-curve intercepts,  $\zeta_{it}$ , normalized to 100 in 1970. Overall, wage-setting conditions have improved at least since the early 1990s, except in Greece, Japan, and Switzerland. Ireland stands out because of sharp and continuous improvements in wage-setting conditions since the 1970s. Within the euro area, wage-setting improved significantly in the Netherlands since the early-1980s, following the 1982 Wassenaar agreement. Finland has posted large improvements since the early-1990s. Wage moderation since the 1980s can be observed in France and Italy, while in Belgium, Germany, and Spain wage moderation started in the mid-1990s. Outside the euro area, wage-setting deteriorated through the early-1980s in the United Kingdom, the United States, Australia, and Canada but has improved continuously since then.<sup>11</sup>

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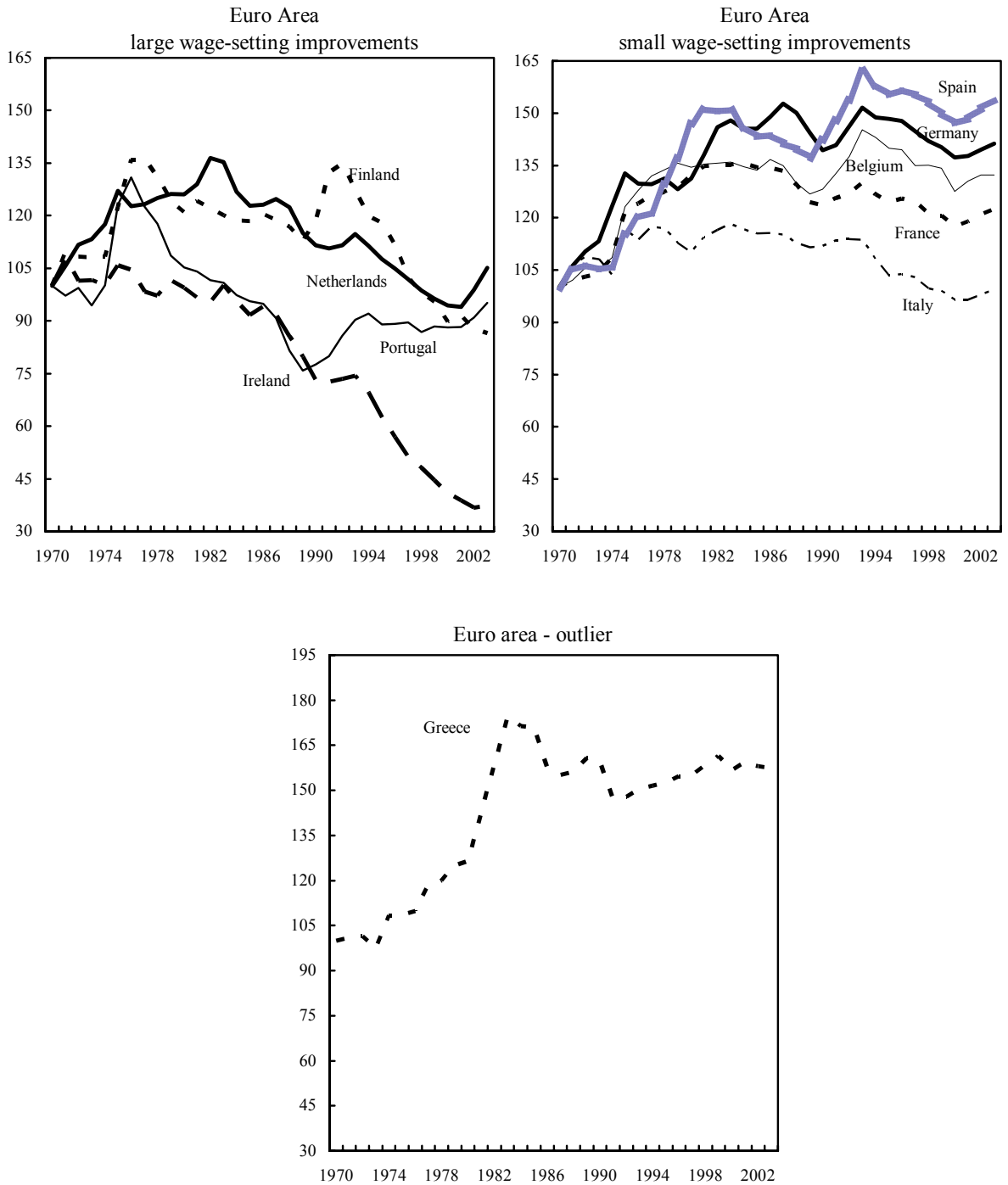
<sup>8</sup> Blanchflower and Oswald (1994) first presented this finding, which was replicated by other studies. Card (1995), however, criticizes Blanchflower and Oswald's original methodology and notices that elasticities for the United States could be smaller than 0.1. Galdeano and Turunen (2005) report point estimates close to 0.1 for the euro area, but also show that these estimates hide country differences. Using business sector data, Estevão (2003) found a 0.1 elasticity for a panel of OECD countries.

<sup>9</sup> Labor-saving technology,  $A$ , in the business sector was determined by (see Blanchard, 1997): (i) calculating a Solow residual using hours of work, the capital stock, real value added, and the share of labor income in value added; (ii) weighing the Solow residual by the share of labor income in value added; and (iii) creating indices with 1970=100.

<sup>10</sup> The identification of wage curve shifts is enhanced by using the consumption expenditures deflator to create real wages, instead of price measures belonging to the labor demand. The description of wage-setting changes and the econometric results are not sensitive to using the coefficients reported in Galdeano and Turunen (2005) for six EU countries.

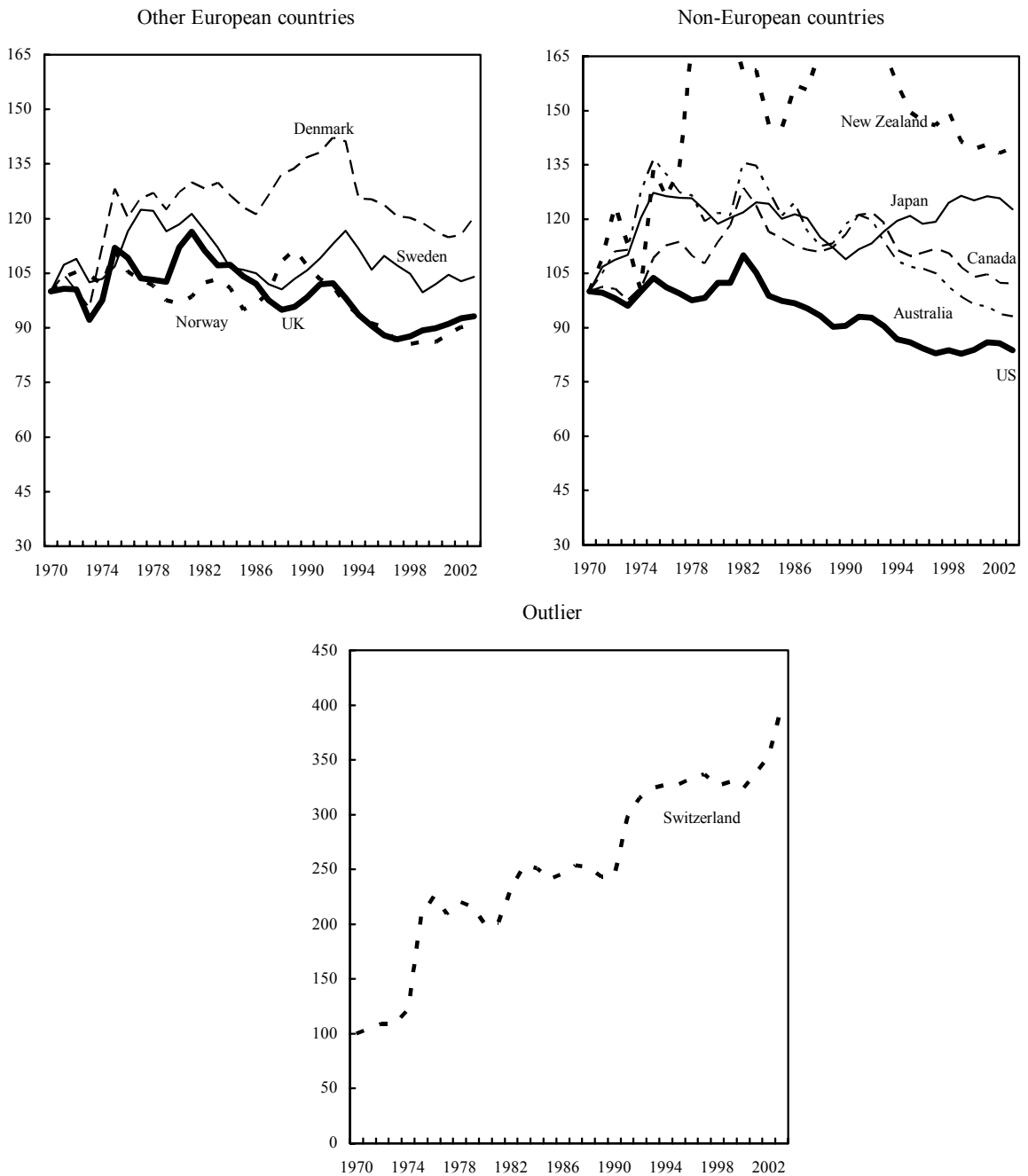
<sup>11</sup> A semi-logarithmic specification (with a semi-elasticity of 1 with respect to the unemployment rate) generates more moderate worsening in wage-setting conditions in countries with very low unemployment rates (close to zero) in 1970, e.g. Germany. That is because the logarithmic specification puts relatively more weight on unemployment rate movements below 5 percent. However, the ordering shown in Figures I.3 and I.4, and the econometric results presented below are insensitive to the shape of the wage curve.

Figure I.3. Euro Area: Structural Changes in Wage-Setting Conditions  
(1970=100)



Source: OECD Analytical Database; and staff estimates.

Figure I.4. Outside the Euro Area: Structural Changes in Wage-Setting Conditions  
(1970=100)



Source: OECD Analytical Database; and staff estimates.

## Wage-setting changes and the real economy

19. **As suggested by theory, wage-curve shifts are positively correlated with unemployment rates and negatively correlated with per capita GDP growth.** Figure I.5 shows a scatter plot of changes in the unemployment rate and per capita business GDP growth on wage-curve shifts between 1970 and 2003. The cross-country dispersion is large but the correlations are evident. Figure I.6 excludes Ireland and Switzerland, two large outliers, and confirms the correlations. However, these correlations are weaker (lower  $R^2$ ) when the analysis is limited to the last 20 years and excludes Ireland and Switzerland (Figure I.7, top panels).

20. **In addition, regulations curbing competition in product markets seem to dampen the positive effect of wage moderation on economic performance.** The lower panels of Figure I.7 illustrate this point by plotting changes in economic performance against the interaction of wage-curve shifts and indices of product market regulation from the OECD.<sup>12</sup> The fit of the bivariate relationship between changes in economic performance and the interactive variable is significantly better than in the top panels of Figure I.7, highlighting the importance of controlling for regulatory practices when analyzing the impact of wage moderation on employment and output.

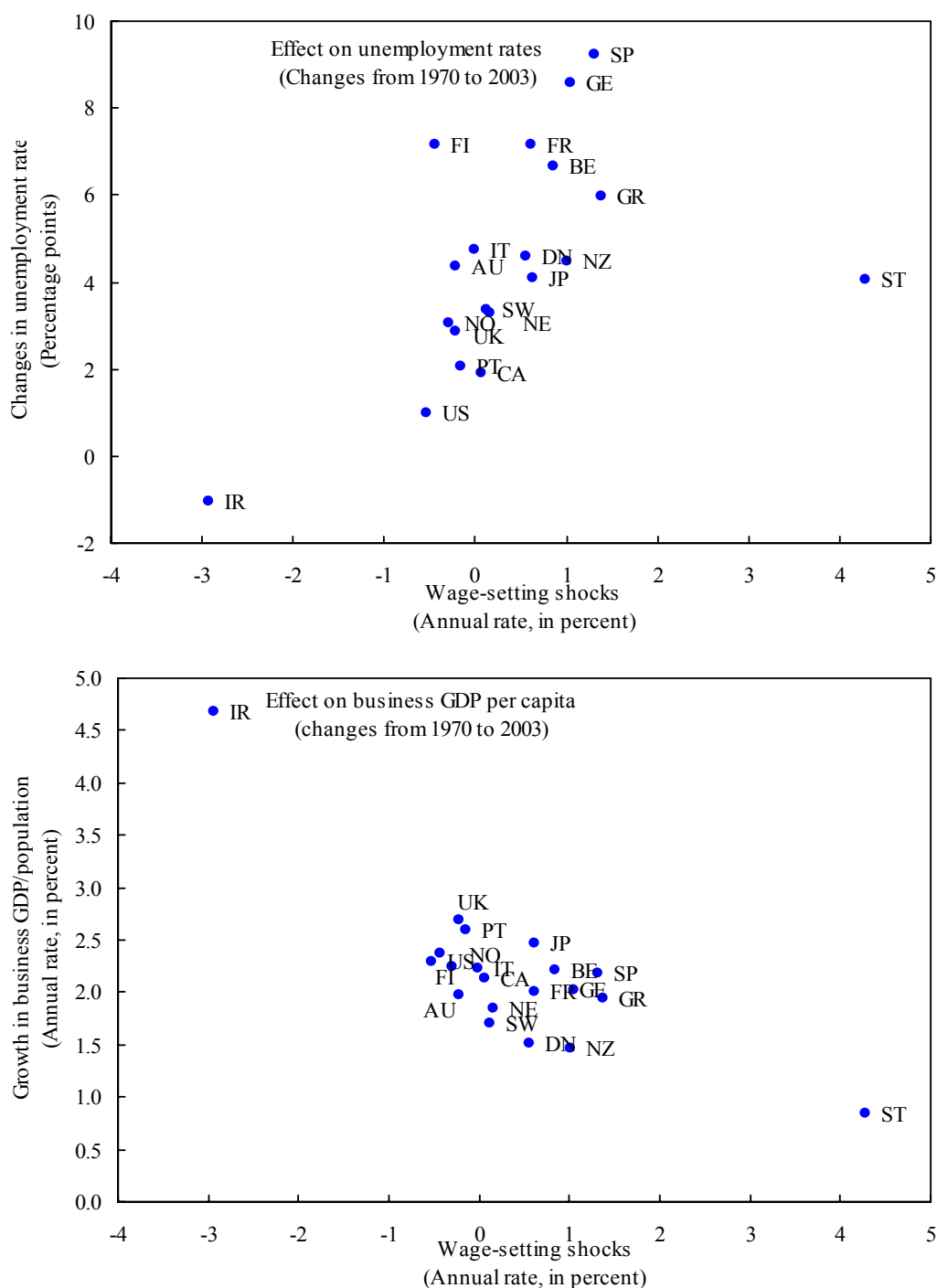
21. **An econometric framework can provide more robust evidence on the benefits of wage moderation.** Equation (4) relates annual changes in a real variable in country  $i$  in year  $t$ ,  $\Delta r_{it}$ , (either the percent change in per capita business GDP,  $\Delta y_{it}$ , or in the unemployment rate change,  $\Delta u_{it}$ ) to contemporaneous and lagged values of wage-curve shifts ( $\Delta \xi_{it}$ ), product market regulation ( $reg_{it}$ ), the interaction between regulation and wage-curve shifts ( $reg_{it} * \Delta \xi_{it}$ ), year-dummies capturing common excluded variables ( $\beta_t$ ), and residuals (country-specific effect,  $\alpha_i$ , and  $\eta_{it}$ ). The regulatory variable,  $reg_{it}$ , is defined as deviations from the sample average—a high value suggesting a highly regulated product market—which implies

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<sup>12</sup> Product market regulation is measured as an average of OECD indices for regulation in seven large utility and service industries: airlines, postal services, telecommunications, electricity, gas, railways, and roads. OECD researchers ranked each of these industries according to several regulatory dimensions (e.g. the size of entry barriers, firms' freedom to set prices, and the extent of public sector ownership). The assumption here is that the average level of regulation in those sectors is a good proxy for overall regulatory impediments to product market competition in each country. The key role of these industries in production infra-structure and distribution supports this assumption. Indices for product market regulation are available only from 1975 to 1998, which reduced the sample size for the estimates reported in columns (3) and (4) of Tables I.1 and I.2. 1998 levels of regulation were interacted with wage shocks in 2003 in Figure I.7. Appendix I.A contains more details on the regulation indices.



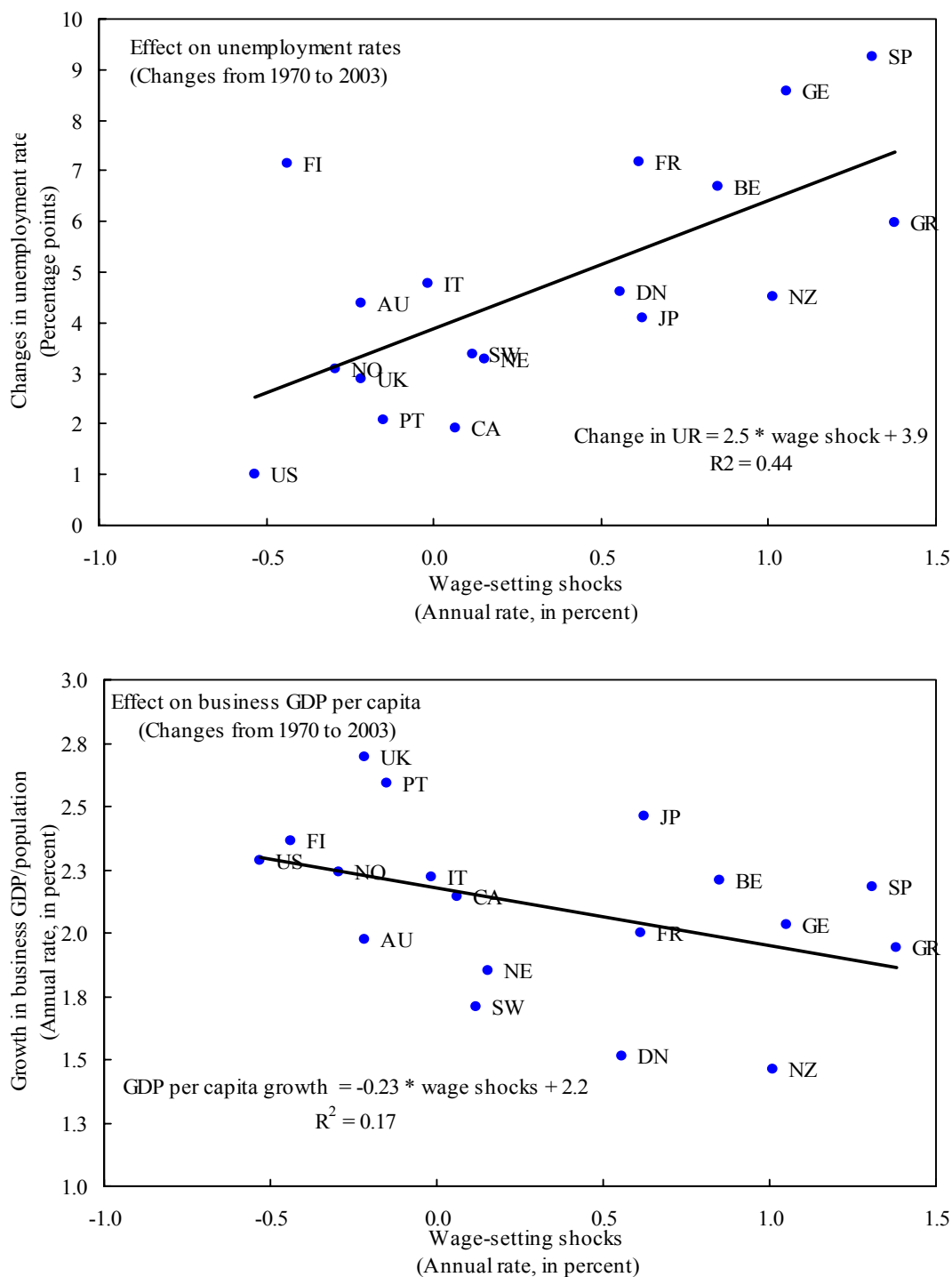
Figure I.5. Economic Consequences of Changes in Wage-Setting Behavior Since the 1970s <sup>1/</sup>



Sources: OECD Analytical Database; EC - AMECO; and staff calculations.

<sup>1/</sup> Wage-setting shocks = shifts in the wage curve. The countries included in the sample are: Australia, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and United States.

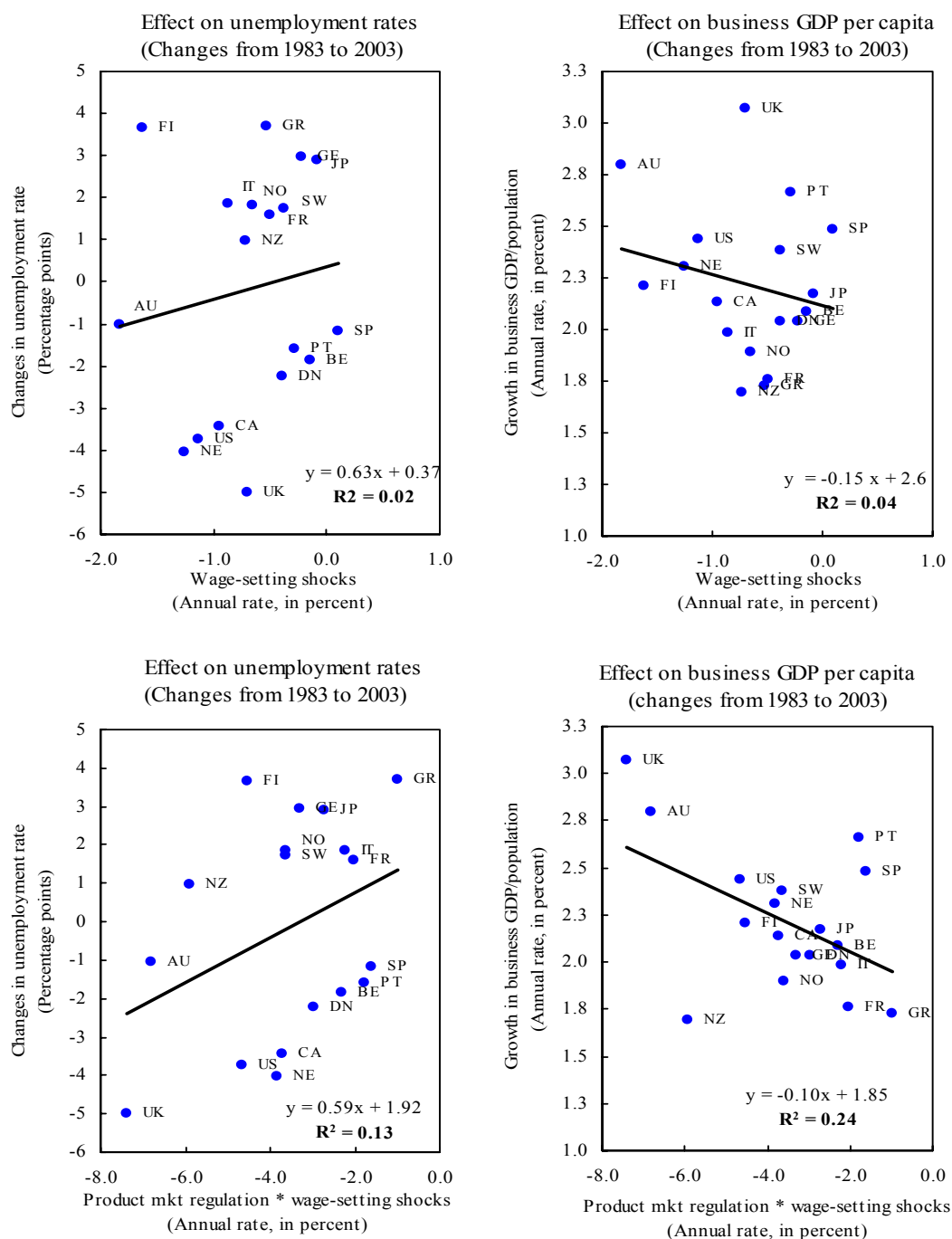
Figure I.6. Economic Consequences of Changes in Wage-Setting Behavior Since the 1970s <sup>1/</sup>  
(Excluding Ireland and Switzerland)



Sources: OECD Analytical Database; EC - AMECO; and staff calculations.

<sup>1/</sup> Wage-setting shocks = shifts in the wage curve. The countries included in the sample are: Australia, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, United Kingdom, and United States.

Figure I.7. Wage-Setting Behavior and Product Market Regulation Since the 1980s <sup>1/</sup>



Sources: OECD Analytical Database; EC - AMECO; and staff calculations.

1/ Wage-setting shocks = shifts in the wage curve. The countries included in the sample are: Australia, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, United Kingdom, and United States.

that  $\varphi_1$  and  $\lambda_1$  capture the average elasticity of economic performance to current and past wage shocks, i.e. the effect of wage shocks when  $reg_{it} = 0$ . The coefficients  $\varphi_2$  and  $\lambda_2$  capture the direct effect of product market regulation on real variables. The coefficients  $\varphi_3$  and  $\lambda_3$  measure how deviations of regulation from the sample average affect the pass-through of wage-setting shocks to real variables. The parameter estimate for  $\varphi_1$  should be negative (positive) and, if product market regulation dampens the effect of wage shocks,  $\varphi_3$  should be positive (negative) when equation (4) refers to GDP per capita growth (unemployment rate changes). The coefficient of the lagged dependent variable,  $\phi$ , captures adjustment costs.

$$\Delta r_{it} = c + \beta_i + \overbrace{\varphi_1 * \Delta \xi_{it} + \varphi_2 * reg_{it} + \varphi_3 * reg_{it} * \Delta \xi_{it}}^{\text{Contemporaneous}} + \underbrace{\phi * \Delta r_{it-1} + \lambda_1 * \Delta \xi_{it-1} + \lambda_2 * reg_{it-1} + \lambda_3 * reg_{it-1} * \Delta \xi_{it-1}}_{\text{Dynamics}} + \underbrace{\alpha_i + \eta_{it}}_{\text{Residuals}} \quad (4)$$

22. **Restrictions to product market competition vary considerably across countries and time, causing large disparities in the effects of wage moderation.** Econometric estimates for a panel of 20 OECD countries support the relationships suggested by the simple correlations. Tables (I.1) and (I.2) show estimates of equation (4) (column 4), and other specifications including the effect of product market regulations and adjustment dynamics separately (columns 1 to 3).<sup>13,14</sup> While the relation between wage-curve shifts and unemployment rates is positive, the interactive coefficient implies that this effect is weaker in countries with more regulated product markets (i.e.  $reg > 0$ ) and stronger in countries with

<sup>13</sup> When a lagged dependent variable is included (and because of country effects and possible serial correlation of the residuals) the estimation follows the random effects GMM procedure proposed by Arellano and Bond (1991). According to the authors' suggestion, the coefficient estimates and their standard errors are obtained from the robust one-step version of their estimator. On the other hand, the model evaluation statistics are from two-step estimators. The over-identifying restrictions imposed by the model are not rejected.

<sup>14</sup> In the absence of a lagged dependent variable, random effects FGLS estimation is used. In general, the Breusch-Pagan test pointed to significant country effects. Hausman tests sometimes rejected the hypothesis that the random-effect estimates were consistent, but in those cases the alternative fixed-effect estimation (always consistent but not necessarily efficient) produced coefficients of the same magnitude.

less regulated product markets (i.e.  $reg < 0$ ). The same dampening effect of restrictive regulations is present in the equation for GDP per capita growth. The lower panel of Figure I.8 shows long-run elasticities of GDP growth and changes in unemployment rate to wage shocks in 1998, when the time series for the regulation variable ends. The elasticities differ substantially across countries depending on the extent that product market regulation restricts competition.<sup>15</sup>

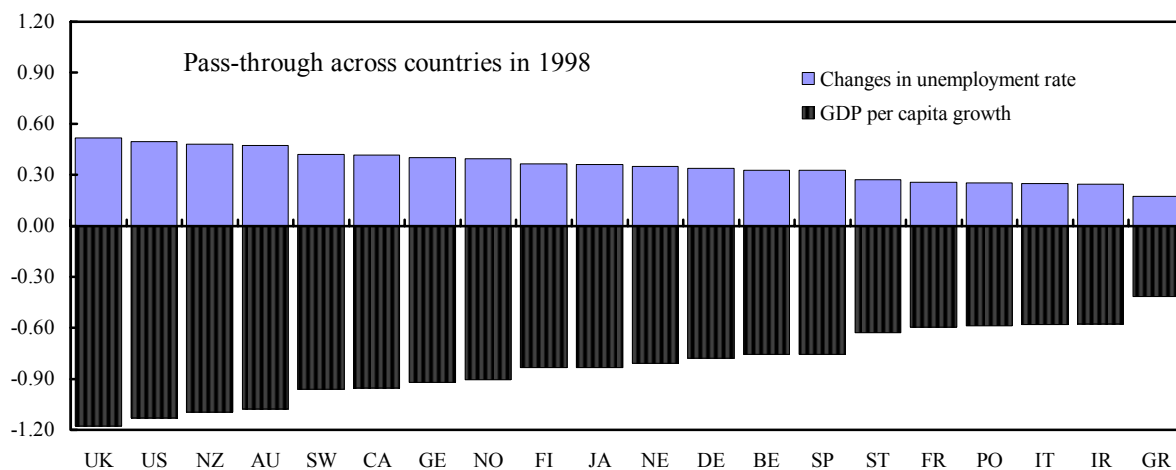
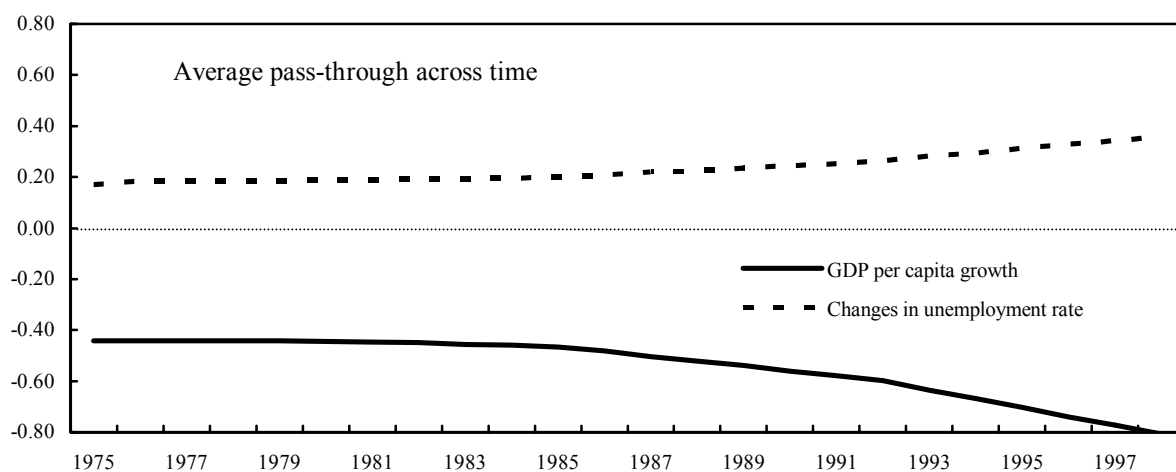
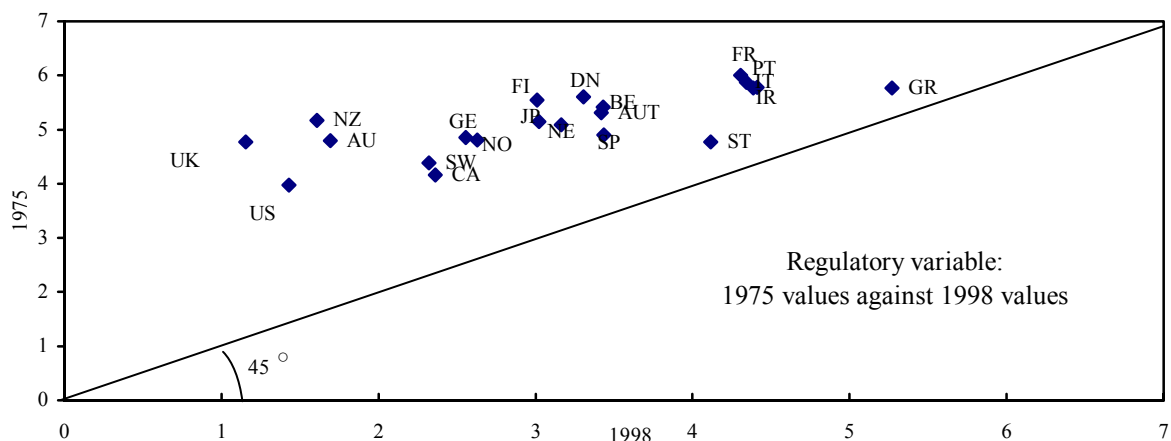
**23. The evidence of a direct link between the effectiveness of labor market reforms and the degree of product market competition reinforces political economy messages made elsewhere in the literature.** This chapter presents empirical evidence that product market reforms increase the economic benefits of labor market reforms, thus making them more acceptable for unions. Other theoretical results point in the same direction and led to arguments for combining and sequencing reforms to improve their chances for implementation. Blanchard and Giavazzi (2003), for instance, provide a model focusing on dynamic aspects of both labor and product market reforms. They conclude that product market reforms should come first as, by lowering barriers to entry and fostering competition in the product market, they should increase real wages (through lower prices) and reduce unemployment. Higher real wages would buy goodwill from unions and ease implementation of labor market reforms. Helbling and others (2004) present evidence supporting this view.

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<sup>15</sup> Long-run effects are calculated as  $\frac{\varphi_1 + \varphi_3 * reg_{it} + \lambda_1 + \lambda_3 * reg_{it-1}}{1 - \phi}$ . Product market

regulations per se do not affect changes in real variables, as the linear coefficient on  $reg_{it}$  is estimated to be zero. Even though lagged coefficients are relatively small, dynamic effects accumulate over time to a significant impact on GDP per capita *level* and, even more, on the unemployment rate. For instance, a one-time 5 percent downward shift in the wage curve in an economy with average levels of regulation increases GDP per capita level by about 2.5 percent by the end of the third year. The level of the unemployment rate after three years of adjustment is near one percentage point lower, while the static specification implies half of this effect.

Figure I.8. OECD: Product Market Regulation and Pass-Through of Wage-Setting Changes



Source: Nicoletti and Scarpetta (2003) and staff estimates.

Table I.1. The Effect of Wage Curve Shifts on Business GDP per Capita

Dependent variable: Changes in business GDP per capita (percent) =  $\Delta gdp_{it}$

	(1) Coef.	(2) Coef.	(3) Coef.	(4) Coef.
$\Delta \xi_{it}$	<b>-0.369**</b> (0.016)	<b>-0.382**</b> (0.017)	<b>-0.376**</b> (0.019)	<b>-0.424**</b> (0.020)
$\Delta gdp_{it-1}$	---	0.294** (0.040)	---	0.303** (0.042)
$\Delta \xi_{it-1}$	---	0.045* (0.023)	---	0.043* (0.024)
$regul_t$	---	---	0.001 (0.001)	0.001 (0.005)
$\Delta \xi_{it} * regul_t$	---	---	<b>0.065**</b> (0.022)	<b>0.089**</b> (0.022)
$regul_{t-1}$	---	---	---	0.002 (0.005)
$\Delta \xi_{it-1} * regul_{t-1}$	---	---	---	0.040* (0.022)
Time dummies	yes	yes	yes	yes
Estimation method	FGLS, random effects	GMM, random effects	FGLS, random effects	GMM, random effects
Test statistics	Breusch-Pagan Chi-sq. (1) = 8.64 Hausman Chi-sq. (32) = 1.29	Overidentifying restr.: Wald Chi-sq. (495) = 409.05	Breusch-Pagan Chi-sq. (1) = 10.0 Hausman Chi-sq. (26) = 23.30	Overidentifying restr.: Wald Chi-sq. (340) = 355.7
Overall R <sup>2</sup>	0.62		0.62	
Number of observations	660	620	480	440
Number of groups (countries)	20	20	20	20
Number of time periods	33	31	24	22
Sample	1971-2003	1973-2003	1975-1998	1977-1998

Source: Staff estimation and calculations using data from the OECD - Analytical Database.

Note: Data are at an annual frequency. Wage-setting (structural) shifts are log changes in compensation per hour in the business sector divided by the PCE deflator, minus log changes of labor-saving technology, minus log changes of the unemployment rate multiplied by the elasticity of wages with respect to unemployment (0.1). For a discussion of this variable, see "Why Is Labor Productivity Growth in the Euro Area So Sluggish?", Marcello Esteve, WP/04/200.

Standard error in parentheses. \* Significant at 5 percent level; \*\* Significant at 1 percent level.

Table I.2. The Effect of Wage Curve Shifts on the Unemployment Rate

Dependent variable: Changes in the unemployment rate (percentage points) =  $\Delta u_{it}$

	(1) Coef.	(2) Coef.	(3) Coef.	(4) Coef.
$\Delta \xi_{it}$	<b>0.062**</b> (0.007)	<b>0.071**</b> (0.007)	<b>0.074**</b> (0.009)	<b>0.115**</b> (0.010)
$\Delta u_{it-1}$	---	0.383** (0.036)	---	0.400** (0.040)
$\Delta \xi_{it-1}$	---	0.037** (0.008)	---	0.025* (0.010)
$regul_t$	---	---	0.000 (0.000)	-0.003 (0.002)
$\Delta \xi_{it} * regul_t$	---	---	<b>-0.051**</b> (0.011)	<b>-0.060**</b> (0.011)
$regul_{t-1}$	---	---	---	0.002 (0.003)
$\Delta \xi_{it-1} * regul_{t-1}$	---	---	---	0.010 (0.011)
Time dummies	yes	yes	yes	yes
Estimation method	FGLS, random effects	GMM, random effects	FGLS, random effects	GMM, random effects
Test statistics	Breusch-Pagan Chi-sq. (1) = 4.47 Hausman Chi-sq. (32) = 1.74	Overidentifying restr.: Wald Chi-sq. (495) = 486.2	Breusch-Pagan Chi-sq. (1) = 0.80 Hausman Chi-sq. (26) = 5.14	Overidentifying restr.: Wald Chi-sq. (340) = 351.4
Overall $R^2$	0.41	---	0.43	---
Number of observations	660	620	480	440
Number of groups (countries)	20	20	20	20
Number of time periods	33	31	24	22
Sample	1971-2003	1973-2003	1975-1998	1977-1998

Source: Staff estimation and calculations using data from the OECD - Analytical Database.

Note: Data are at an annual frequency. Wage-setting (structural) shifts are log changes in compensation per hour in the business sector divided by the PCE deflator, minus log changes of labor-saving technology, minus log changes of the unemployment rate multiplied by the elasticity of wages with respect to unemployment (0.1). For a discussion of this variable, see "Why Is Labor Productivity Growth in the Euro Area So Sluggish?", Marcello Esteve, WP/04/200.

Standard error in parentheses. \* Significant at 5 percent level; \*\* Significant at 1 percent level.



## **Product market regulation and the pass-through of wage-setting changes**

**24. Regarding regulatory developments, product markets have become more flexible across the OECD since 1975, increasing the pass-through from wage moderation to growth and employment.** Product markets in every country in the sample became more flexible between 1975 and 1998 (Figure I.8, top panel). The greater flexibility has translated into larger elasticities of GDP and unemployment with respect to structural wage-setting changes (Figure I.8, middle panel).<sup>16</sup> Data for economy-wide product market regulation for only two years (1998 and 2003) suggest that impediments to product market competition have declined further (Figure I.9).<sup>17</sup> In particular, the extent of government involvement in product markets and barriers to international flows of capital and trade have fallen considerably since 1998. Cross-country dispersion in product market policies has also shrunk.

**25. Nevertheless, important cross-country differences persist and further product market liberalization within the euro area would increase the benefits of labor market reforms.** According to the data used in this chapter, eight euro-area countries were among the ten most-regulated OECD economies in 1998. Thus, the pass-through of wage moderation (in part the result of labor market reforms) in the euro area was about half of that in the four least regulated economies, all outside the euro area (Figure I.8, bottom panel). In addition, according to the economy-wide data for 2003, notwithstanding the overall product market flexibilization observed in the OECD since 1998, barriers to entrepreneurship have fallen relatively less and impediments to competition persist. For instance, barriers to entry in non-manufacturing industries (the most important determinant of product market regulations used in this chapter) are still quite relevant. In addition, despite some regulatory convergence in recent years, large differences between countries with “relatively liberal” and “relatively restrictive” (including many euro-area countries) regulatory environments persist. Finally, intra-EU regulatory divergences have shrunk since 1998 but remain significant.<sup>18</sup>

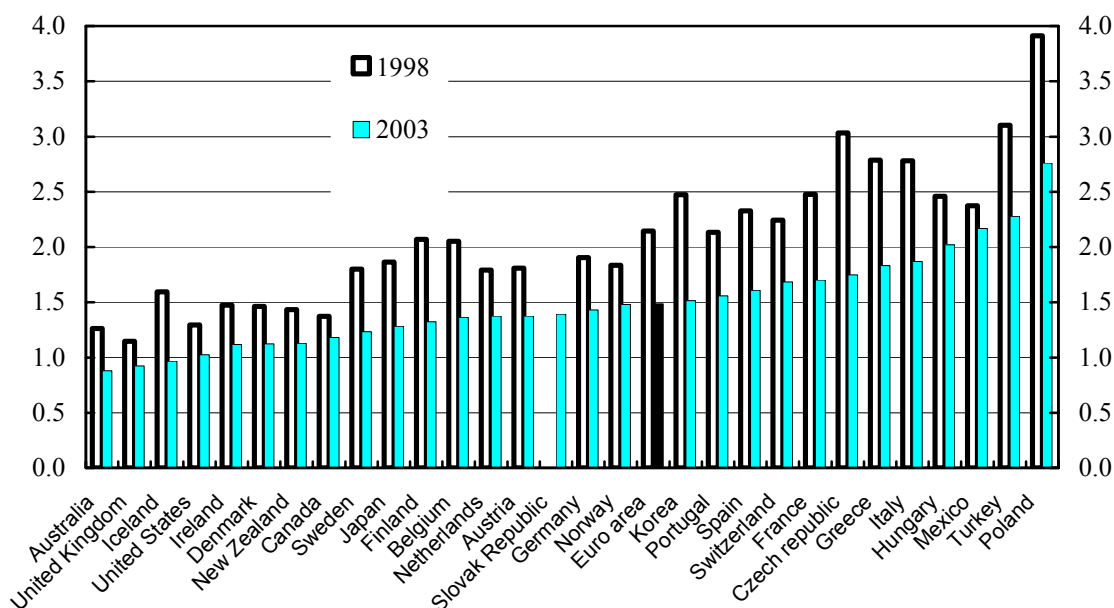
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<sup>16</sup> The average elasticities of GDP per capita growth and changes in unemployment rate with respect to changes in wage-setting conditions shown in Figure I.8 include the dynamic effects captured by the lagged dependent and shock variables in equation (4) (see previous footnote).

<sup>17</sup> See Conway and others (2005). Unfortunately, this statistical information is not consistent with the time series for product market regulation used in this chapter. The OECD measures used here refer to particular (albeit important) non-manufacturing industries, while the new OECD Product Market Regulations (PMR) indices for 1998 and 2003 refer to the whole economy. The indices are a composite of 16 more disaggregated indicators broadly covering the extent of state control on the economy, barriers to entrepreneurship, and barriers to foreign trade and investment.

<sup>18</sup> See Conway and others (2005).

Figure I.9. Strength of Anti-Competitive Product Market Regulation, 1998 and 2003



Source: OECD.

Note: The indicator of economy-wide regulation is measured on a scale from 0 (most liberal) to 6 (most restrictive) and is described in Conway and others (2005).

## E. Conclusions And Final Remarks

26. **Wage moderation has been the “rule” rather than the “exception” across industrial countries in the last 20 years, although the extent of wage moderation varied considerably.** The cross-country variation is particularly large within the euro area where in some nations wages have increased consistently less than technological growth since the 1970s or early-1980s (e.g., Ireland, the Netherlands, and Portugal) while in others wage moderation is a 1990s event (e.g., Belgium, Germany, and Spain).

27. **However, wage moderation has translated differently into improved economic performance, depending on a country’s degree of product market regulation.** Econometric evidence for a sample of 20 OECD countries shows that restrictions to product market competition dampen the effects of wage moderation. This result is consistent with a link between product market regulation and firms’ rent-seeking behavior. In less regulated product markets, an improvement in wage-setting conditions may generate fiercer competition for market shares. In the process, output and employment increase more in these markets. By contrast, in more regulated product markets, softer competitive pressures may lead incumbent firms to expropriate a larger share of the cost reduction in the form of higher rents.

28. **These findings are consistent with previous work on the complementarity of labor and product market reforms.** Some studies suggest that product market reforms should come first as, by lowering barriers to entry and fostering competition, they tend to increase real wages and reduce unemployment. Higher real wages would buy goodwill from unions and ease implementation of labor market reforms. Thus, adequately sequencing product and labor market reforms can make some reforms more politically acceptable. This chapter provides empirical evidence for a direct link between the effectiveness of labor market reforms and the degree of product market competition, which reinforces the political economy message: product market reforms increase the economic benefits of labor market reforms, thus making them more acceptable for workers.

29. **Overall, highly-regulated product markets are undermining the effectiveness of labor market reform in the euro area.** While product markets of virtually all OECD countries have become more market friendly in the last 30 years, policy approaches and results continue to differ, including within the euro area. Without additional progress in this area calls for more labor market reforms to lower unemployment and increase production may continue to be questioned by wide segments of society.

### **THE OECD PRODUCT MARKET REGULATION DATA**

Intensity of regulation is measured according to the data described by Nicoletti and Scarpetta (2003). The OECD International Regulation Database covers 21 OECD countries (Australia, Austria, Belgium, Canada, Switzerland, Germany, Denmark, Spain, Finland, France, UK, Greece, Ireland, Italy, Japan, the Netherlands, Norway, Portugal, Sweden, US, New Zealand) and seven non-manufacturing industries: electricity and gas supply (generation, transmission, distribution), road freight, air passenger transport, rail transport, post (basic letter, basic parcel and express mail) and telecommunications (fixed and mobile). Entry conditions are ranked in all seven industries while information on the extent of public ownership is available for 6 industries. Other dimensions of product market regulations (market structure and the extent of vertical separation) are available for some of them. The regulatory indicators measure restrictions on competition and private governance on a scale from 0 to 6 (from least to most restrictive). Similarly to Alesina and others (2003), the product market regulation index used here is a simple arithmetic average of all indices for the seven industries.

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## II. DECLINING MONEY VELOCITY IN THE EURO AREA: IMPLICATIONS FOR THE ECB'S MONETARY ANALYSIS<sup>19</sup>

### A. Introduction

30. **This chapter examines aspects of the ECB's monetary analysis, within the context of their overall two-pillar policy framework, and issues surrounding its use.** At issue is not whether euro-area inflation is a monetary phenomenon; clearly, at some horizon, money matters. The policy challenge for central banks is to operationalize this in a robust way. In the ECB's case, a key question is how monetary aggregates can serve as reliable input within its monetary policy strategy that aims to achieve price stability over the "medium term."<sup>20</sup> Within the central bank's two-pillar framework, the monetary analysis should provide, in the first instance, a robust assessment of liquidity conditions, and, ultimately, an effective "cross-check" on inflationary pressures over this horizon. This paper illustrates some empirical dimensions of these challenges by examining the following questions:

- What is the nature of the relationship between money and inflation in the euro area over different horizons, particularly over the medium term?
- What measurement and conceptual issues affect the assessment of liquidity conditions, particularly in light of the (variable) trend decline in area-wide velocity?
- To what extent do macroeconomic versus structural factors help explain the behavior of velocity? What bearing does this have for assessing liquidity conditions, and, ultimately, for the "cross-check" on inflationary risks from the monetary analysis?

Answers to these questions are instrumental in helping delineate what operational role money should play—within the ECB's policy framework—in order to offer a reliable guide to effective monetary policy decision making and communication.

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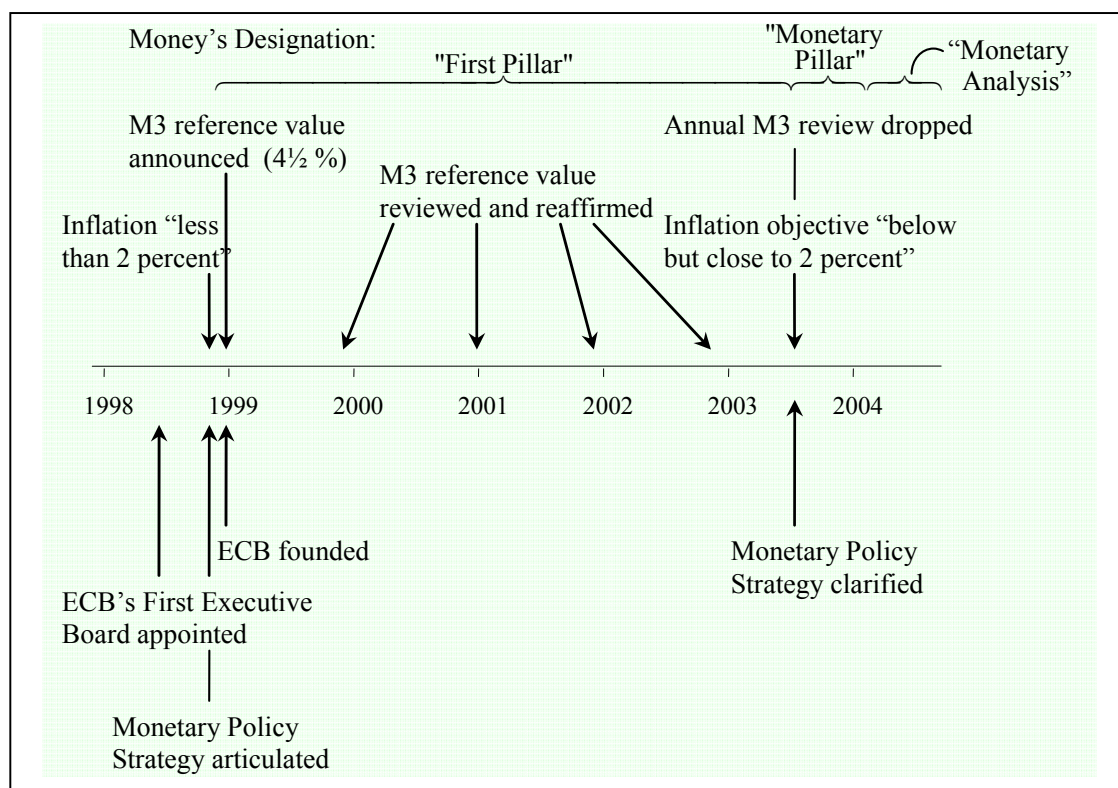
<sup>19</sup> Prepared by Hamid Faruquee (EUR).

<sup>20</sup> Price stability for the ECB is defined in the context of year-on-year increases in the Harmonized Index of Consumer Prices (HICP); a "medium term" orientation is meant to convey a forward-looking dimension to monetary policy decisions, although no explicit timeframe is cited given the uncertainties involved; see ECB (2004).

## B. Background

31. **The ECB's monetary policy framework—and the role ascribed to money—has evolved since its inception.** Originally, the ECB's monetary policy framework was elaborated as a two-pillar strategy, with money occupying the preeminent role as the “first pillar” in the analysis of medium-term risks to price stability. Figure II.1 shows a timeline of key events and the evolution of money's role within the ECB's policy framework over the past six years. Following the clarification of its policy strategy in May 2003, the ECB moved away from its “pillar” designation and recast the role of money in its inflation assessment. “Monetary analysis,” in the ECB's parlance, was to be used to provide a medium- to long-term perspective, to “cross-check” the assessment of short- and medium-term risks to price stability obtained from its “economic analysis.” Many outside observers have interpreted these changes as deemphasizing the role of monetary aggregates in the ECB's policy framework.<sup>21</sup>

Figure II.1. ECB Timeline and the Designation of Money



<sup>21</sup> See, for example, Gerlach (2004), Gali et al (2004).



32. **However, the ECB's monetary analysis has figured prominently in its recent concerns and communications.** At its Fall 2004 meetings, the Governing Council adopted discernibly “hawkish” language with respect to the balance of risks to price stability, emphasizing the need for “strong vigilance.”<sup>22</sup> Faced with a recovery losing steam, a strengthening currency, and inflation already at low levels (albeit slightly above 2 percent), why did the ECB strike such a strident note on inflation risk?<sup>23</sup> With policy interest rates on hold at historically low levels for nearly two years, the ECB's concerns derive, in large part, from its monetary analysis or “cross check” with money. Concerns center around a liquidity “overhang” and uncertainty about how this would unwind once the recovery gathers momentum. More concretely, broad money's sustained growth in excess of its reference value has accumulated into a sizable “real money gap.” Accordingly, the ECB assesses that “there remains substantially more liquidity in the euro area than is needed to finance non-inflationary growth.” Concomitant concerns that low interest rates were fueling asset price inflation—i.e., a boom in house prices in several area real estate markets—round out the cautionary signals from the cross-check and the need for “continued vigilance” on the part of the ECB.<sup>24</sup>

33. **But recent liquidity developments may pose an “embarrassment of riches” with respect to inflation.** On some level, the fact that liquidity has grown rapidly for several years, while underlying inflationary pressures have remained well contained, if not subdued, raises broader questions about the operational robustness of the monetary analysis and its cross check on medium-term price pressures. In response to this challenge, ECB staff analysis has examined complicating issues regarding estimates of excess liquidity and its potential inflationary impact—citing the role of portfolio shifts and risk aversion in the wake of the asset price boom and bust in 2000–01.<sup>25</sup> In light of these and other uncertainties, however, a lingering question remains regarding the appropriate level of concern one should infer from recent monetary developments.

34. **The paper is organized as follows.** Section C recounts the numerical basis for the ECB's reference value and estimates of “excess” liquidity and the real money gap. Section D briefly revisits the nexus between money and inflation in the euro area. Section E presents

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<sup>22</sup> ECB's October 2004 press statement.

<sup>23</sup> ECB (mid-point) projections for growth in 2005 were marked down from 2.3 percent in September 2004 to 1.6 percent in March 2005; annual HICP inflation (mid-point) projections for 2005 held steady, but was expected to further decline to 1.6 percent in 2006.

<sup>24</sup> See Chapter III for a discussion of asset prices and their operational role for monetary policy.

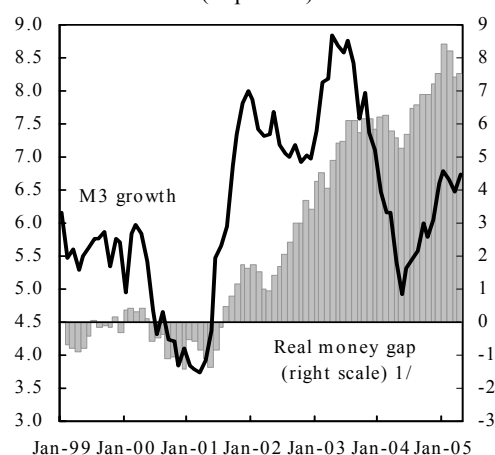
<sup>25</sup> See ECB *Monthly Bulletin* (October 2004).

(univariate) structural break analysis of area-wide velocity and highlights measurement issues for liquidity given velocity's variable decline. Section F broadens the discussion to a multivariate context and explores possible factors behind changing liquidity preference in the euro area as it pertains to the robustness of the cross-check with money. Section G concludes.

### C. Mind the Gap

35. **Money growth has shown little affinity for the reference value since EMU, suggesting the build-up of a “liquidity overhang” in recent years.** Signaling the prominent role of money, the numerical face of the ECB's monetary analysis is the reference value—i.e., 4½ percent for annual M3 growth—defined more precisely than its core inflation objective of “below but close to 2 percent.”<sup>26</sup> Actual growth in broad money, however, has persistently exceeded the 4½ benchmark since 2001, adding up to ample liquidity. To illustrate this, the real money gap is shown in the Figure II.2, based on observed growth in M3 less that in consumer prices—relative to their respective reference value or policy objective (see below)—and accumulated assuming an initial gap of zero in January 1999 when the euro was introduced.

Figure II.2. Monetary Developments  
(In percent)



Source: ECB; Eurostat and staff calculations.

36. **To better understand the quantitative basis for money's reference value, the quantity equation furnishes the basic analytical framework.** The relationship asserts that the product of money with its turnover rate or velocity of circulation equals the value of all nominal transactions (proxied by nominal GDP); in log differences, the equation can be expressed as follows:

$$\pi + \Delta y = \Delta m + \Delta v. \quad (1)$$

<sup>26</sup> The reference value for money does not entail a commitment on the part of the ECB to mechanically target monetary growth. Rather, monetary developments in light of the reference value are analyzed, in conjunction with other indicators, in order to ascertain their implications for inflation. In May 2003, the Governing Council decided to no longer annually review its underlying medium-term reference value, but would continue to monitor the validity of these underlying assumptions as necessary.

Assuming that the medium-term values for annual inflation  $\pi$  and potential output growth are  $1\frac{3}{4}$  percent and 2 percent respectively, equation (1) suggests that the ECB's reference value for money growth of  $4\frac{1}{2}$  percent corresponds to an equilibrium decline in velocity of  $-\frac{3}{4}$  percent. Consistent with a reasonable range for potential output growth ( $1\frac{3}{4}$ – $2\frac{1}{4}$  percent), the ECB's acknowledged range for the annual change in velocity around this mid-point is  $-\frac{1}{2}$  to -1 percent.<sup>27</sup> The validity of this latter assumption is explored in Section E.

**37. Estimates of excess liquidity can also be understood in terms of “gaps,” including for velocity.** Note that the quantity relationship can also be written in “gap” form for money, prices, output, and velocity—expressed as deviations from their medium-term (equilibrium) values (denoted with a bar  $\bar{\phantom{x}}$ ):

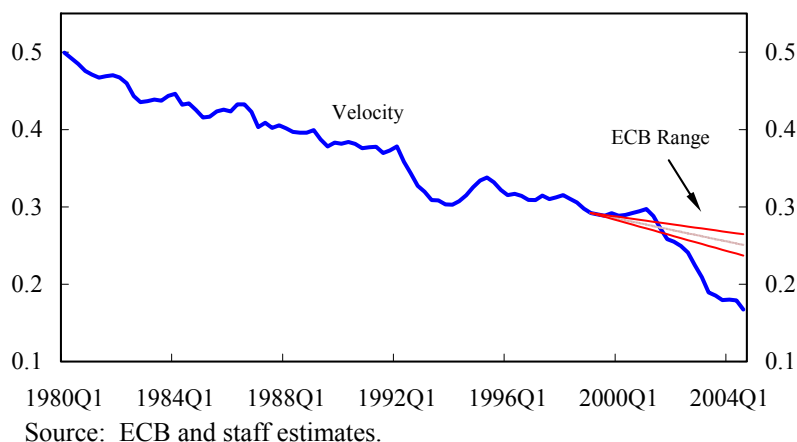
$$\underbrace{[(m - p) - (\bar{m} - \bar{p})]}_{\text{"Real Money Gap"}} = \underbrace{(y - \bar{y})}_{\text{"Output Gap"}} - \underbrace{(v - \bar{v})}_{\text{"Velocity Gap"}} \quad (2)$$

Equation (2) shows that the real money gap must equal the difference between the output and velocity gaps. When the economy is cyclically strong (i.e., positive output gap) or the velocity of circulation is depressed (i.e., negative velocity gap), real liquidity should be relatively high. Correspondingly, if money growth has been relatively brisk but has not passed through to higher inflation (or output), velocity must have declined. In terms of numbers, the area's “excess” liquidity can be illustrated in velocity space as follows. Assuming a zero velocity gap in 1999, the ECB's assumed range for trend velocity is drawn in Figure II.3.<sup>28</sup> The considerable negative deviation in velocity (i.e., between 7–10 percent in mid-2004) from the ECB's reference range that emerges is consistent with the sizeable positive real money gap shown in Figure II.2 adjusted for output gaps.

<sup>27</sup> See ECB (2004). The ECB opted not to announce money's reference value as a range to avoid misconceptions that this would constitute an operational target for monetary policy.

<sup>28</sup> Data on velocity shown in the figure are based on the ECB's “preferred” series derived from aggregated series for money, output and prices based on irrevocable exchange rates for the period prior to EMU. Data issues and alternative series are discussed later in Section E.

Figure II.3. Euro Area M3 Velocity, 1980:Q1–2004:Q3  
(In logarithms)



#### D. Horizon Matters

38. **A useful policy role for money—in particular, M3—depends upon its role in determining inflation and over what horizon, which are ultimately empirical issues.** The choice of M3 as the “right” measure of money is predicated on two key assumptions: (1) the stability of the money demand relationship, and (2) its leading indicator properties for medium-term price developments. The general validity of both assumptions are discussed below. From a policy standpoint, however, it should be noted that even if both conditions were met, whether this justifies money’s special role as a separate pillar in the ECB’s policy framework is a separate issue that is subject of an ongoing, vigorous debate. See Box II.1.

39. **Most studies find that the link between money growth and inflation is robust at longer horizons.** Using euro-area data from 1980-2004, Neumann and Greiber (2004), for example, find a one-to-one relationship between “core” money growth—defined as long-run movements—and inflation. Monetary cycles less than 8 years, however, have no predictive power. Jaeger (2003) finds the same horizon cut-off for various industrial countries over the past 40 years. A contrary view, however, is offered by Nicoletti-Altimari (2001), arguing that euro-area money and credit aggregates can forecast inflation at shorter horizons. The information content of money is especially useful at horizons beyond 1½ years, and performs best at the longest horizon considered there (3 years). Also, simple monetary and credit aggregates outperform real money gap measures.<sup>29</sup>

<sup>29</sup> Analyzing data from 1980-2001, Gerlach and Svensson (2003) find that the real money gap is useful for forecasting inflation, while the standard money growth indicator has no predictive power, despite stable money demand. For data between 1970 and 2003, Gerlach (2004) finds that money growth is informative for future inflation, on par with the usefulness (continued...)

### **Box II.1. A Separate Pillar for Money?**

#### **Defenders of the separate money pillar put forward a number of justifications:**

- *Money can act as a timely proxy.* Masuch and others (2003) maintain that since GDP and output gaps are notoriously difficult to identify in real time, monetary indicators can perform a useful function. Indeed, Orphanides (2003) argues that the 1970s inflationary bias in the United States reflected exaggerated beliefs regarding the output gap, given the failure to recognize the productivity slowdown. But Gerlach (2004), for example, argues there is little reason to think that money growth can provide as much information about the output gap as output itself (or its direct proxies).
- *Money plays a distinct role in assessing financial developments.* Masuch and others (2003) point to money's signaling role in the build-up of financial imbalances and asset price bubbles. Chapter III revisits these issues. Jaeger (2003) argues that having this distinct role may provide some insurance against the emergence of these financial dynamics. Adherents of this viewpoint often argue that an appropriate role for money could have lessened the impact of the Great Depression and the Japanese crash in the late 1980s. But others challenge the notion that this calls for a separate pillar and claim that policymakers should look at more direct measures of financial distress (Galí and others, 2004).
- *Money serves as a nominal anchor.* Jaeger (2003) suggests that the anchor role is rooted in psychology, based on some European countries' postwar experiences with (hyper-) inflation. Masuch and others (2003) argue that money can help avoid destabilizing paths for inflation expectations and potential problems of indeterminacy associated with "moneyless" policy rules (e.g., Taylor rule), identified by Benhabib et al (2001) and others; McCallum (2002), however, argues that the "expectations trap" issues are of little practical importance. Also, Galí and others (2004) counter by arguing that problems arising from self-fulfilling expectations are not confined to policy rules that exclude money nor is including money necessary to solve the problem.

#### **Critics have argued that the two-pillar system creates manifold communication problems.**

After the ECB policy strategy clarification in 2003, some have complained that the precise role for its monetary analysis remains confusing, especially since M3 growth has consistently outpaced the reference value. Many have taken this to argue that the ECB does not directly take money growth into consideration when setting interest rates, relying more on indicators of economic activity, suggesting a mismatch between "words and deeds" (Gerlach, 2004). Even supportive studies—finding a role for monetary factors in setting policy rates—agree that variables like the real money gap are more pertinent than raw M3 growth rate (Carstensen, 2003). Others have criticized the current situation as one of monetary policy "immobility" but communications "volatility" (in tone), reflecting an ECB "caught between two pillars" yielding conflicting signals (Gros, et al, 2005).

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of the output gap. In the pre-EMU era, Jaeger (2003) finds that both the money and output gaps predict inflation—the former especially over longer horizons.

40. **A simple glance at the euro-area data suggests that the link between money and inflation is more apparent at lower frequencies.** Figure II.4 compares (non-overlapping) changes in (log) prices—measured either by the GDP deflator or the HICP index—with changes in (log) M3 in excess of (log) real GDP at quarterly, annual, 5-year, and 10-year horizons. Although correlations (denoted by  $\rho$  in the figure) are low at shorter horizons, the correlation between inflation and “excess” money growth is near unity at five years and ten years. Notably, however, “too much money chasing too few goods” has tended to *overpredict* goods price inflation in the euro area. Namely, money growth in excess of output growth has translated into less than proportional inflation (i.e., observations lying below the 45-degree line), reflecting velocity’s trend decline.<sup>30</sup> A notable outlier in this direction is the 5-year period under EMU from 2000–04 (see Figure II.4, Panel 3). Hence, ascertaining the likely inflationary impact of monetary developments requires a more explicit accounting for velocity’s trend behavior and the factors underpinning it.

### E. Measuring Velocity Trends

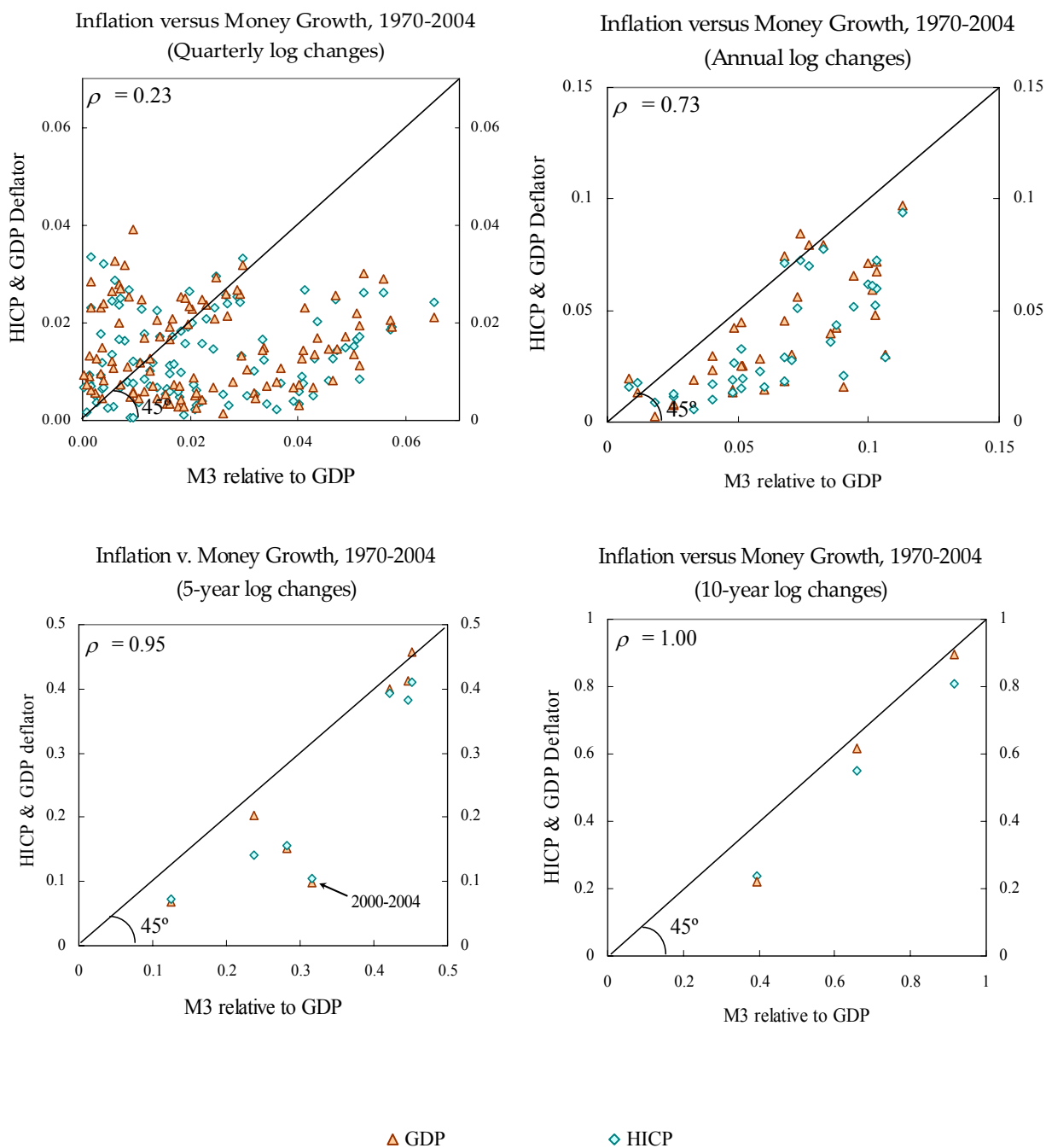
41. **The usefulness of the cross-check provided by the monetary analysis hinges on its reliability in assessing liquidity conditions—which faces challenges stemming from both measurement and conceptual issues.** While money growth may adequately explain inflation over the longer-term, robust assessment of medium-term risks to price stability is faced with additional challenges associated with changing velocity or liquidity preference, including those possibly induced by the advent of the single currency. Three areas—two narrow and one broad—are pertinent:

- First, analysis of area-wide money demand is confronted by the short sample of the most relevant time period—i.e., that provided by monetary union itself. Historical lessons are inherently difficult to draw from the earlier period given that different monetary regimes across member states existed prior to the start of EMU.
- Second, reliably measuring liquidity conditions in the context of changing trends in velocity becomes more difficult. This challenge is most apparent for the numerical focal point of the monetary analysis—namely, M3’s reference value.

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<sup>30</sup> Equivalently, the income elasticity of money demand is typically found to be greater than unity; see Masuch et al. (2003) and Brand et al. (2002) for a review. But note that this is simply the other side of the same coin, since (residual) velocity is imposed to be stationary in these estimates and, in any case, cannot be observed independently.

Figure II.4. Euro Area Money and Inflation Correlations



Source: ECB and staff estimates.

- Finally, and more broadly speaking, robustness of the monetary analysis and its cross-check for underlying inflation will crucially depend on determining the economic forces (i.e., transitory or structural) driving velocity changes as developments unfold. For the ECB, it must ascertain in real time the operational implications of these dynamics. These issues are discussed further in the current and penultimate sections, respectively.

42. **Historical analysis of area-wide velocity is immediately confronted with a fundamental uncertainty regarding data prior to the formation of monetary union.** The most relevant period to examine money demand under EMU covers only about six years. In addition to the inherent uncertainty in relating economic behavior before and after monetary union, a more basic data uncertainty arises on how best to combine past, diverse national experiences—i.e., under previous monetary and exchange rate regimes—to inform analysis about EMU.<sup>31</sup> To make this concrete, consider several alternative series for M3 velocity—all constructed using ECB data and shown in Figure II.5. The series labeled “ECB”, shown earlier and used primarily for the analysis, is the central bank’s preferred velocity series. Its construction is based on aggregated national data for nominal GDP and M3 at *irrevocable fixed exchange rates*, announced on December 31, 1998 (and as from January 1, 2001, in the case of Greece).<sup>32</sup> A shorter series (labeled “PPP”) combines national outputs and money stocks at *purchasing power parities*, following the methodology of the ECB’s own Area Wide Model (AWM).<sup>33</sup> Conceptually, in the aggregation, the former construction emphasizes the *nominal* relevance of each member state’s economy (anchored by its 1998 fixed nominal conversion rate), while the latter places weight on the *real* relevance of each economy (as measured by its PPP benchmark). Yet a third series (labeled “VSA”) would join aspects of both approaches and use a variable-specific aggregation, based on the concept “closest” to the variable (e.g., nominal-based or real-based weights), combining monies at irrevocable exchange rates and outputs at PPP. Looking at the figure, the three series all show a secular

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<sup>31</sup> See Fischer and others (2004) for a discussion of national differences regarding money.

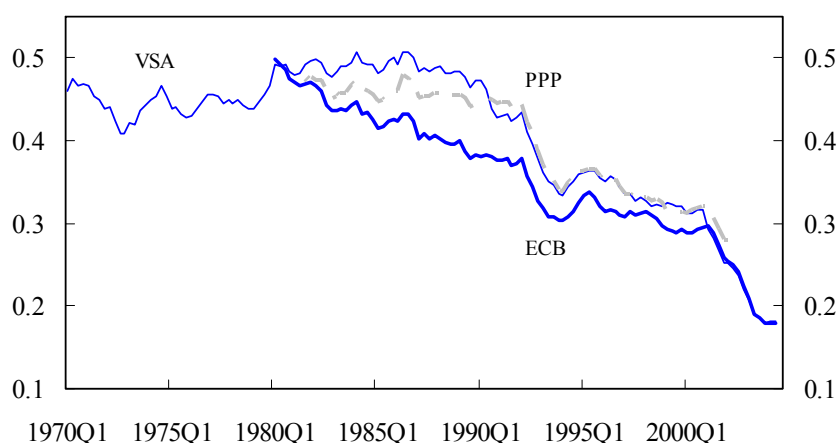
<sup>32</sup> See, for example, Bruggeman and others (2003). While recognizing that no method is clearly superior, they favor this approach as it (i) creates a “synthetic” euro area historically using the same technique applied after the start of EMU, and (ii) preserves balance sheet identities. However, this approach cannot be extended to interest rates, thus requiring a “mixed” aggregation method in order to study area-wide money demand.

<sup>33</sup> Specifically, national variables, including (log) GDP, are aggregated using the “index method” with fixed weights for countries based on their share in constant GDP measured at PPP exchange rates in 2001; see Fagan et al (2001). This approach is predicated (subject to the usual caveats) on the assumption that PPP provides useful platform to make international comparisons—e.g., living standards and real production across countries.



decline in velocity but do not yield identical pictures. Unfortunately, a clear choice is not obvious since both real and nominal factors are relevant for liquidity conditions and demands. Detailed analysis based on the VSA series, by virtue of its longer time span—but similar to the results obtaining with the shorter PPP series, is relegated to the appendix. But key differences with the ECB series are noted in the text. It should also be noted that all three methodologies use fixed weights and tend to produce less volatile turnover rates (i.e., more predisposed toward stable velocity) than (say) one based on market exchange rates.

Figure II.5. Alternative Historical Velocity Series, 1970:Q1–2004:Q2  
(In logarithms)



Source: ECB and staff estimates.

43. **Regarding numerical assessments, the economic relevance of the real money gap relies on the sensibility of its reference values, including for velocity.** The largest sources of uncertainty in the analysis are on the right-hand side of equation (1). On the left hand side, the medium-term value for inflation is a normative concept—i.e., an externally-given objective of policy; here, the only issue is ascribing a numerical value or “thick point” for the ECB’s inflation objective. Also, supply-side analyses offer independent estimates of potential growth and the output gap. This turns the focus to the other side of the equation and the reliability of benchmarks for money and velocity, which are inextricably intertwined. First, velocity (and its gap) cannot be observed independently from (and thus embodies) developments in money, output, and prices. Second, given the inflation objective and potential growth, the economic relevance of the reference values for money and velocity necessarily go hand-in-hand.

44. **Contrary to various expectations, velocity in the euro area has continued its secular decline.** Financial innovation and numerous technological advances creating greater access and viable alternatives to money would suggest that its turnover rate should increase over time. Moreover, with the euro’s introduction, many had expected that a wider menu of

financial instruments (e.g., deeper securities markets) would reduce the role of money (and credit) in the euro area economy.<sup>34</sup> However, the history of money velocity stands in direct contradiction to these predictions—and not just since EMU, but over the past quarter century.<sup>35</sup> The velocity of circulation (as evident in Figure II.3 and II.5) has experienced a long-run decline—i.e., money is being held longer and has been rising relative to GDP.<sup>36</sup> Based on ECB quarterly data from 1980 to 2004 for M3 and nominal GDP, a simple linear trend model for the quarterly series yields the following estimates:

$$v_t = 0.489 - 0.003t + e_t. \quad (3)$$

Both the constant and trend coefficient are significant at the 1 percent level. The trend coefficient, obtained with quarterly data, suggests (on an annualized basis) a decline in velocity of roughly -1 percent per year—not far from the ECB’s (mid-point) assumption. However, several econometric problems are evident. First, standard unit root (i.e., ADF) and stationarity (i.e., KPSS) tests both suggest that the linear trend model fares poorly compared to a non-stationary model; see Table II.A1. In economic terms, this highlights the fact that velocity deviations from trend are extremely persistent, leaving open the issue of whether velocity shocks are permanent or whether the trend is misspecified. Stability tests—valid under the assumption of a trend stationary model—reject parameter constancy for the trend; see Table II.A2.<sup>37</sup>

**45. Structural change analysis of area-wide velocity indicates *at least one trend break in the series*.** Visually, in Figure II.3, the declining trend appears to have steepened more recently. More formally, sequential regressions testing for a one-time trend break in

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<sup>34</sup> Building on this premise and targeting U.S. benchmarks for money and credit, Gros and others (2005) warn that instead of converging toward U.S. levels, money and bank credit growth in the euro area have, in fact, matched or exceeded that in the United States. A short time perspective (i.e., since EMU), however, belies several underlying financial trends.

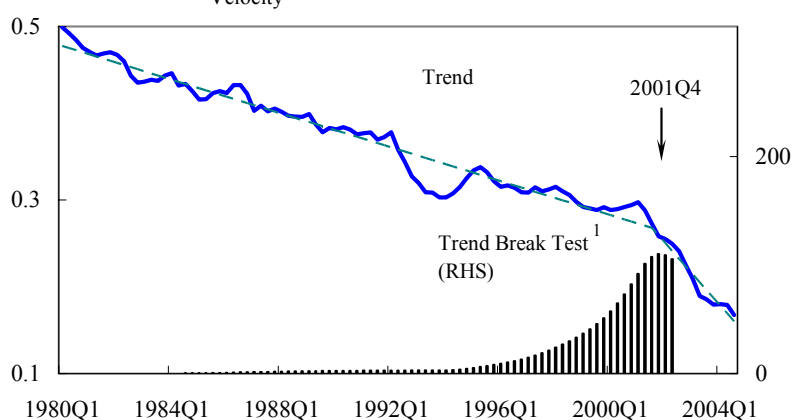
<sup>35</sup> Moreover, data on broad money and nominal GDP for the United States, United Kingdom, and Canada confirm that velocity’s secular decline is a more widespread phenomenon.

<sup>36</sup> This applies to narrow money as well, including currency in circulation. After the arrival of automated teller machines (ATMs), other innovations include debit cards, electronic payments, smart cards, and network or e-money. Nevertheless, the adage “cash is king” still holds true, not least of all due to the anonymity it provides; see Drehman et al (2002) and Rogoff (2002).

<sup>37</sup> Stability tests based on Hansen (1991). Parameter constancy is rejected at the 1 percent level in the longer velocity series; see appendix.

velocity across all permissible break dates—based on the Quandt-Andrews maximal  $F$ -test—suggest a significant break around 2001:Q4; see Figure II.6.<sup>38</sup> Using a battery of other structural change tests based on various methodologies, other (single) break dates obtain in the narrow range from 2000:Q2 to 2001:Q4; see Table II.A2. For example, Perron’s (1997) unit root test against a stationary alternative with a breaking trend (with endogenous or unknown breakpoint) selects a similar break date, based on maximizing the possibility of rejecting a unit root.<sup>39</sup> Interestingly, but perhaps not surprisingly (given low statistical power in finite samples), this latter test still does not strongly reject a unit root—indicating that deviations around the breaking trend are still fairly persistent and leaving open the possibility of multiple breaks.

Figure II.6. Euro Area Velocity, 1980:Q1–2004:Q3  
(In logarithms unless noted otherwise)



Source: ECB and staff estimates.

<sup>1</sup> Quandt-Andrews  $F$ -statistic (in levels).

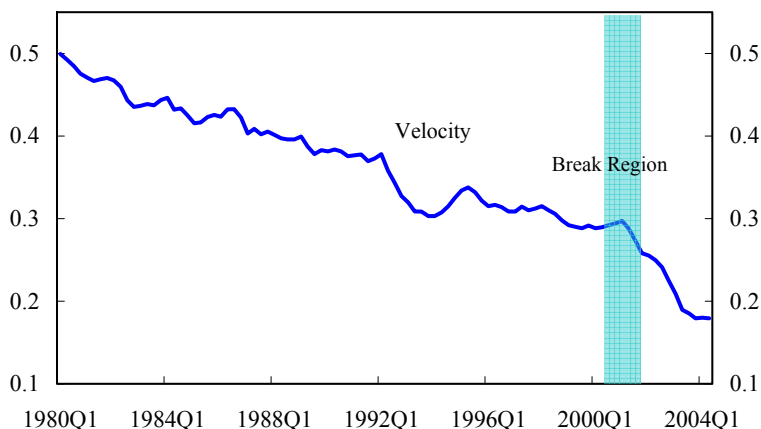
46. **Further tests indicate possible multiple breaks in velocity, particularly if the longer series is considered.** Formal tests for multiple structural breaks—using both sequential and the simultaneous methods—suggest additional breaks points in the ECB

<sup>38</sup> The critical values are based on Andrews (1993). To avoid end-point sensitivity, the series were trimmed (by either 10 or 15 percent) on both ends in applying various break tests; note that the maximal  $F$ -test statistic accurately dates the timing of the break only under certain regularity conditions; see Hansen (2001).

<sup>39</sup> Selection of the breakdate is chosen using Perron’s “additive outlier model”; see Perron (1997); see Table A2.

velocity series around 1994; see Table II.A2.<sup>40</sup> The longer VSA series for velocity also reveals several potential break points, with a dominant break region around 1987; see Table II.A3.<sup>41</sup> In that case, additional break tests corroborate the most recent break region between end-2000 to end-2001 found in the ECB series (see Figure II.7).

Figure II.7. Euro Area M3 Velocity, 1980:Q1–2004:Q3  
(In logarithms)



Source: ECB and staff estimates.

47. **Working with a single structural break yields a very different estimate of (post-break) trend velocity from the linear model.** Velocity, allowing for a non-linear trend function drawn in Figure II.6, can be represented by:

$$v_t = 0.488 - 0.002t(< 2001Q4) - 0.007t(\geq 2001Q4) + e_t. \quad (4)$$

<sup>40</sup> The sequential method—i.e., further splitting the sample based on the break(s) found at the previous step—quickly loses degrees of freedom and may lead to detection of spurious breaks. The Bai and Perron (1998, 2003) approach considers the number and location of breaks simultaneously based on the entire sample to address spurious breaks. In terms of the number of breaks, the Bayesian Information Criterion (BIC), penalizing additional parameters (i.e., breaks)—favors the one-break model over the two-break model in the shorter series.

<sup>41</sup> Based on data from 1970–2003, Gerlach (2004) finds that money growth’s ability to help predict future inflation changes (i.e., weakens) from the pre-1987 period to the later period.

Including a trend break, the fit of the equation improves and parameter instability is attenuated (see Table II.A2). In breaking-trend form, the implied annual rate of decline in velocity steepens from -1 percent prior to 2001 to -2½ percent thereafter, exceeding (in absolute value) the upper end of the ECB's range between -0.5 and -1.0 percent for trend velocity growth. Table II.1 compares velocity trends under both models with the ECB's assumed range for velocity.

Table II.1. Euro Area M3 Velocity Trends, 1980:Q1–2004:Q3  
(Annualized rate; in percent)

ECB velocity range	Linear trend model	Breaking trend model (post-break)
-0.75 ± 0.25	-1.07 (0.05) <sup>1</sup>	-2.59 (0.07) <sup>1</sup>

<sup>1</sup> (Annualized) standard errors in parentheses, calculated using delta method.

48. **Results regarding velocity's variable decline are robust to the assumption of trend stationarity versus difference stationarity.** Unlike the trend model, the growth model—i.e., working in first differences of (log) velocity—does not suffer from problems associated with unit roots (see again Table II.A1). But very similar implications for velocity's trend obtain from time-series estimates based on velocity growth; see Table II.A4.<sup>42</sup> Specifically, the growth model also shows signs of parameter instability, namely in the constant term (analogous to the slope coefficient in the trend model).<sup>43</sup> Moreover, allowing for a shift in mean—i.e., in the drift—yields similar estimates for velocity's post-break decline and very similar location(s) of the breakdate(s); see Table II.A4.

<sup>42</sup> Adding an autoregressive coefficient on lagged velocity growth would yield a coefficient around 0.3; the estimated long-run drift in the series and parameter instability issues are unaffected.

<sup>43</sup> The growth model for velocity is given by  $\Delta v_t = \mu + \varepsilon_t$ , where  $\mu$  is the drift term and  $\varepsilon_t$  is a random error. Solving this recursively, one can show that velocity (in log levels) is:  $v_t = v_0 + \mu t + \sum_{i=1,t} \varepsilon_i$ , analogous to the linear trend model with one notable difference that errors accumulate—i.e.,  $v$  is *not* covariance stationary.

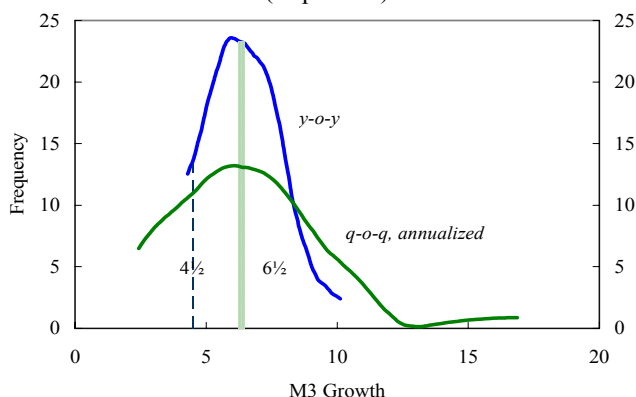
**49. Estimates of “excess” liquidity are sensitive to underlying assumptions regarding the behavior of trend velocity.**

The implications of velocity’s breaking-trend (or mean-shift in growth) for the real money gap can be illustrated as follows. With a single structural break, the relevant reference value for annual M3 growth would rise (post-break) to around  $5\frac{3}{4}$  or 6 percent rather than  $4\frac{1}{2}$  percent, *ceteris paribus*.<sup>44</sup> To put these numbers in some perspective, average M3 growth has been  $6\frac{1}{2}$  percent since the start of monetary union; see Figure II.8.

Using the same initial assumptions—i.e., zero gaps for velocity, output, and real money at the start of EMU—

the accumulated real money gap in 2004:Q2 would be  $6\frac{1}{2}$ – $7\frac{1}{2}$  percentage points lower than in Figure II.2. Relaxing these starting assumptions (i.e., zero gaps in 1999), one could further use the level implications of the breaking-trend model. Here, a very small, *positive* velocity gap emerges, implying a negative real money gap, albeit close to zero.

Figure II.8. Distribution of Money Growth, 1999:Q1-2004:Q2 (In percent)



Source: ECB and staff calculations.

## F. Explaining Changing Liquidity Preference

**50. While the structural break analysis highlights potential instability in velocity, it cannot explain the nature and causes of changing liquidity preference—instrumental for determining money’s policy role.** The univariate analysis cannot provide an economic explanation for the “trend” breaks that have been identified. Conceptually, these structural breaks may even be compatible with multivariate analysis showing a *stable* long-run demand for money—depending on its economic determinants (and their behavior). Seen in this broader context, area-wide velocity has declined at a time of low inflation, interest rates, and asset returns that have reduced the opportunity cost of holding money. These macroeconomic factors could explain rising money demand in an otherwise predictable fashion. A number of ECB studies indeed find a stable long-run money demand function, although using sample periods that typically end in 1999 (or earlier).<sup>45</sup> Taking a more critical view, however,

<sup>44</sup> Using HICP inflation (instead of the GDP deflator) to construct a long series for velocity would yield a corresponding reference value around  $5$ – $5\frac{1}{4}$  percent.

<sup>45</sup> See, for example, Coenen and Vega (1999), Brand and Cassola (2000), Calza and others (2001). More recent studies broadly supporting stable area-wide money demand (till 2001) (continued...)

Carstensen (2004) argues that conventional money demand specifications have become unstable, with the break-point from the multivariate break analysis located at the end of 2001, coinciding with the findings of the univariate analysis. This suggests that structural factors more recently may also be relevant and could lead to somewhat different interpretations of monetary developments and their implications for inflation.

**51. Key to determining the liquidity (and inflation) implications associated with changing velocity is a better understanding of its root causes—in particular the relative roles of macroeconomic versus structural factors.** Disentangling the underlying causes behind “structural” trend breaks in velocity’s time series is crucial—in particular, the extent to which these are long-lasting or fleeting changes, and whether they present risks of higher inflation. The present macroeconomic environment and outlook—i.e., low inflation, interest rates and asset returns—favor holding more money longer, but the component decline in velocity driven by these factors (particularly, expectations) could change relatively swiftly as conditions change. On the other hand, structural factors could indicate more fundamental changes that could endure. Hence, ascertaining the various economic factors (and their relative roles) is central for reliably determining the medium-term inflationary dynamics and risks surrounding current monetary developments.

**52. Although firm conclusions are difficult to draw given limited information and the short time elapsed, several tentative explanations may be at work with respect to recently changing liquidity preference in the euro area—beyond traditional money-demand considerations:**

- Portfolio shifts and heightened risk aversion in the wake of the stock market boom and bust may underlie a protracted flight to safety offered by monetary financial instruments.<sup>46</sup>
- The euro cash changeover created a new monetary reality—including the introduction of large denominations for the first time in several countries—for a large currency union of 300 million people. This may have affected demands for cash, including in the informal sector both within and beyond euro area borders.
- The advent of the European single currency has also altered the landscape of international monetary system. The international role of the euro—as vehicle,

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are Brand et al (2002) and Bruggeman et al (2003). Kontolemis (2002) shows, though, that periods of disequilibrium arising from velocity shocks, can be protracted.

<sup>46</sup> Akin to ECB staff analysis, Carstensen (2004) emphasizes stock market variables and portfolio adjustment to explain the money demand instabilities identified in his analysis.

reserve, and invoice currency—is significant and expanding, suggesting the increasing relevance of currency substitution and foreign demand for euros.<sup>47</sup>

53. **Portfolio shifts seeking the safety of monetary instruments in the wake of financial market turbulence offer a partial explanation for increase demand for liquidity.** Analysis conducted by ECB staff posits that increased risk aversion among investors has raised demand for more liquid and more secure financial instruments as found in M3.<sup>48</sup> Figure II.9 shows recent growth in M3 and an adjusted series attempting to correct for these portfolio shifts based on ECB estimates.<sup>49</sup> As evident in the figure, a portion of the rapid expansion in broad money in the aftermath of the stock market decline in 2000–01 can be attributed to these considerations. Less clear from the analysis is the extent to which this phenomenon should also feature in other industrial countries with similar equity market developments (i.e., common shocks) and whether an unwinding would necessarily lead to higher goods (rather than asset) price inflation. It should also be recognized that even after correcting for the (estimated) impact of portfolio shifts, adjusted broad money has nonetheless persistently grown at a relatively brisk pace of close to 6 percent. This suggests that other explanations also need to be pursued.

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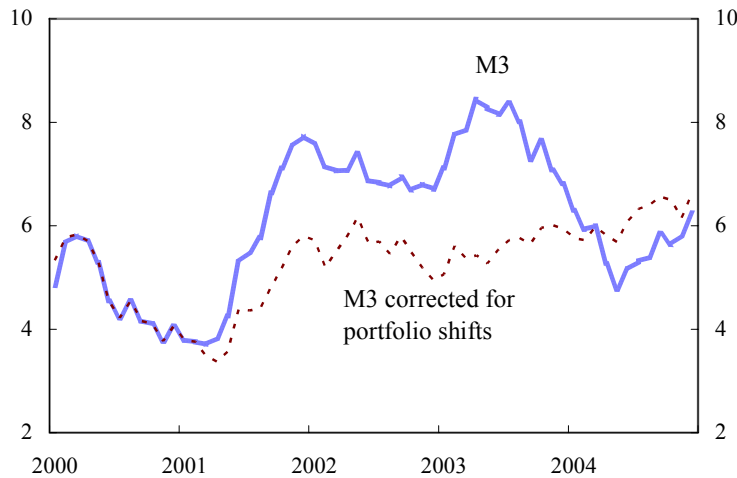
<sup>47</sup> See ECB (2005) for a review of the euro's international role. Note that M3 is a resident-based concept—i.e., money held by agents residing in the euro area. However, currency substitution (by residents) and measurement difficulties in tracking euros held by non-residents can allow international influences to play a role. See discussion below.

<sup>48</sup> See ECB, *Monthly Bulletin*, May 2003 and October 2004. The ECB's monetary analysis also examines the role of institutions and financial innovation in assessing liquidity conditions in real time. For example, the growth of internet banks—offering attractive deposit rates—has garnered recent attention by ECB staff.

<sup>49</sup> The corrected series, derived from univariate estimates augmented by crude intervention variables (e.g., dummies), exhibit portfolio shifts as early as 1992, *but* a zero impact on many intervening dates. The estimates, as acknowledged in the ECB Monthly Bulletin of October 2004, should be interpreted with caution. Structural change tests still find possible breaks in the corresponding velocity series.



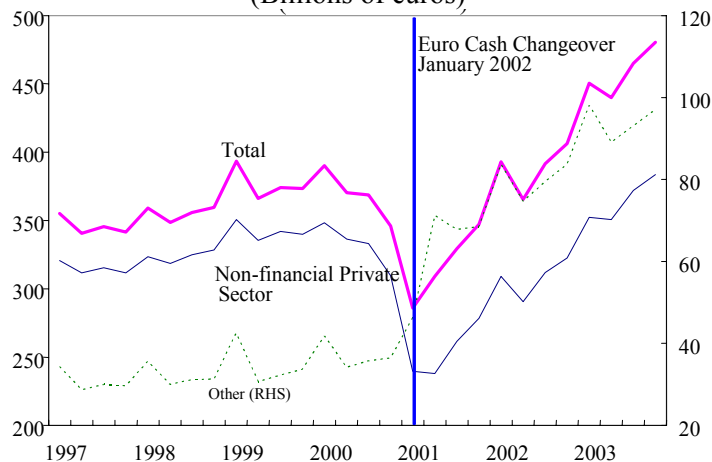
Figure II.9. M3 and Adjusted M3 Growth, 2000–04  
(In percent)



Source: ECB.

54. **The euro cash changeover coincides with a rapid increase in currency demand that has yet to subside.** In January 2002, the enormous undertaking of introducing physical euro notes and coins ushered in a new monetary era in a very tangible way. Around that time, area-wide currency in circulation displayed an expected “v-shaped” pattern, as legacy currencies (and their demands) were being phased out and replenished by new euro notes and coins; see Figure II.10. Less expected, however, has been the brisk, sustained rise in currency demand (and, hence, M1) ever since the changeover which accounts, to a large extent, for the rapid growth in M3.

Figure II.10. Currency in Circulation  
(Billions of euros)



Source: ECB.

**55. Initial data suggest cash “hoarding” by agents early in the changeover process, particularly in the largest currency denominations (i.e., €500, €100 notes), a trend which has apparently continued.**<sup>50</sup> In most member states, the introduction of currency denominations equivalent to the €500 note was unprecedented, perhaps leading to some substitution within demands for M1 instruments but also satisfying some pent-up demands. Rogoff (1998) argues that growing currency holdings (relative to recorded output) in OECD countries reflect vibrant underground economies, where probably greater than 50 percent of banknotes circulate.<sup>51</sup> Against this backdrop, the introduction of large euro banknote denominations, in his view, has offered an attractive operating currency for the underground economy, not just domestically but globally. This includes possible growing counterfeiting activities that could have repercussions for money demand for legal tender (i.e., Gresham’s law). In addition, network externalities offered by the advent of a single currency in a monetary union of more than 300 million people is likely to boost its wider usage and demand.<sup>52</sup>

**56. Beyond the informal sector, the international role of the euro continues to expand, with possible implications for money demand.** Estimates indicate that one out of every ten euro notes circulates outside the area, still well below estimates (around 50 percent) for the U.S. dollar.<sup>53</sup> While the figure is not trivial in the case of the euro, it comprises a small part of the stock of broad money.<sup>54</sup> However, measurement problems since the changeover make current estimates more uncertain.<sup>55</sup> Meanwhile, net currency shipments

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<sup>50</sup> “In contrast to the decline in the number of small banknotes in circulation, the demand for large denominations increased steadily in the first eight months of 2002. The strongest rise in demand was for the EURO 500 banknotes, which more than doubled between mid-January and the end of August [+120%]. Demand also rose during this period for the EURO 100 banknotes, by no less than 60%. This shows that there was a rapid increase in the hoarding of banknotes in the first months of the euro cash era...”—W.Duisenberg (ECB President), speech on the occasion of the International Imaging Industry Summit, (September 2002).

<sup>51</sup> A large literature ubiquitously uses currency demand as the key measure of the relative size of the underground economy; See, for example, Schneider and Enste (2005) and the references cited therein.

<sup>52</sup> See, for example, Feige and Dean (2004).

<sup>53</sup> See, for example, Porter and Judson (1996) and Feige (1996)).

<sup>54</sup> Fischer et al (2004) estimates foreign circulation of euro legacy currencies between 8 and 15 percent in the late 1990s, in line with current estimates of euros circulating abroad.

<sup>55</sup> “As the initial supply of euro banknotes abroad, the so-called frontloading, was entirely channeled in December 2001 through central banks and commercial banks, the initial amount  
(continued...)

of euros abroad continue, and the single currency is playing an expanding role on the international stage.<sup>56</sup> As a store of value, euro reserves have been steadily growing as a share of world currency reserves (mainly at the expense of other non-dollar currencies).<sup>57</sup> As a vehicle or reference currency in the 2-trillion dollar daily foreign exchange market, 98 percent of all foreign exchange transactions involve either the dollar or the euro, with the euro-dollar exchange rate as the most heavily traded currency pair (approximately \$500 billion per day).<sup>58</sup>

**57. As an emerging rival to the U.S. dollar as an international currency, the euro is likely to see increasing currency substitution and foreign demand, influencing area velocity.** A glance at velocity's gap, obtained as the residual from breaking-trend estimates, displays strong correlations with movements in the euro-dollar exchange rate.<sup>59</sup> When the euro was relatively weak in value against the U.S. dollar, the velocity of circulation was relatively high (compared to trend); when the euro substantially strengthened and after physical euro notes and coins were introduced, turnover has been relatively low.<sup>60</sup>

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of banknotes that foreigners received was meticulously captured in data...However, as euro banknotes have been available to anyone inside the euro area since then, they can flow out through many unrecorded channels. As time goes by...data on banknotes shipments by banks will become increasingly less reliable as a measure of the foreign circulation of the euro.” — T. Padoa-Schioppa (ECB Board Member), lecture at ECB 8th Dubrovnik Economic Conference (June 2002).

<sup>56</sup> See ECB (2005).

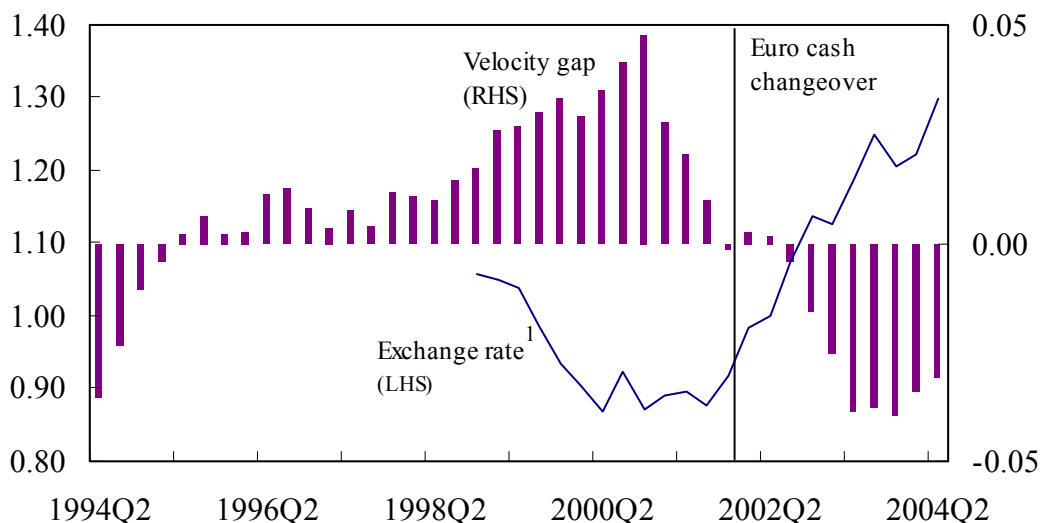
<sup>57</sup> See IMF Annual Report (2004).

<sup>58</sup> See BIS (2005).

<sup>59</sup> The correlation coefficient is -0.86. Velocity gaps shown in the figure are derived from the longer series based on a single trend break (in 1987). The resulting gaps based on this historical break thus encompass both transitory deviations *and* more recent trend breaks—the latter being particularly relevant for comparisons with candidate factors generating possible structural change in money demand.

<sup>60</sup> Examining demands for euro legacy currencies (and excluding the period directly surrounding the cash changeover), Fischer and others (2004) find a stable long-run relationship between real currency, real private consumption, an opportunity cost variable and the euro's real effective exchange rate—capturing non-resident demands.

Figure II.11. Area Velocity Gap and Dollar-Euro Exchange Rate  
(In logarithms unless noted otherwise)



Source: IFS and staff estimates.

<sup>1</sup> Dollars per euro (LHS).

## G. Concluding Remarks

58. This chapter has sought to examine key issues and features involving monetary aggregates in the euro area as they pertain to the role of money within the ECB's policy framework. In attempting to ascertain the operational usefulness of money for robustly guiding and communicating policy decisions, the analysis yields the following conclusions:

- **The nexus between inflation and money growth in the euro area appears most reliable over longer horizons.** This delineates a useful role for money as a long-run anchor within the monetary policy strategy, though its shorter-term operational role is less apparent based on the available data and made less clear by the recent dynamics in money's velocity of circulation.
- **Area-wide velocity appears to have experienced a variable rate of decline, challenging a robust assessment of liquidity.** "Excess" money growth thus far has largely found its counterpart, not in higher prices or output, but in a significant trend decline in velocity. Structural change analysis suggests several structural breaks in trend velocity as late as 2000–01, and recent trend estimates for velocity's decline lie outside the assumed range that is consistent with the ECB's reference value for M3 growth. In addition to data uncertainties, this potentially weakens the reliability of static reference values, liquidity measures, and their implications for inflation risks.

- **Strengthening the cross check as an indicator of underlying inflationary pressures entails further determination and disentangling of the underlying sources of changing liquidity preference.** A more definitive understanding of the forces and dynamics behind velocity changes would strengthen the assessment of liquidity conditions and their inflationary consequences. At issue is determining the extent to which macroeconomic versus structural factors account for recent changes, whether these developments could rapidly reverse, and whether this might pass through to higher HICP inflation. The ongoing challenge is to do so, and to accurately draw and convey the attendant monetary policy implications, with limited information as these developments are still unfolding.
- **Changing liquidity preference could partly reflect fundamental changes stemming from the creation of a large currency union.** Following the advent of Europe's single currency, the physical changeover to euro notes and coins coincided closely with a sharp rise in currency demand that has yet to subside. The euro's expanding role as an international currency—as an eventual rival to the U.S. dollar—also portends increasing foreign demand. Wide swings in the value of the euro against the dollar, for example, have also correlated strongly with changing velocity, suggesting the importance of currency substitution and non-resident demands.

Table II.A1. Unit Root Tests of Euro Area Velocity, 1980:Q1–2004:Q3

Variable	ADF <sup>1</sup>	KPSS <sup>2</sup>
$v$	-1.89	0.23**
$\Delta v$	-6.60**	0.11

A \*(\*\*) indicates significance at the 5 (1) percent level.

<sup>1</sup>Augmented Dickey-Fuller  $t$ -test for unit root against trend-stationary alternative; lag length (=1) selected based on Akaike information criterion (AIC).

<sup>2</sup>Kwiatkowski, et al (1992)  $\eta(\tau)$  test for trend stationarity against unit root alternative; lags=1.

Table II.A2. Structural Break Analysis of Euro Area Velocity, 1980:Q1–2004:Q3  
(Trend Stationary Model:  $v_t = \mu + \gamma t + \varepsilon_t$ )

Model:	Linear Trend		Breaking Trend	
Slope <sup>1</sup>	-1.07**		-2.59** (post break)	
Stability <sup>2</sup>	0.49*		0.02 (post break)	
$R^2$	0.94		0.97	
Structural Break Tests	Test Statistic	Breakdate	Test Statistic	Other Breakdates
Maximal $F$ <sup>3</sup>	110.1**	2001Q4	32.4**	1994Q2
Sup. $LM$ <sup>4</sup>	24.5**	2001Q1	22.2**	1994Q4
Exp. Avg $LM$ <sup>4</sup>	8.0**	"	8.0**	"
Bai-Perron <sup>5</sup>	...	2000Q2	...	1992Q3
Unit Root Test <sup>6</sup>	-1.65	...	-3.78	2001Q1

A \*(\*\*) indicates significance at the 5 (1) percent level.

<sup>1</sup>Coefficient on time trend; at annual rate, in percent.

<sup>2</sup>Test for parameter stability based on Hansen (1991).

<sup>3</sup>Quandt-Andrews structural change test; critical values based on Andrews (1993).

<sup>4</sup>Structural change test based on Andrews and Ploberger (1994);

<sup>5</sup>Multiple break test based on Bai and Perron (2003).

<sup>6</sup>Unit root tests based on Phillips and Perron (1988) and Perron (1997).

Table II.A3. Structural Break Analysis of Alternative Velocity Series, 1970:Q1–2004:Q2  
(Trend Stationary Model:  $v_t = \mu + \lambda t + \varepsilon_t$ )

Model:	Linear Trend		Breaking Trend	
Slope <sup>1</sup>	-0.64**		-2.08** (post break)	
Stability <sup>2</sup>	3.70**		0.56* (post break)	
$R^2$	0.57		0.94	
Structural Break Tests	Test Statistic	Breakdate	Test Statistic	Other Breakdates
Maximal $F$ <sup>3</sup>	901.6**	1987Q2	61.4**, 32.4**	1972Q4, 2001Q2
Sup. $LM$ <sup>4</sup>	90.1**	1992Q2	43.1**, 29.4**	1989Q1, 2001Q3
Exp. Avg $LM$ <sup>4</sup>	41.7**	"	17.9**, 12.5**	"
Bai-Perron <sup>5</sup>	...	1986Q1	...	1992Q3, 2000Q4
Unit Root Test <sup>6</sup>	-0.33	...	-3.75	1987Q2

A \*\* indicates significance at the 5 (1) percent level.

<sup>1</sup>Coefficient on time trend; at annual rate, in percent.

<sup>2</sup>Test for parameter stability based on Hansen (1991).

<sup>3</sup>Quandt-Andrews structural change test; critical values based on Andrews (1993).

<sup>4</sup>Structural change test based on Andrews and Ploberger (1994);

<sup>5</sup>Multiple break test based on Bai and Perron (2003).

<sup>6</sup>Unit root tests based on Phillips and Perron (1988) and Perron (1997).

Table II.A4. Structural Break Analysis of Alternative Velocity Series, 1970:Q1–2004:Q2  
(Difference Stationary Model:  $\Delta v_t = \mu + \varepsilon_t$ )

Model:	First Differences		Mean Shift	
Drift <sup>1</sup>	-0.81**		-2.11** (post break)	
Stability <sup>2</sup>	1.07**		0.18 (post break)	
$R^2$	0.00		0.09	
Structural Break Tests	Test Statistic	Breakdate	Test Statistic	Other Breakdates
Maximal $F$ <sup>3</sup>	13.6**	1986Q4	5.4**, 7.9**	1972Q4, 2001Q1
Minimum SSR <sup>4</sup>	...	1986Q3	...	1993Q2, 2000Q4
Unit Root Test <sup>5</sup>	-9.01**	...	...	...

A \*\* indicates significance at the 5 (1) percent level.

<sup>1</sup>Point estimate on constant term; at annual rate, in percent.

<sup>2</sup>Test for parameter stability based on Hansen (1991).

<sup>3</sup>Based on  $F$ -distribution.

<sup>4</sup>Breakdate(s) based on minimized sum of squares a la Bai and Perron (2003).

<sup>5</sup>Non-parametric unit root test based on Phillips and Perron (1988).



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### III. HOUSE PRICES AND MONETARY POLICY IN THE EURO AREA<sup>61</sup>

#### A. Introduction

59. **The ECB, as part of its monetary analysis, has stressed the risks of an accommodative monetary policy associated with asset (particularly housing) market developments.** Concerns have centered around high credit growth feeding through to high house prices, which in turn has implications for price stability. These issues have loomed large in recent ECB communications. In 2005, the January and February monthly bulletins warned of “*unsustainable price increases in property markets*”. In its March report, the ECB stated that “*demand for loans for house purchases continues to be robust, contributing to strong house price dynamics in some regions of the euro area.*” The April bulletin noted that “*...strong monetary and credit growth indicates the need to carefully monitor whether risks are building up in the context of strong house price increases in some regions of the euro area.*” While the May and June editorials did not mention house prices, they did point to continued upside risks to price stability from strong money and credit growth. So, at a time when the economic analysis confirms little in the way of underlying inflationary pressure, the evidence from the monetary analysis cross-check is dampening this appraisal.

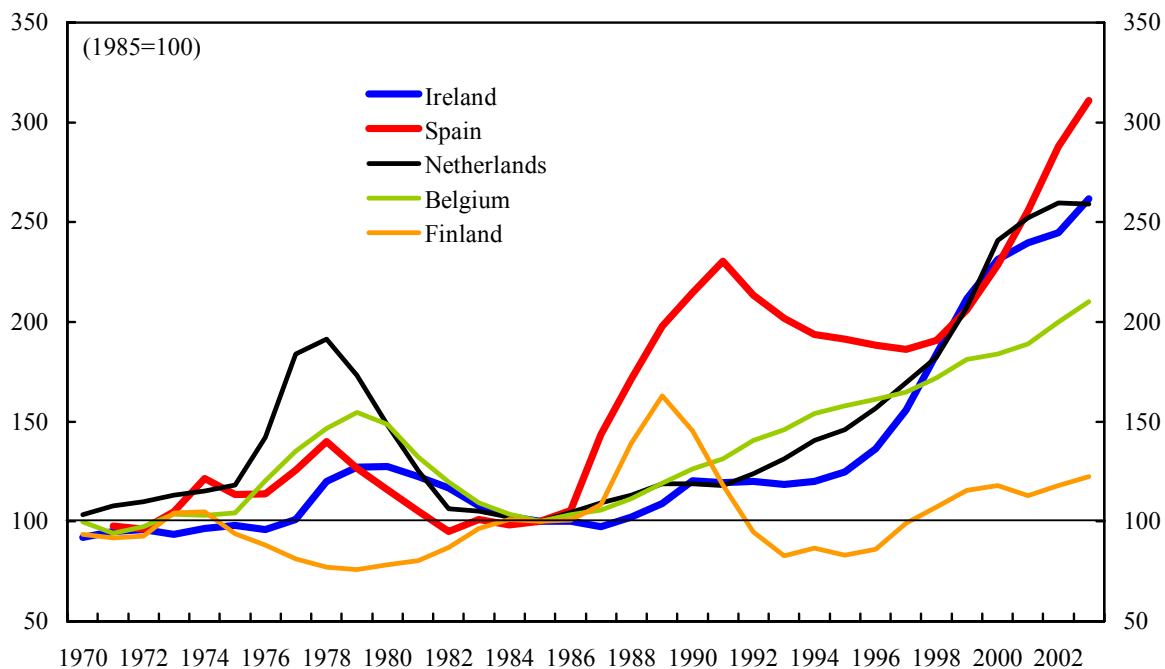
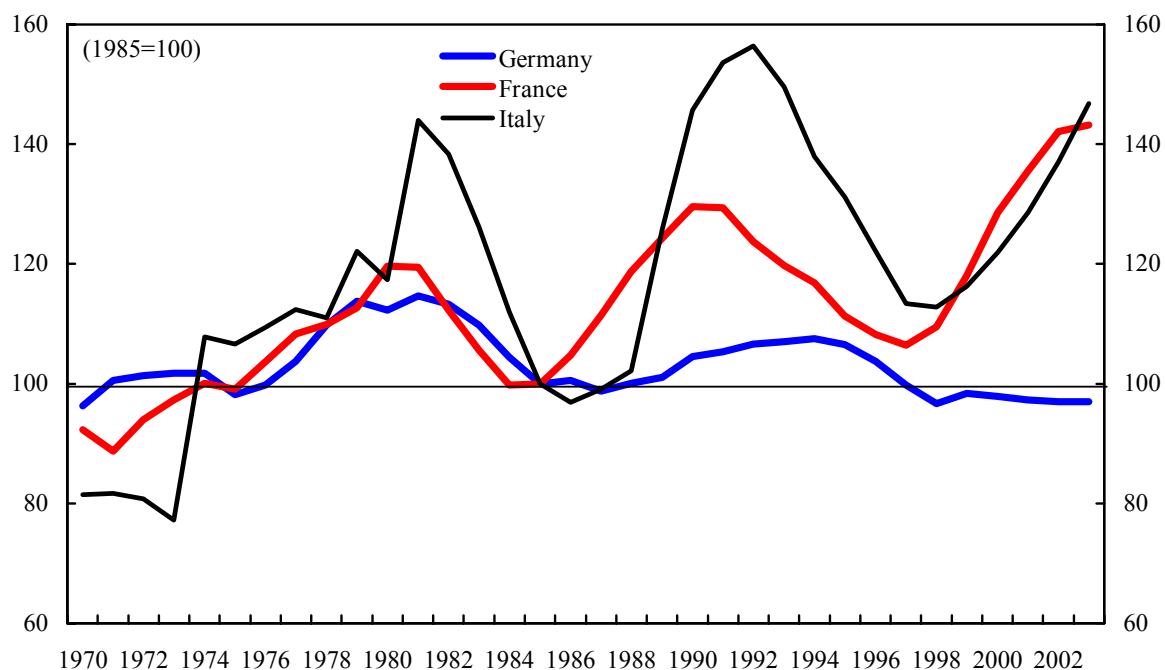
60. **There are a number of ways house prices can affect real activity and inflation.** For a start, higher house prices could stimulate consumption through a wealth effect. Alternatively, a rise in housing prices could raise the ability of households to borrow when there are imperfections in the credit market, by raising the value of collateral (Bernanke, Gertler, and Gilchrist, 2000). Such a “financial accelerator” model posits a feedback mechanism between credit and housing prices—higher credit leading to higher consumption of goods and services, but possibly also to higher asset prices. However, many argue that the true cost of an unfettered increase in housing prices is not so much the direct inflationary impact of the boom, but the potential detrimental effect of the ensuing bust phase. Asset price busts, accompanied by financial instability and a collateral-induced credit crunch, can be extremely costly in terms of output.

61. **Taking a long-term perspective, the pattern of real housing prices differed markedly across countries** (Figure III.1). Over the period 1970-2003, real house prices barely budged in Germany, rose modestly in countries like France and Italy, and expanded considerably in places like Spain, the Netherlands, and Ireland (Table III.1). As can be seen from Figure III.1, the sample can be basically divided into two camps: high and low house price growth. The “low growth” cadre comprises the three large countries (plus Finland), while the other four (Ireland, Spain, Belgium, the Netherlands) recorded much faster growth

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<sup>61</sup> Prepared by Anthony Annett (EUR).

Figure III.1. Real Housing Prices in Selected Euro Area Countries



Sources: BIS calculations based on national data.

over the long-term.<sup>62</sup> One caveat should be noted upfront, however: data on house prices are imperfect at best, suffering from different methodological problems across countries.

**62. Divergences have persisted under economic and monetary union.** Table III.2 shows the cumulative growth of credit, real housing prices, and goods prices across eight euro-area countries from 1998–2003.<sup>63</sup> As can be observed, while inflation has been muted in most countries, real houses prices have expanded at a much faster clip, except in Germany where they stagnated. Similarly, the growth in credit has been robust, especially in countries like Ireland and Spain. Casual inspection supports a link between high credit and high house price growth countries. Of particular note is the cross-country variability; the standard deviation of real house price growth across countries was almost four times that of inflation, and credit growth was even more variable still. Thus low and stable inflation across countries co-existed alongside very different housing market developments.

**63. This chapter will explore the inter-relationship between credit, house prices, and inflation in the euro area.** A basic theme is that the transmission mechanisms between asset prices and economic activity, and between monetary policy and asset prices, are complicated. In this vein, Section B will argue that the relationship between credit and money growth and house prices depends on a variety of country-specific institutional characteristics. Such heterogeneity in experiences across the area complicates the task of a monetary policymaker attempting to extract clear signals from asset prices. Following this, Section C will show that the link between house price and goods price inflation is also not straightforward. In particular, house prices do not appear to help forecast consumer prices over the short- to medium run. Moreover, there is a tension between the potential inflationary consequences of the boom and the far more serious deflationary consequences of the bust. Finally, Section D will argue that these concerns mean that operationalizing monetary policy to address explicit asset price concerns in the euro area is beset with difficulty. Given this, other policy instruments, especially at the national level, may be more suited to tackling emerging asset price booms. Section E concludes.

## **B. Credit and House Prices**

**64. There is a broad literature on the economic determinants of real house prices.** Appealing to this literature, European Central Bank (2003) derives a comprehensive list of factors with the potential to affect house price dynamics, including: household income; real

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<sup>62</sup> The euro area sample (eight countries) is dictated by data availability on real house prices. Austria, Greece, Luxembourg, and Portugal are not included.

<sup>63</sup> Here, and throughout this chapter, “credit” means “credit to total residents granted by monetary financial institutions (consolidated).” This was the only historical series available on a consistent basis for all countries from Eurostat.

interest rates; household formation and other demographic variables; supply side variables; financial market institutions and credit availability; and taxes, subsidies, and other public policies directed toward housing. Income is a key variable, while the effect of interest rates has not been as clearly established, although most results show a negative relationship. After income, the main *long-run* determinant of house prices is household formation. Other researchers reach similar conclusions (e.g. Borio and McGuire, 2004). Schnure (2005) shows that income, unemployment, and interest rates affect housing prices in the United States. Tsatsaronis and Zhu (2004) point to inflation. Others argue that equity prices play a role (Sutton, 2002).

**65. The relationship between house prices and credit and money is not always easy to evaluate.** European Central Bank (2003) notes that the relationship between the change in mortgage debt-to-GDP and house prices is not straightforward. Causality is hard to pin down, as rising mortgage debt may be the result of high prices, not the cause, while any co-movement could reflect a common response to third factors such as interest rates or expected future income growth. But some studies do find clear evidence of a role for monetary variables. Giuliadori (2004), for example, shows that house prices are affected by monetary shocks. Borio and McGuire (2004) argue that monetary policy matters when it comes to the emergence of sequential equity and housing price booms; housing booms tend to lag equity booms, with the lag length depending on interest rates. Moreover, housing price peaks are influenced partly by financial imbalances.

**66. A baseline model is estimated to analyze the short- to medium-run dynamics in real house prices.** The following equation is fitted to the data:

$$\Delta h_{i,t} = \alpha_i + \beta_1 \Delta h_{i,t-1} + \beta_2 \Delta h_{i,t-2} + \beta_3 \Delta d_{i,t-1} + \beta_4 \Delta d_{i,t-2} + \beta_5 \Delta r_{i,t-1} + \beta_6 \Delta r_{i,t-2} + \beta_7 \Delta c_{i,t-1} + \beta_8 \Delta c_{i,t-2} + \varepsilon_{i,t} \quad (1)$$

where  $i$  denotes a country,  $t$  is a time subscript, and  $\Delta$  represents the first difference operator. In terms of the variables,  $h$  is the log of real house prices,  $d$  is the log of real disposable income per capita,  $r$  is the real long-term interest rate, and  $c$  is the log of real credit. Separately, this equation is estimated replacing  $c$  with  $m$ , the log of real broad money.<sup>64</sup> The  $\alpha_i$  component represents a country fixed effect. Therefore, the baseline is a panel regression for the eight countries in the sample, estimated using fixed effects (LSDV). But a more simple equation using pooled OLS was also estimated. Moreover, separate regressions were also run for each country, although the relatively short credit series means that these results

<sup>64</sup> The money series is longer than the credit series, spanning about 30 years, instead of only 20 for credit.



must be interpreted with a great deal of caution.<sup>65</sup> The results are instructive (Table III.3). Not surprisingly, the lagged dependent variable has the most explanatory power, and is significant in most countries, with the notable exception of Germany. In line with other studies, real income per capita is not a major determinant of *short-run* housing price dynamics in the panel, and is significant only in some countries (Germany, Ireland, Finland). The coefficient on the real interest rate has the expected negative sign, and is significant in the panel. Some have argued that nominal interest rates are also important determinants of house price dynamics. Robustness checks (unreported) show that replacing real with nominal interest rates in the baseline equation yields a statistically significant negative coefficient, but that this result no longer holds when including both variables together (real interest rates remain significant). Short-term interest rates are also significant in some specifications. But the real long-term interest rate is the most dominant variable in this class, with a statistically significant coefficient in every specification.

**67. The econometric results show that credit and money help predict real house prices only in some countries.** The coefficients on the real credit growth in the panel regressions are not significant. In the individual country equations, credit seems to matter only in France, Ireland, and Spain. If real credit is replaced by real money, then the results show a significant money coefficient in France, Ireland, Belgium, Finland, and Spain, but not for the panel. One tentative conclusion, therefore, is that credit and money variables have no clear predictive power in explaining short- to medium-term real house prices across the euro area as a whole. The relationship depends on country-specific circumstances.

**68. These results are robust to different panel specifications.** The use of fixed effects in a dynamic panel equation can be criticized, given the noted bias. But Judson and Owen (1999) show that, based on Monte-Carlo experiments, when the time series is long enough relative to the cross-section dimension, the bias inherent in dynamic panel estimation is not large enough to make alternative estimators more desirable. Indeed, they find that the LSDV estimator performs better than alternatives with 30 or more years of data. Others have argued that when the time span covered by the data is reasonably large (around 22), then the application of IV-type estimators to a first differenced version of the dynamic panel model does not seem necessary, and can even lead to a large loss of efficiency (see Haque, Pesaran, and Sharma, 1999). Nonetheless, to check robustness, the model was also estimated using the Arellano-Bond dynamic panel technique. The results are similar, except that the coefficient on the real credit (but not the real money) variable is now marginally significant.

**69. Aside from short- to medium-run dynamics, the long-run determinants of real house prices can also be modeled.** The following long-run equation between real house prices and the previous explanatory variables is estimated:

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<sup>65</sup> Indeed, Belgium was omitted altogether, for data availability reasons.

$$h_{i,t} = \alpha_i + \gamma_1 d_{i,t} + \gamma_2 r_{i,t} + \gamma_3 c_{i,t} + \mu_{i,t} \quad (2)$$

Following this, an Engle-Granger two-step version of equation (1) is then estimated, with the lagged residuals from equation (2) acting as the error-correction variable. Results are shown in Table III.4, both for the baseline model with real credit, and for the real money specification. In the long-run levels specifications, the coefficients of the three key independent variables—real disposable income per capita, real long-term interest rates, and real credit and/or money—are all statistically significant with the expected signs.<sup>66</sup> Thus while there is scant evidence that real income, credit, or money matter for short- to medium-run dynamics, they are important determinants of long-run trends. The conclusions relating to the short- to medium-run dynamics do not change with the introduction of a (statistically significant) error correction component. In particular, while helping drive long-term trends, credit and money aggregates appear not to affect short- to medium-run dynamics.

**70. The literature shows that the effect of monetary policy and conditions on house prices depends largely on institutional factors.** Differences in house price volatility across the area depend to some extent on institutional differences in credit markets between countries. In this context, a number of recent studies have analyzed the extent to which these factors affect house price volatility and the transmission mechanism to consumption. Maclennan, Muellbauer, and Stephens (1999) show that countries with fixed interest mortgage rates, low loan-to-value ratios, high transactions costs, and a smaller owner-occupied sector tended to experience lower house price volatility and smaller consumption effects. France and Germany fit neatly into this category, with Ireland and the United Kingdom at the opposite end of the spectrum. Giuliadori (2004) argues house prices enhance the effect of monetary policy on consumption when mortgage markets are more competitive. In the same vein, Iacoviello and Minetti (2003a) argue that the credit or collateral channel itself depends on these kinds of institutional factors. Tsatsaronis and Zhu (2004) also make a similar point, showing that the impact of credit on housing prices is more muted in countries where lending is conservative and equity withdrawal is rare.

**71. Countries differ across a number of institutional mortgage market characteristics.** Four aspects of mortgage markets are considered:<sup>67</sup>

<sup>66</sup> To capture demographic effects, the long-run equation was also estimated with the log of population as an explanatory variable. This variable did not yield a significant coefficient over the period analyzed; not did it affect any of the other coefficients or standard errors in any significant way. As population varied little in most countries over time (with the exception of Ireland), differences in population would likely be captured by the country fixed effects.

<sup>67</sup> The source of this categorization is Tsatsaronis and Zhu (2004).

- *Mortgage interest rates are variable* instead of fixed (Finland, Ireland, Spain). Variable rates are likely to make house prices more sensitive to short-term interest rates and hence monetary policy.
- *Equity withdrawal is used* (Finland, Ireland, the Netherlands). If households can withdraw home equity to take advantage of low refinancing rates and increased house values, then the credit channel of monetary policy could be enhanced, with knock-on effects for both consumption and house prices.
- *Mortgage assets are securitized* (Ireland, the Netherlands, Spain). If credit institutions can sell excess exposure in the secondary market, this could lead to lower transactions fees and more flexible mortgage contracts, again bolstering the credit channel.
- *The maximum loan-to-value (LTV) ratio exceeds 80 percent* (France, Ireland, Belgium, Spain). Prudential ceilings determine how conservative mortgage lending is, which affects the strength of the credit channel.

72. **The evidence is consistent with a role for institutional factors in explaining the relationship between credit and house prices.** Table III.5 reports coefficients from the variables of interest, when the panel regression is restricted to countries with certain characteristics. In these various sub-samples, there is a clear relationship between real credit and/or real money and real house prices. The results are borne out in each panel specification—LSDV, pooled OLS, and Arellano-Bond—and are especially strong in Arellano-Bond. In particular, the short- to medium-run transmission from real credit to real house prices is more evident in countries characterized by variable mortgage rates, equity withdrawal, and securitization of mortgage assets. Real money seems to affect house prices in countries with high maximum LTV ratios. Also, the coefficient on long-term interest rates is highly significant in every specification, across every sub-group, and tends to be larger than the coefficient in the broader panel.

73. **A tentative conclusion, therefore, is that house prices are more sensitive to both interest rates and credit and money among countries with certain kinds of institutions.** This is in line with previous research, and backs up the conclusions of Tsatsaronis and Zhu (2004) that more aggressive lending practices strengthen the relationship between house prices and credit, and that countries with variable mortgage rates are associated with larger interest rate effects on house prices. These results are robust to different specifications of the interest rate—real and nominal, short-term and long-term. While the results for each sub-sample could be picking up other factors specific to these countries beyond the trait in question, the use of numerous dimensions to capture institutional effects is reassuring.

74. **The affinity for owner occupation can also matter.** Table III.5 also isolates countries with owner occupation rates exceeding both 60 and 70 percent—an institutional

distinction unrelated to financial markets—on the presumption that the relationship between credit and house prices is more pronounced, the more homeownership is entrenched.<sup>68</sup>

Owner occupation exceeds 70 percent in Ireland, Spain, and Italy and 60 percent also in Belgium and Finland. It is particularly low (40 percent) in Germany.

**75. The different interactions between housing and credit/money variables may be partly related to varying patterns of financial liberalization across the EU, reflecting “financial catch-up.”** There are two potential effects at play. First, the convergence of long-term interest rates across countries in the run-up to EMU could have had an impact on credit and house prices in the countries with previously high interest rates. Second, and in parallel, many countries embarked on extensive financial liberalization over this period. Deregulation began in the early 1980s, and the pace varied markedly across countries. Liberalization typically led to more market-based mortgage markets, increased securitization of mortgage loans, higher loan-to-value ratios and an expansion in mortgage debt. These developments increased the sensitivity of house prices to interest rates (Iacoviello and Minetti, 2003b). They also led to a spurt in credit growth across numerous countries, which could reflect an equilibrium adjustment from repressed to liberalized financial markets.

### C. Inflation and House Prices

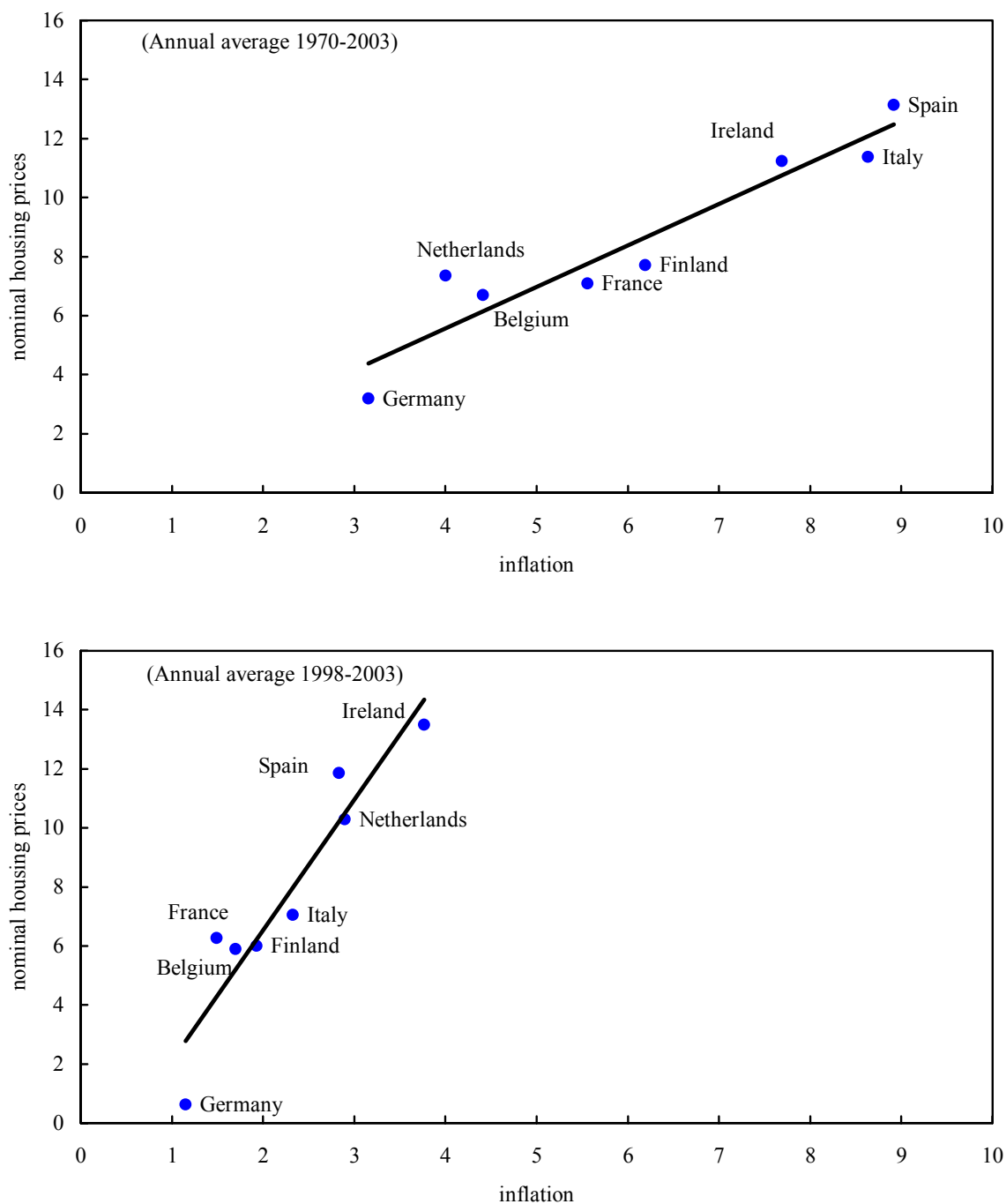
**76. One argument for taking account of asset prices in the conduct of monetary policy is that asset price increases herald future increases in goods and services inflation.** If the wealth or credit effect of house prices on consumption is strong, it might herald an uptick in inflation or inflation expectations, at least in the countries characterized by the “right” institutional framework. Such upside risks to inflation will naturally concern central banks. Indeed, some have argued that, while the relationship between stock prices and subsequent output and inflation is weak, house price movements are a much stronger predictor of future goods market trends (Goodhart, 2001).

**77. Eye-balling the data suggests a positive relationship between house prices and inflation.** Figure III.2 plots the average annual increase in CPI inflation against nominal house price inflation from 1970–2003. A clear relationship is discernible, as those countries with higher housing price growth tend to be those very countries with high goods price growth. Interestingly, the post-EMU picture shows that the relationship has become steeper,

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<sup>68</sup> The source of these data is Guiliodori (2004).

Figure III.2. Inflation and Housing Price Growth in Selected Euro Area Countries  
(In percent)



Sources: BIS calculations based on national data; IMF, World Economic Outlook; and IMF staff calculations.

as larger volatility in house prices is associated with smaller volatility in inflation. Of course, contemporaneous correlation does not imply that house prices actually drive inflation.

**78. But the relationship between lagged asset prices and inflation is not robust in the literature.** In a comprehensive study, Stock and Watson (2001) show that for seven countries—including France, Germany, and Italy—asset prices contain little or no predictive power for inflation through two years. Indeed, they find that the only variables that consistently predict better than simple autoregressions are measures of economic activity, such as the output gap.<sup>69</sup> Some have argued that housing prices convey little information that is not captured in other variables, even if statistically significant (Gilchrist and Leahy, 2002; Cecchetti and others, 2000).

**79. There are some exceptions, however.** Goodhart and Hofmann (2000) find evidence that housing price movements do provide such additional information, while equity prices and yield spreads do not. Using quarterly data on residential property prices for 11 countries, and looking at forecasts up to two years ahead, they find that house prices perform especially well at the two-year horizon. But their sample includes only four euro-area countries (Finland, France, Ireland, the Netherlands) and, within this group, their regressions show housing prices being a significant determinant of inflation only in Ireland.

**80. To explore the short- to medium-run predictive power of house prices for goods prices, a simple empirical forecast model for inflation is fitted to the data.** Specifically, the following equation is estimated:

$$\Delta P_{i,t} = \kappa_i + \delta_1 \Delta P_{i,t-1} + \delta_2 \Delta P_{i,t-2} + \delta_3 \Delta y_{i,t-1} + \delta_4 \Delta y_{i,t-2} + \delta_5 \Delta M_{i,t-1} + \delta_6 \Delta M_{i,t-2} + \delta_7 \Delta H_{i,t-1} + \delta_8 \Delta H_{i,t-2} + \nu_{i,t} \quad (4)$$

where (as before)  $i$  denotes a country,  $t$  is a time subscript, and  $\Delta$  represents the first difference operator. In terms of the variables,  $P$  is the log of CPI,  $y$  is the log of real GDP,  $M$  is the log of broad money, and  $H$  is the log of nominal house prices. The  $\kappa_i$  component represents a country fixed effect. Equation (2) is estimated for the panel of eight countries for which house price data are available. The data are annual, and the sample size varies between 26 and 31, depending on data availability. The baseline is a panel regression estimated using fixed effects (LSDV), but, as before, the equation is also estimated using pooled OLS and the Arellano-Bond dynamic panel technique. Country-specific regression results are also reported.

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<sup>69</sup> Note that output gaps are notoriously difficult to measure in real time, which could lead to inappropriate monetary policy (Orphanides and van Norden, 2002).

81. **This chapter finds scant evidence that lagged house prices help forecast inflation over the short- to medium-run horizon.** With these different estimation techniques, there is no significant evidence that house prices feed through to goods price inflation, at either a one or two year lag (Table III.6). In the country-specific OLS estimation, the only country with a positive and significant coefficient on lagged house prices is Italy. Given the potential non-stationarity of inflation, the equations were re-estimated using the differenced inflation as the dependent variable; Goodhart and Hoffman (2000) undertook a similar exercise. Under this specification, there is still no evidence that lagged house prices contain predictive power for CPI inflation. These results are also robust to certain changes in the baseline, including replacing growth with the output gap, and adding unit labor costs and short-term interest rates. Nor does replacing nominal house prices with real house prices make a difference. Some argue that the effects on inflation may be felt beyond the standard two-year horizon, but adding more lags of house prices does not provide further economic information on inflation or differenced inflation. Furthermore, and perhaps surprisingly, the results do not change when controlling for various institutional differences across credit markets and the degree of owner occupation; the kinds of factors that theoretically should determine the link between house prices and the real economy.

82. **But the results do not rule out the possibility of nominal declines in house prices leading to protracted goods price disinflation, or even deflation.** House price deflation is a relatively rare event. In the present sample, only five episodes of sustained declines in house prices—defined as three or more consecutive years—stand out (Table III.7). Finland and the Netherlands experienced substantial house price deflation, between 1989–93 and 1978–82 respectively. More limited declines occurred in Belgium, France, and Germany. Table III.7 shows the behavior of goods price inflation, before, during, and after these episodes. In Belgium, Finland, and the Netherlands in particular, there was a sharp fall in inflation in the years following the house price bust. Caution is needed in interpreting these trends, however, given that other factors were clearly at play—the post bust period often coincided with more general cyclical conditions that favored low inflation. Nonetheless, it is striking that countries experiencing the largest busts (Finland and the Netherlands) witnessed significant and prolonged disinflation in the post-bust period; both countries recorded the lowest inflation rates in the sample for the respective time periods. The infrequency of large house price busts makes it difficult to disentangle these effects in the empirical evidence. But the true risks to price stability from asset price boom-bust cycles may well be on the downside.

#### **D. The Role of Monetary Policy**

83. **Opinions are divided over how monetary policy should address asset price buildups.** At one end of the scale, many would argue that monetary policy should not accord any special role for asset prices, except to the extent that they affect inflationary expectations (the “hands-off” view). On the other side of the debate, some call for monetary policy to take explicit account of asset prices (the “activist view”). This argument comes in different hues. At the most extreme end, some have even called for the inclusion of asset prices directly in

the index used to gauge price stability.<sup>70</sup> More pertinently, adherents of the activist view have urged central banks to react explicitly to observed asset prices and to “prick” asset price bubbles once they have been properly identified. A third view is more cautious, recognizing both the dangers of action and inaction. Views here have coalesced around the notion that central banks should “lean against the wind” by being tighter than would otherwise be warranted in the face of rising asset prices to contain any bubble developments (see European Central Bank, 2005). As with the activist view, embedded in this approach is a belief that asset prices contain information relevant for price stability, over and above the information contained in the standard indicators.

84. **The “hands-off” approach maintains that monetary policy should reflect asset price changes only to the extent that they impinge on expected inflation.** Bernanke and Gertler (2001) show that a standard inflation-targeting rule—allowing no additional role for asset prices—stabilizes output and inflation, even when asset prices are volatile. This holds whether the boom is caused by fundamentals or not, and there is no additional benefit in responding to asset prices directly. Gilchrist and Leahy (2002) arrive at similar conclusions. While reasonable in theory, it might be unwise for a central bank to *always* eschew paying attention to asset prices, particularly if the trend is widespread. This is especially true in light of the potential financial distress and deflation that could result from an asset price bust.

85. **The “activist” position holds that addressing asset price misalignments can deliver superior inflation performance and reduced output volatility.** This camp believes that standard inflation targeting is myopic to the extent that it focuses on inflation forecasts at fixed (say, two-year) horizons, whereas the full effects of asset mispricing may take more time to materialize (Cecchetti and others, 2000; Cecchetti, Genberg, and Wadhvani, 2002). Adherents of this viewpoint are careful to note that they do not advocate targeting specific levels of asset prices, or responding mechanically to all changes in asset prices the same way; the key is to isolate non-fundamental changes. Dismissing a frequent complaint, they also claim that measuring misalignments is conceptually no more difficult than estimating potential output or equilibrium real interest rates.

86. **Activism faces major implementational hurdles.** The problems are manifold:

- *Discerning between fundamental and non-fundamental asset price movements can be trying.* The position held by Cecchetti and others (2000) is optimal only when the central bank is certain that the asset price boom is driven by non-fundamentals, and when it will burst—conditions unlikely to be met (Bernanke and Gertler, 2001). Even asset price bubbles are driven partly by fundamentals, being typically associated with real factors like high investment and productivity growth (Detken and Smets, 2004;

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<sup>70</sup> See Goodhart (2001) for an exposition of the issues, and European Central Bank (2005) for a detailed description of the conceptual and implementation difficulties that would surround such a proposal.



Filardo, 2004). Moreover, central banks are not privy to private information. A recent survey notes that it is still not possible to isolate asset price bubbles empirically with any degree of clarity (Gurkaynak, 2005). To sum up, in the words of Trichet (2005), “it is very hard to identify them [bubbles] with certainty and almost impossible to reach a consensus about whether a particular asset price boom period should be considered a bubble or not”.

- *Addressing a bubble is fraught with uncertainty.* Even if the central bank is reasonably confident that a bubble exists, any misstep with respect to the timing or magnitude of the required tightening could destabilize the economy (Cogley, 1999; Bean, 2004). A large increase in interest rates would probably be needed, with an adverse impact on economic activity. In particular, success depends on a variety of factors, including when the bubble will burst, how protracted the bust will be, and whether it can be defused at low cost.<sup>71</sup> Thus, the conditions for using monetary policy to tackle asset price misalignments are highly circumscribed and mistakes can be costly.

87. **A key justification for “leaning against the wind” is that it can avoid the build-up of financial imbalances and a subsequent credit crunch** (Borio and Lowe, 2002; Filardo, 2004). Such pre-emption has the advantages of activism without the need to cope with the uncertainties surrounding the identification of asset price bubbles. Based on the premise that a negative shock is worse than a positive one, the policymaker is willing to tolerate being below the central bank’s definition of price stability to take out the necessary insurance in the form of lower inflation than would otherwise be justified (Trichet, 2005). Indeed, safeguarding stability of the financial system is an implicit (if not explicit) mandate of many central banks. As noted at the outset, a fall in housing prices could do substantial harm to the health of the banking system and reduce its willingness to extend credit. Deflation that begins in the housing sector could easily become more widespread. Gros, Mayer, and Ubide (2005) argue that the true cost of permitting bubbles to develop comes in the form of a misallocation of resources and economic stagnation in the bust phase rather than inflation in the boom phase. Moreover, all major deflationary episodes throughout the world have been associated with asset price busts (Trichet, 2005), and the association between housing price declines and disinflation in the euro area is documented in Section C. A further advantage of “leaning against the wind” is that the moral hazard created by central bankers responding asymmetrically to shocks is diminished.<sup>72</sup>

88. **Adherents of “leaning against the wind” note that boom-bust cycles tend to be associated with strong growth in monetary and credit aggregates, often in the context of**

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<sup>71</sup> See Bordo and Jeanne (2002); Gruen, Plumb, and Stone, (2003); and Tetlow (2004).

<sup>72</sup> By loosening in the bust phase but not tightening in the boom, monetary policy can foster excessive risk-taking on the part of investors (Illing, 2001).

**low, stable inflation.** Policymakers are thus called upon to pay close attention to money and credit developments and the concomitant build-up of financial imbalances. In this regard, a number of recent empirical studies stand out. First, Borio and Lowe (2002)—based on an analysis of financial crises in 34 countries—argue that the credit gap (deviations of the credit-to-GDP ratio from trends) tends to be the best leading indicator of financial distress. Second, Detken and Smets (2004)—based on a sample of asset price booms for 18 OECD countries since the 1970s—conclude that real money and real credit growth are higher during the early stages of high cost booms. Moreover, real money growth tends to be significantly higher during asset price booms that lead to serious recessions as opposed to those that do not (Trichet, 2005). Thus money and credit growth could set off warnings bells for future price stability, even in a low inflation environment (Issing, 2005). The co-existence of asset price and credit booms with low inflation could be the bane of central bank credibility, or it could reflect favorable productivity developments (Borio and Lowe, 2004).

89. **This approach to monetary policy is often geared toward longer horizons, and can be used to justify the ECB's monetary pillar.** Supporters of “leaning against the wind” maintain that liquidity indicators contain information on future output and inflation beyond the standard two-year horizon (Borio and Lowe, 2004). The “horizon” position gels nicely with the ECB's two-pillar strategy, whereby the monetary pillar concerns itself with longer-term price pressures. In the same context, Jaeger (2003) argues that having an explicit pillar focusing on money and credit could guard against the build-up of area-wide asset bubbles. Trichet (2005) argues that the ECB's approach is superior to inflation targeting in this regard, even if inflation forecast horizons under the latter are extended beyond the standard 1-2 years. Indeed, the evidence from Section B points to a long-run relationship between real credit/money and real house prices, even in the absence of a clear short-to medium-term one.

90. **All in all, the “lean against the wind” position is attractive, but difficult to operationalize in the euro area.**<sup>73</sup> Some of the difficulties in applying the activist position successfully also apply here. In particular, for “leaning against the wind” to work, the probability of the bubble bursting soon should be low, and the growth in the bubble should be interest sensitive. Also, as demonstrated earlier in this chapter, the relationship between credit and housing prices in the area is not clearly defined, depending on country-specific institutions. In particular, the predictive power of credit and monetary aggregates for real houses prices over the short- to medium-run horizon appears to be confined to a subset of countries: those with more market-based credit markets, more aggressive lending, and higher levels of owner-occupation. Others have noted that asset price booms (and housing price booms in particular) tend to occur more frequently in small countries, and are particularly rare in France, Germany, and Italy (Detken and Smets, 2004; Bordo and Jeanne, 2002). This alone could diminish the adverse impact of a “contagion” effect of a bust phase across

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<sup>73</sup> A similar challenge in operationalizing the ECB's monetary pillar is discussed in Chapter II.

countries. Also, this chapter has shown that there is little evidence of housing prices helping predict goods prices in the short- to medium run. Of course, this does not rule out deflation risks. But the need to keep a watchful eye on both inflationary and deflationary pressures at the same time can prove especially challenging.

91. **Given these concerns, a central bank focusing on potential asset price booms could face communications problems.** This arises from (i) the imprecise link between monetary policy, asset price cycles, and the real sector, (ii) the complexity of the optimal rule, and (iii) the need to match up instruments with goals to ensure accountability (Mishkin, 2001; Issing, 2003). Disyatat (2005) argues that pre-emption against the build-up of financial imbalances really implies putting financial imbalances in the central bank loss function, and this leads to less transparency and greater uncertainty in communications. Communication is harder when asset price trends are at odds with price stability indicators at the standard horizon, and when the central bank needs to signal both upside and downside risks to price stability.

92. **But it would be imprudent to downplay the risks to price stability and economic activity from surging asset prices.** First, financial liberalization can increase asset price volatility, and some have argued that the financial deregulation in Europe from the 1980s onwards contributed to an increase in the number of asset price booms (Detken and Smets, 2004). Second, a low inflation environment increases the risk of deflation in the event of nominal declines in house prices. Moreover, while the boom phase may be localized in certain markets, the damage caused by the bust phase could become more widespread, particularly if combined with limited flexibility in factor markets (Gros, Mayer, and Ubide, 2005).

93. **However, other instruments appear better suited than monetary policy to address house price developments head-on.** Concerns surrounding house price booms may be better addressed at the national level, through fiscal policy measures and financial sector regulation/supervision. In the first instance, policymakers can target the various tax deductions and allowances, as well as subsidies, that provide support to house prices. They could also consider responses such as encouraging fixed-rate mortgages, placing tough prudential upper limits on loan-to-value ratios, and promoting a private rental sector (MacLennan, Muellbauer, and Stephens, 1999). More broadly, Schwarz (2002) argues that capital requirements should be put in place that would increase with the growth of credit collateralized by assets with booming prices. In a similar vein, Borio, Furfine, and Lowe (2001) recommend cyclically sensitive capital requirements (raising them in booms, reducing them in recessions). Using prudential means to control local house prices in a regionally-integrated financial sector, however, raises other problems.

## E. Conclusions

94. **This chapter has argued that the nexus between monetary policy, credit growth, and house prices across the euro area is far from clear.** In particular:

- House prices have behaved very differently across euro-area countries. Also, the relationship between credit, money, and house prices appears to differ.
- The short- to medium-run predictive power of credit and monetary aggregates for asset prices is uncertain, depending on country-specific institutional factors. Most notably, the factors that lend themselves to a more robust link between credit, interest rates, and house prices are generally absent in the largest members. Over the long run, however, real money and credit do help predict real house prices.
- The short- to medium-run predictive power of house prices for goods prices is tenuous. There is little evidence that house price inflation feeds through to goods price inflation. The real risk from the point of view of economic activity might be the consequences of a housing price bust, including deflation—a much rarer, and very harmful, event.

In such an environment, pre-emptive monetary policy is difficult to operationalize for the euro area. Accordingly, other, national, policy instruments—fiscal and financial—might be more appropriate tools to reign in surging asset prices, if deemed necessary.

95. **Looking ahead, many of the problems created by differences in local institutions could potentially be solved by fostering more integrated mortgage markets across the euro area.** For the United States, Schnure (2005) shows that the shift from bank-based mortgage lending to a system of securitized mortgage finance since the mid-1980s was associated with a reduction in the volatility of credit growth and housing prices across U.S. regions. Convergence was fostered by the integration of banking markets and increasing securitization of mortgage loans, leading, in essence, to a national mortgage market. This offers obvious lessons for the euro area. Despite lower interregional migration, there is more divergence of house prices across EU countries than across the different regions of the United States (see Chapter VI). Integration of mortgage markets through securitization across the euro area could potentially bring about similar convergence, also improving the effectiveness of monetary policy.

Table III.1. Selected Euro Area Countries: Real House Price Growth, 1970–2003

	Average	St. Dev	Max	Min	Cumulative
Germany	0.1	2.6	5.8	-4.9	0.7
France	1.4	4.4	9.0	-6.0	55.2
Italy	2.3	10.6	39.6	-11.2	80.3
Ireland	3.4	6.6	18.6	-7.8	184.3
Belgium	2.4	5.8	15.2	-11.0	110.4
Netherlands	3.2	9.1	29.5	-15.5	150.8
Finland	1.3	10.0	28.5	-20.0	30.9
Spain	4.0	10.0	36.1	-9.6	218.4

Source: BIS calculations based on national data.

Table III.2. Selected Euro Area Countries: Credit, House Prices, and Inflation  
(Cumulative change, 1998-2003)

	Credit	Real House Price	CPI
Germany	11.7	0.3	6.5
France	30.3	30.8	8.5
Italy	38.4	30.2	12.6
Ireland	151.4	42.2	22.1
Belgium	12.7	22.3	9.6
Netherlands	56.3	41.9	16.6
Finland	47.9	14.1	10.7
Spain	87.9	62.9	16.2
Average	54.6	30.6	12.9
Standard deviation	46.2	19.1	5.1

Source: Eurostat, BIS calculations based on national data.

Table III.3. Real House Price Equations

(Variables in log differences 1/)

	Real house prices		Real income per capita		Real long term interest rate		Real credit		Real money		R <sup>2</sup>	N
	Lag 1	Lag 2	Lag 1	Lag 2	Lag 1	Lag 2	Lag 1	Lag 2	Lag 1	Lag 2		
Panel												
Fixed effects	0.75***	-0.30***	0.26	0.06	-0.01***	-0.00	0.05	-0.02			0.59	156
Pooled OLS	0.79***	-0.29***	0.23	0.04	-0.01***	0.00	0.05	-0.02			0.58	156
Arellano-Bond	1.50***	-0.64***	0.14	-0.19*	-0.02***	0.01***	0.08*	-0.06				156
Fixed effects	0.66***	-0.19**	0.22	-0.08	-0.01***	-0.00			0.19	-0.04	0.47	223
Pooled OLS	0.67***	-0.18**	0.19	-0.10	-0.01***	-0.00			0.19	-0.05	0.47	223
Arellano-Bond	1.48***	-0.60***	0.19	-0.28*	-0.01***	0.01***			0.17	-0.15		223
Individual countries												
Germany	0.27	0.09	0.14**	0.04	-0.01***	-0.01**	0.24	-0.31			0.71	20
	0.37	-0.04	0.01	0.20	-0.01**	-0.03			0.16	-0.11	0.43	29
France	1.28***	-0.60***	0.02	-0.17	-0.01**	0.01	0.51**	-0.43***			0.91	21
	1.13***	-0.76***	0.29	-0.00	-0.01	0.00			0.44***	-0.07	0.85	27
Italy	0.63**	-0.09	0.41	0.82	-0.02	-0.01	0.15	0.03			0.76	21
	0.01	0.43**	1.07	0.16	-0.02	-0.02***			0.33*	0.48	0.73	26
Ireland	0.53	-0.30***	0.56**	-0.08	-0.02***	0.01	0.07**	0.11**			0.90	18
	0.97***	-0.32**	0.25	-0.09	-0.00	0.00			0.38**	-0.20	0.91	21
Belgium 2/	...	...	...	...	...	...	...	...			...	...
	1.04***	-0.17	-1.10***	0.26	0.00	-0.01***			0.26***	-0.17	0.81	30
Netherlands	0.75***	-0.30	0.10	0.58*	-0.02	0.00	0.24	-0.14			0.64	21
	1.12***	-0.64**	0.45	0.50	-0.03***	-0.00			-0.09	-0.09	0.74	30
Finland	0.61	-0.72**	1.38*	0.60***	-0.02*	-0.00	0.44	-0.21			0.72	21
	0.75***	-0.49***	0.29	0.22	-0.01	0.00			0.77**	-0.47	0.61	30
Spain	0.51	0.01	0.95	-1.62	-0.01	-0.01	0.39*	-0.17			0.56	21
	0.43**	-0.05	0.76	-0.73	-0.02**	0.00			1.32*	-0.61	0.52	30

Sources: BIS calculations based on national data; Eurostat; WEO; OECD.

1/ Real interest rate in differences

2/ The credit series in Belgium was too short for meaningful analysis.

\*\*\*= t-statistic significant at 1 percent level; \*\*= t-statistic significant at 5 percent level; \*= t-statistic significant at 10 percent level.

Table III.4. Real House Prices: Error Correction Model

(Variables in log differences) 1/

Variable		Real credit		Real money	
		Long-term	Short-term	Long-term	Short-term
Real house prices	Lag 1		0.75***		0.68***
	Lag 2		-0.16**		-0.06*
Real income per capita	Level	0.65***		0.67***	
	Lag 1		0.17		0.16
	Lag 2		0.05		-0.05
Real long-term interest rate	Level	-0.02***		-0.01***	
	Lag 1		-0.01***		-0.01***
	Lag 2		-0.00		-0.00
Real credit	Level	0.19***			
	Lag 1		0.04		
	Lag 2		-0.02		
Real money	Level			0.13*	
	Lag 1				0.14
	Lag 2				-0.08
Error Correction			-0.12***		-0.13***
R <sup>2</sup>		0.68	0.63	0.59	0.52
N		178	156	245	223

Sources: BIS calculations based on national data; Eurostat; WEO; OECD.

1/ Real interest rate in differences

\*\*\*= t-statistic significant at 1 percent level; \*\*= t-statistic significant at 5 percent level;

\*= t-statistic significant at 10 percent level.

Table III.5. Institutional Factors, Credit, and Real House Prices

(From the baseline regression in Table III.3):

Institutional Variable	Countries	Specification	Coefficients 1/		
			Interest rate	Real credit	Real money
Variable rate mortgages	Finland	Pooled OLS	-0.02***	0.12*	0.62***
	Ireland	Fixed effects	-0.02***	0.14**	0.62***
	Spain	Arellano-Bond	-0.02***	0.10***	0.54***
Equity withdrawal	Finland	Pooled OLS	-0.02***	0.08**	0.06
	Ireland	Fixed effects	-0.02***	0.08**	0.04
	Netherlands	Arellano-Bond	-0.03***	0.15***	0.07
Securitization of mortgage assets	Ireland	Pooled OLS	-0.02**	0.09*	0.09
	Netherlands	Fixed effects	-0.02**	0.11**	0.09
	Spain	Arellano-Bond	-0.02**	0.12***	0.06
Max loan-to value ratio above 80 percent	France	Pooled OLS	-0.02**	0.03	0.45***
	Ireland	Fixed effects	-0.02**	0.04	0.44***
	Belgium	Arellano-Bond	-0.01***	0.04	0.38***
Owner occupied housing exceeds 60 percent	Ireland	Pooled OLS	-0.02***	0.04	0.51***
	Spain	Fixed effects	-0.02***	0.04	0.52***
	Italy	Arellano-Bond	-0.02***	0.04	0.40***
	Belgium				
Owner occupied housing exceeds 70 percent	Finland				
	Ireland	Pooled OLS	-0.02**	0.10*	0.36*
	Spain	Fixed effects	-0.02**	0.11**	0.36*
	Italy	Arellano-Bond	-0.01***	0.11***	0.21**

Sources: Table III.3, Tsatsaronis and Zhu (2004); Guiliodori (2004).

1/ First lag only. Interest rate coefficient derived from credit equation.

\*\*\*= t-statistic significant at 1 percent level; \*\*= t-statistic significant at 5 percent level; \*= t-statistic significant at 10 percent level.



Table III.6. Inflation Equations

(Variables in log differences)

	CPI Lag 1	Lag 2	Real GDP Lag 1	Lag 2	Broad money Lag 1	Lag 2	House prices Lag 1	Lag 2	R <sup>2</sup>	N
<b>Panel-- inflation</b>										
Fixed effects	0.98***	-0.15	0.11	0.12**	0.06**	0.03	0.01	-0.02	0.87	238
Pooled OLS	0.99***	-0.14	0.10	0.11*	0.05**	0.03	0.02	-0.02	0.87	238
Arellano-Bond	1.57***	-0.63***	0.07	-0.06	0.03	-0.02	0.03	-0.01		238
<b>Panel-- differenced inflation</b>										
Fixed effects	0.07	-0.12	0.15*	0.20***	0.02	-0.00	0.01	-0.05**	0.19	233
Pooled OLS	0.08	-0.11	0.13	0.19***	0.02	-0.00	0.01	-0.05***	0.18	233
Arellano-Bond	0.83***	-0.23**	0.05	-0.01	0.02	-0.03**	0.02	-0.04**		233
<b>Individual countries-- inflation</b>										
Germany	0.35**	0.02	0.02	0.16	-0.18	0.05	0.09	0.29	0.71	31
France	1.16***	-0.29	0.19	-0.04	0.02	0.00	0.06	0.00	0.95	27
Italy	0.78**	-0.08	0.87**	-0.79*	0.11	0.01	0.12*	0.01	0.93	26
Ireland	1.0***	-0.24	-0.15	0.22	0.13	0.04	0.03	0.02	0.88	31
Belgium	1.0***	-0.19	0.50***	0.16	0.10	0.03	-0.17	0.10	0.86	31
Netherlands	1.12***	-0.28	0.18*	0.28	0.05**	-0.02**	-0.06	0.04	0.86	31
Finland	1.09***	-0.26	0.28*	0.20	0.08	0.11	-0.03	-0.11	0.91	31
Spain	0.63***	0.27	0.57	0.11	0.19	0.03	-0.06	-0.05	0.97	30

Sources: BIS calculations based on national data; Eurostat; WEO; OECD.

\*\*\*= t-statistic significant at 1 percent level; \*\*= t-statistic significant at 5 percent level; \*= t-statistic significant at 10 percent level.

Table III.7. Selected Euro Area Countries: Nominal Declines in House Prices and Inflation

	Decline in House Prices (Cumulative)	Average CPI inflation		
		Before 1/	During	After 1/
Belgium 1980-1983	-7.4	6.4	8.0	3.0
Finland, 1989-93	-36.2	4.9	3.5	1.1
France, 1991-97	-6.6	3.2	1.9	1.4
Germany, 1983-87	-6.0	5.7	1.1	2.2
Netherlands, 1978-82	-26.5	7.9	5.9	1.5

Sources: BIS calculations based on national data; Eurostat; OECD.

1/ Average of five years.

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## IV. THE INTEGRATION OF EUROPEAN FINANCIAL MARKETS<sup>74</sup>

### A. Introduction

96. **This chapter reviews the state of integration of Europe's financial markets, drawing mainly on existing assessments, as well as the major remaining obstacles.** Whenever convenient, the paper illustrates ongoing financial integration with the convergence of prices of similar financial products, the crossborder correlation of returns, and developments in crossborder financial flows. But the focus is mainly on how developments in the architecture of financial markets have advanced integration, including as a result of the EU Financial Sector Action Plan. Section A reviews the evolution in the markets for money, government and corporate bonds, securitization, interest rate derivatives, and equities. It concludes with a review of post-market infrastructures and retail finance. Section B discusses the FSAP and the evolving regulatory landscape. Section C concludes.

### B. The Current State of Financial Integration in Europe<sup>75</sup>

#### Money Markets

97. **The interbank money market is basically fully integrated, which is crucial for the conduct of a single monetary policy and to integrate financial markets.** Domestic interbank money markets fully converged, merging into a single, unified euro interbank money market with the launch of the euro. This was the result of careful preparation, including the development of area-wide reference rates (EONIA and Euribor) and the building of cash payment system infrastructures (TARGET and EURO1).<sup>76</sup> According to ECB survey data, cross-border interbank transactions (measured by the number of counterparties) represented about 54 percent of all interbank transactions in 2004.<sup>77</sup>

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<sup>74</sup> Prepared by Francois Haas (ICM).

<sup>75</sup> See Appendix IV.A for illustrations.

<sup>76</sup> TARGET (Trans-European Automated Real-time Gross settlement Express Transfer system), is run by the ECB and National Central Banks. EURO1, a net settlement system, is run by the Euro Banking Association.

<sup>77</sup> The percentage of cross-border interbank transactions has declined slightly in the last 3 to 4 years, possibly reflecting the redistribution role performed by large banks to the benefit of smaller banks within countries and, within large banking groups, the concentration of treasury activities at the home country level.

98. **However, repo markets remain largely segmented along domestic lines.**<sup>78</sup> This reflects mainly the fragmentation of crossborder security clearing and settlement procedures rooted in differences in domestic legal and tax frameworks, technical requirements, and market practices. Some means are available to overcome hurdles (e.g., the Correspondent Central Banking Model—CCBM—for the monetary authorities and the triparty repo for market participants). Nevertheless, this fragmentation raises the cost of cross-border repo transactions, limits the pool of collateral that is effectively and readily available to market participants, and thus impairs the efficiency of the euro money market.<sup>79</sup>

99. **Furthermore, fragmentation also affects the market for short-term securities, notably those of financial and corporate issuers.** Key factors are the multiplicity of settlement circuits and differences in legal frameworks and disclosure requirements applying to issuers. As a result, well-established domestic markets and a newer, euro Commercial Paper (CP) market in London—where issuance of private CP has increasingly concentrated—operate side by side with few connections. This euro CP market has proved very dynamic and innovative, growing significantly in size and reaching a stock of securities of about euro 400 billion by June 2004.

100. **For a truly euro area-wide money market to emerge, further changes are thus necessary.** The Undertakings of Collective Investment in Transferable Securities (UCITS III) directive, which awaits implementation, is expected to harmonize the investment rules applying to money market funds and removes limitations on investment in commercial paper and other short-term securities. In addition, issuance practices and market conventions are still heterogeneous. In response, proposals to enhance standardization of money market securities, such as the Short-Term European Paper (STEP) project, have been put forward by market participants. Whether the short-term securities market can be integrated without

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<sup>78</sup> A repurchase agreement (or repo) is an agreement between two parties whereby one party sells to the other a security at a specified price with a commitment to buy the security back at a usually pre-agreed later date, for a specified price. According to the European Repo Council, the gross size of repo transactions in euro amounted to euro 3.2 trillion in mid-2004, more than twice the estimated size in June 2001.

<sup>79</sup> The CCBM is designed to allow Eurosystem counterparties to use eligible collateral issued (i.e. registered or deposited) in other euro area countries, by transferring collateral to an account maintained by the national central banks (NCBs) in the “issuing” Securities Settlement System (SSS). The local NCB will act as a correspondent central bank (CCB). In triparty repo transactions, the collateral and the cash are delivered by the trading counterparts to an independent custodian bank or clearing house which is responsible for ensuring the maintenance of adequate collateral value.

active support of European and national domestic authorities, however, remains an open question.<sup>80</sup>

### **Government bond markets**

101. **EMU has fostered a deeper, more liquid, complete, and increasingly integrated government bond market.** The convergence of yields shows the degree of integration of euro-area government bond markets. Furthermore, in the wake of EMU the volatility of yields has declined significantly and has been increasingly driven by common factors. Of course, some yield differences should be expected to persist because government bonds in the euro area are not perfect substitutes: countries carry different credit risks and there is no area-wide “bail out” mechanism.

102. **Monetary union undid the segmentation that national currencies created in sovereign debt markets, introducing direct competition for an increasingly international pool of investors.** The challenge for public debt managers is therefore to secure the attractiveness not only of their own debt, but more generally, of the euro government bond market, combining competition and cooperation.<sup>81</sup> The harmonization of secondary market conventions, new issuance policies (the publication of auction calendars, the promotion of fungible benchmark issues, and the increased use of syndication), and active debt management on the secondary market have contributed to increasing the homogeneity, transparency and liquidity of public debt markets. Simultaneously, competing government debt issuers have expanded the range of products offered to investors.<sup>82</sup>

103. **The transformation of secondary market infrastructures, notably growing electronic trading, has facilitated the integration of government bond markets,**

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<sup>80</sup> The STEP task force has been set up by the ACI-Euribor. Its recommendations for the establishment of a European market for short-term securities include, in particular, the use of a single set of market conventions and standardized information memorandum by issuers. While the ECB is supporting the launch of a “STEP label” it has not had the same catalytic role as for the EONIA initiative in 1998–99.

<sup>81</sup> While there is no formal coordination of issuance policy between the debt agencies and treasuries, different venues, such as the EFC Sub-Committee on EU Government Bills and Bonds Markets allow for technical discussions and exchanges of information.

<sup>82</sup> Constant maturity bonds, inflation-indexed bonds and, more recently, ultra-long maturity bonds. With a rapidly aging European population and in the context of a reform of public pension systems, ultra-long fixed income securities are expected to meet a growing demand from institutional investors with long term liabilities, such as pension funds and life insurers, and ultimately provide the necessary anchor for the development of new investment products.



**including the narrowing of spreads.** The MTS network has become the main cash trading platform for European government bonds. It provides real time quotations from selected market makers to a wide range of professional participants, and automated electronic execution. Through market making obligations imposed on the participating dealers these platforms contribute to enhancing the liquidity and transparency of the secondary market. The characteristics of these electronic platforms, in particular liquidity arrangements and the organization of pre-trade transparency, may raise important issues regarding the resilience of the liquidity offered by these platforms, including somewhat “artificial” liquidity.<sup>83</sup> Specifically, an important question in the context of the Financial Services Action Plan (FSAP) and the discussions surrounding the implementation of the Directive on Financial Markets Instruments (MiFID), is how pre-trade transparency affects the supply of liquidity, including the activities of large market participants.<sup>84</sup>

### **Corporate bond markets**

**104. EMU turned largely currency-driven domestic markets, dominated by highly-rated financial issuers, into an integrated and more diversified euro market.** Issuance of non-government bonds by euro-area players grew significantly in years surrounding the introduction of the euro: non-government bond issues jumped from euro 273 billion in 1998 (less than 26 percent of the US volume) to euro 657 billion in 1999 (more than 74 percent of the US level), and stabilized in following years.

**105. Investment strategies of institutional investors underscore the area-wide nature of the corporate bond market.** The adoption of the euro has been associated with a large increase in the asset share of internationally investing bond funds, mostly at the time of the changeover. A similar shift took place in the investment policies of pension funds and life insurance companies. By 2003, in all euro-area countries more than half of the assets of bond funds were invested with an area-wide strategy. As a result, the role of country-specific factors behind bond prices and spreads relative to international and industry-specific factors

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<sup>83</sup> The MTS system organizes quoted prices so that the best bid and offer prices are displayed, but layered behind these are a “depth of book” (i.e., other market makers’ prices that will be used when larger trades come through). This approach has many advantages: market makers can quote prices that are, in effect, conditional on the strength of demand; and traders can rapidly execute large complex trades, confident that they are getting the best price for each trade.

<sup>84</sup> Madhavan and Porter (2001) find that on the Toronto Stock Exchange, the increase in pre-trade transparency (public dissemination of the limit order book) had detrimental effects on liquidity (volatility and execution costs), and on the depth of the market.

has been declining. In Denmark, Sweden, and the United Kingdom, by contrast, the share of bond funds with a Europe-wide strategy has remained stable between 1998 and 2001.

**106. The integration of investment banking activities has mainly benefited Europe's larger corporations.** Underwriting fees on corporate bond issues have been declining as investment banks realized economies of scale and barriers to entry in the underwriting businesses fell.<sup>85</sup> The high degree of competition that characterizes the conduct of investment banking activities in Europe today is, to a large extent, related to the greater role played by US investment banks, which have expanded their market share. This situation of growing integration and competition in the provision of investment banking services for large corporations contrasts significantly with the fragmented financial markets facing Europe's small and medium-sized enterprises.

### **Securitization markets**

**107. Securitization, virtually non-existent in the mid-1990s, has been expanding rapidly but remains underdeveloped.**<sup>86</sup> A key obstacle to a deeper market is the absence of a common legal framework for pan-European securitization programs. The securitization landscape in Europe appears more like an aggregation of local markets, based on the use of different techniques and instruments. The United Kingdom's dominant share in European securitization (assets originating from the United Kingdom represented 43.2 percent of ABS issuance in 2004 and close to 56 percent of MBS issuance) and, at the other end of the spectrum, the marginal volume of cash securitization originating from Germany (3.3 percent of the volume of new issuance) illustrates this situation.<sup>87</sup> In the securitization market, maybe more than in other market segments in Europe, the need to overcome differences in legal frameworks and market fragmentation has translated into the development of "high-tech" financial products, based on sophisticated financial engineering.

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<sup>85</sup> Average gross fees in the euro denominated corporate bond market halved in 1999 (from 1.7 to 0.8 percent), and have remained around 0.6 percent since then, a level similar to the United States.

<sup>86</sup> In 2004, new issuance of Asset Backed Securities (ABS) and Mortgage Backed Securities (MBS) grew by 15 percent and 10 percent, respectively, in Europe, to euro 105.1 and 138.5 billion, respectively. New issuance grew by 53.2 percent (to euro 896.6 billion) and 12.4 percent (to US dollar 387.4 billion) in the US. The latter figure refers to private-label MBS. When taking into account Agency MBS and Collateralized Mortgage Obligations (CMO) issuance, overall new issuance in the US declined by 42.6 percent (to US dollar 1.76 trillion).

<sup>87</sup> In 2004, the "True Sale Initiative" became operational, and should facilitate the development of a securitization market in Germany.

108. **Covered bond markets, by contrast, have a stronger footing in Europe.** Balance sheet securitization represents an important segment of European financial markets: the size of the EU covered bond market stood at more than euro 1.5 trillion at the end of 2004, representing around 20 percent of the total European bond market. From Germany, the covered bond model has spread across Europe, including the United Kingdom.

### **Interest rate derivatives markets**

109. **Interest rate derivatives developed significantly since EMU.**<sup>88</sup> The growth of over-the-counter (OTC) euro-denominated futures has been especially significant at the short end of the market, where the development of liquidity management tools went hand in hand with the high degree of integration in the euro interbank money market.<sup>89</sup> For exchange-traded derivatives, the transition to euro-denominated contracts after a period of fierce competition between exchanges and products, has ultimately resulted in the concentration of liquidity and activity in two sets of contracts: the Euribor-based 3 month Euronext-Liffe contract, and the series of German government debt-backed contracts developed by Eurex-Deutsche Boerse.

### **Equity markets**

110. **In equity markets, the strength of integration trends is less clear-cut.** Equities show an increased correlation of price movements across countries and a convergence of premiums.<sup>90</sup> This might reflect an increased synchronization of fundamentals among euro-area countries as well as the fact that the larger, listed firms are increasingly globally-operating companies. At the same time, the correlation of sector returns appears to have risen as well.

111. **Consolidation of trading infrastructures is proceeding but significant fragmentation remains.** The three main trading platforms—Euronext group,<sup>91</sup> which ties markets of different sizes in a decentralized but technically uniform trading environment, Deutsche Boerse Group, and the London Stock Exchange—offer different organization

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<sup>88</sup> Daily average transactions in over-the-counter interest rate derivatives denominated in euro represent, according to the 2004 BIS survey of derivatives markets, 45 percent of OTC interest rates derivatives (forwards, swaps and options), ahead of US dollar denominated contracts (33.9 percent).

<sup>89</sup> Interest rate swaps indexed on the overnight euro reference rate are estimated to represent an daily average turnover of euro 40 billion.

<sup>90</sup> See, for example, Adjaouté and Danthine (2004).

<sup>91</sup> The Euronext group brings together the stock markets of Paris, Brussels, Amsterdam, and Lisbon, as well as the LIFFE derivatives exchange.

models. Competition between established stock exchanges and from new trading devices (multilateral trading facilities and the internalization of orders) benefits issuers and investors through a decline in trading costs. Nonetheless, the current situation remains unsatisfactory in many respects. Competing platforms can result in a fragmentation of liquidity, a risk which the trading architecture promoted by the recent MiFID might amplify.

## **Post-market infrastructures**

**112. Inefficiencies in the clearing and settlement of cross-border securities transactions and the absence of a clear, widely agreed model for the future organization of the industry represent a major hurdle toward an integrated area-wide financial market.** In contrast with market participants, who have adopted an increasingly global approach to European financial markets, clearing and settlement infrastructures remain organized around pre-existing domestic structures. In 2001, the Giovannini group identified 15 barriers to cross-border securities transactions, arising from differences in technical requirements, market practices, domestic tax procedures, and domestic laws and regulations (Appendix IV.B). The group proposed a global strategy combining actions by market participants and public authorities to remove these barriers. The removal of these barriers will not necessarily dictate how the structures of the clearing and settlement industry will evolve, but can be expected to increase the pressure for the consolidation of post-market infrastructures.

**113. The post-trading treatment of transactions is complex and a source of additional costs and delays for crossborder transactions.** European and non-European investors seeking to diversify their portfolios across Europe face largely identical technical difficulties in the settlement of their crossborder transactions and have expressed similar discomfort with the current situation. Different crossborder clearing and settlement channels are available.<sup>92</sup> Global custodians and ICSDs appear to be the most common venue for crossborder transactions in European financial markets, as they offer a single entry point, in particular for non-euro resident investors who have no “natural” base in any euro-area country. As a result of the fragmentation, crossborder clearing and settlement involve multiple intermediaries. This raises costs, magnifies credit and operational risks, and contributes to delays for market participants.<sup>93</sup>

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<sup>92</sup> They can rely on local/correspondent banks, who are members of the foreign Central Securities Depositories (CSDs), operate through an International Central Securities Depository (ICSD) or a global custodian, or use, when available, direct links between CSDs (such direct links do not exist between all CSDs and, furthermore, often offer only “free-of-payment” securities transfer facilities, meaning that the cash component of the transaction has to be processed independently, through another system).

<sup>93</sup> Direct costs comparisons are difficult, due to differences in fee structures and services. Based on a bottom-up approach, Deutsche Boerse/Clearstream estimated that the average

(continued...)

114. **Consolidation in the clearing and settlement industry has taken different forms at the domestic and European levels, but remains incomplete.** The Euronext/Clearnet-LCH/Euroclear partnership illustrates the horizontal approach to consolidation among institutions providing similar services. This approach contrasts with the more vertical consolidation in the Deutsche Boerse group, where trades concluded on the Xetra (cash) or Eurex (derivatives) platforms are cleared, netted, and settled through subsidiaries of Deutsche Boerse.

115. **Given the importance of clearing and settlement arrangements for achieving a truly integrated financial market, the European Commission has now focused on the issue.** The MiFID is expected to contribute to improving crossborder clearing and settlement efficiency, as it extends the rights of market intermediaries (investment firms and banks) and regulated markets to access Central Counterparties and Securities Settlement Systems located in other member states under non-discriminatory conditions. Furthermore, investment services providers are now granted the right to choose the settlement location for their transactions (but not the right to choose their clearing location), thus eliminating the need to maintain multiple memberships in Securities Settlement Systems. This partial opening to more competition, however, will need to be complemented in a forthcoming framework directive to further advance integration.

## **Retail finance**

116. **Retail financial services, for individuals and small and medium-size businesses, remain highly fragmented.** Limited convergence of interest rates—to the extent measurable given the diversity of products—suggests that the market for consumer loans shows very little integration. By that measure, the mortgage market appears somewhat more integrated, possibly reflecting collateralization, which reduces the need for monitoring and enables securitization and competition. Nonetheless, crossborder activity remains marginal (only 1 percent of European consumers are believed to take mortgage loans from other member state institutions). While the costs of mortgages appear to be fairly uniform across countries, available mortgage products differ across national markets.<sup>94</sup> Integration has begun in the

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cost per transaction was between 29 percent (wholesale transactions) and 152 percent (retail transactions) higher in crossborder operations than in domestic operations. The 2001 Giovannini report also offers an indirect estimate of differences in costs for domestic and crossborder transactions, based on per-transaction income of CSDs and ICSDs, with the cost of the latter being up to 11 times higher than the cost of the former. Furthermore, according to a 2004 NERA/City of London study, direct clearing and settlement costs in Europe are significantly higher than in the United States, for domestic transactions (by a range of factors from 3 to 8, depending on the market) and even more for cross-border transactions (by a range of factors from 5 to more than 300, depending on the channel of settlement).

<sup>94</sup> In December 2004, the Forum Group on Mortgage Credit released a report, and offered a series of 48 recommendations to the European Commission on how to better integrate

(continued...)

market for time deposits but not for savings deposits, possibly because of the role of taxation and regulation.

### **C. The FSAP and the Evolving Regulatory Landscape**

#### **Key aspects of the Financial Services Action Plan**

**117. The purpose of the Financial Services Action Plan (FSAP) is to remove regulatory and market barriers that limit the cross-border provision of financial services and the free flow of capital within the EU.** The FSAP is a multi-faceted approach that addresses the major issues of financial market organization, seeking to create a level playing field among market participants and to support the integration of European financial markets (Appendix IV.C). The FSAP and the additional measures that have been agreed in response to market developments are the backbone of the future architecture of European financial markets.<sup>95</sup> They comprise a number of interlocking projects and directives, three of which are particularly far-reaching with respect to the development of markets.

**118. The Markets in Financial Instruments Directive (MiFID) is, to a large extent, the cornerstone of the FSAP.** The MiFID has the potential to strongly reshape European financial markets, starting with equity markets. The directive will provide securities firms with an updated EU passport, allowing them to offer a range of financial services across member states on a “home country control” basis. Key features of the directive are the promotion of open market architecture, competition between regulated and unregulated markets, and the search for a balance between market efficiency and investor protection, in particular through complex order execution and transparency rules. Following requests from the Member States and industry, the EU Commission proposed on June 20, 2005 to extend the transposition and implementation deadlines for the MiFID by six months each, thus delaying full implementation by a year until April 30, 2007.

**119. Two further directives—the prospectus and transparency directives—are particularly important.** They seek to unify the rules imposed on issuers regarding financial information. The absence of harmonized financial disclosure rules for European corporations

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mortgage markets across the EU, addressing issues such as consumer confidence (harmonization of early repayment fees, harmonization of the way the Annual Percentage Rate Charge is calculated), legal and collateral framework (need to avoid conflicts of law, facilitate cross-border mortgage contracting, flexibility of the link between mortgage debts and the collateral security), and distribution of mortgage products (equal treatment between local and foreign banks).

<sup>95</sup> The FSAP was endorsed by the European Council in March 2000, with the deadline for the adoption of EU-level legislative measures set for 2005.

and the general shortcomings in available financial information have frequently been pointed out by international investors. Together with the unification of the accounting framework, these directives seek a significant improvement: investors (particularly retail investors) will benefit from better and more homogeneous information, while issuers will be able to issue across EU markets on the basis of a single prospectus.<sup>96</sup> Regarding bond issues, the disclosure requirements imposed on issuers vary depending on whether they are deemed to target wholesale or retail investors.<sup>97</sup> There are fears that this new framework may prove excessively cumbersome and expensive, particularly for non-European companies. Some companies are already choosing to list their shares and eurobonds in venues that are unregulated in the sense of European Directives.<sup>98</sup> By offering investors and issuers additional choice, these developments should contribute to the completeness of European financial markets. A risk, however, is that they foster the creation of opaque, unlisted markets that would weaken the benefits of the new framework for investor protection.

### **The Lamfalussy process**

120. **The so-called Lamfalussy process is the major vehicle for the design and the implementation of the FSAP regulatory work.** Its objective is to speed up the legislative process, deliver more uniform and better technical regulation, and facilitate supervisory convergence. Initially limited to the securities markets, the Lamfalussy process was extended in November 2003 to the banking, insurance, and pension sectors as well as to the mutual funds industry. It is organized in four layers:

- The core principles of legislation take the form of directives and regulations adopted by the political bodies, the European Council and the Parliament (Level 1), on the basis of proposals prepared by the Commission.
- Technical implementation of framework directives and regulations is done by the European Commission, on the basis of recommendations made by high level

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<sup>96</sup> Significant differences remain, however, in domestic corporate laws, for instance regarding bankruptcy procedures, and may call for further harmonization.

<sup>97</sup> Bond issues with a minimum denomination of € 50,000 are exempt from most of the directives' requirements.

<sup>98</sup> The Alternative Investment Market, a component of the London Stock Exchange, has relinquished its status as a Regulated Market to become an "Exchange Regulated Market." Similarly, Euronext launched a new "organized" but unregulated market (Alternext), accessible to equity issuers with limited requirements, but still offering investors more guarantees than the so-called "free markets". In the Eurobond market, similar initiatives have been launched in London, Luxembourg, Switzerland, and Norway.

regulatory committees (Level 2), in consultation with Level 3 committees, and users and experts from the industry.<sup>99</sup>

- The implementation of EU legislation at the national level is the task of expert committees composed of national regulators and central banks (Level 3).<sup>100</sup> Level 3 committees are responsible for supporting a consistent day-to-day implementation of EU legislation, by issuing guidelines and reviewing national regulatory practices.
- Compliance with and enforcement of legislation by member countries is mainly the responsibility of the European Commission (Level 4).

121. **It will take several years for the benefits of implementation measures to fully materialize and thus it is too early to draw strong conclusions on the impact of the FSAP and Lamfalussy process.** The adoption of most Level 1 legislation is an initial success for the Lamfalussy framework. Level 2 and 3 committees are now taking the center stage, with responsibility for the technical transcription of framework directives and their implementation in member states. For developments on the ground, much will depend on how Level 2 and 3 committees, particularly the latter, conduct their work. The role of such committees will be especially important in areas where the principle of the single passport granted by the home country has to be implemented, and where cross-border competition can be seriously undermined by host-country regulation. At both Level 2 and 3, a significant further strengthening of cooperation between national authorities will be required to avoid risks of “renationalization” of regulation (Level 2) and to ensure the convergence of supervisory practices (Level 3), in lieu of a single “federal” regulator/supervisor.

122. **The implementation of MiFID illustrates the operation of the FSAP and the Lamfalussy process and offers a major test.** The directive is a compromise between initially significantly diverging domestic approaches to market regulation. Key will be the ability of the Committee of European Securities Regulators to foster genuine cooperation by national authorities in the design of the implementing measures to achieve a convergence of supervisory practices, preserve the directive’s cohesion, and avoid its dilution.

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<sup>99</sup> Level 2 Committees are the European Securities Committee, the European Banking Committee, and the European Insurance and Operational Pensions Committee.

<sup>100</sup> The Committee of European Securities Regulators (CESR), the Committee of European Insurance and Occupational Pensions Supervisors (CEIOPS), and the Committee of European Banking Supervisors (CEBS).



## D. Summary and Outlook

123. **The establishment of EMU has been a major force in the transformation of financial markets in Europe.** The dynamics associated with the creation of the euro, the removal of exchange rate risk and restrictions on holdings of foreign assets, and the implementation of a common monetary policy have significantly accelerated the pace of financial integration. From the point of view of market participants integration should allow access to the entire market without the need for establishing local presences and comply with different sets of rules. These are essential conditions for the development of crossborder flows and an efficient functioning of financial markets. The FSAP and the Lamfalussy process seek to put these conditions in place, by building a common rules book for financial service providers and securities markets and by seeking the convergence of supervisory practices.

124. **However, the progress with respect to integration has been uneven.** The contrast between the growing integration of wholesale financial markets and the continued fragmentation of retail-oriented financial services is striking, although the latter are expected to benefit indirectly from integration of the former. In general, unsecured markets (e.g., the interbank money market) exhibit a much higher level of integration than securities and collateralized markets. Among securities markets, bond markets appear more integrated than equity markets. The former are essentially over-the-counter (OTC) markets, targeting primarily institutional investors, while the latter are largely regulated markets, with an active base of retail investors. Whether cash or derivatives, OTC markets, which are more flexible, have been spearheading financial innovation in Europe.

125. **Furthermore, various critical issues have yet to be addressed and the Commission's "Green Paper on Financial Services Policy (2005–10)" is proposing key steps:**

- **The creation of an integrated and barrier-free clearing and settlement system is a crucial element for the completion of an integrated and efficient European capital market.** The obstacles to efficient cross-border settlement are not only technical but also legal, grounded in differences in national corporate laws. Therefore, removing these barriers will ultimately require complementary actions by market participants and public authorities. This process should be market-driven, whenever possible, rather than following a centrally-imposed blueprint. However, different market players may have different interests—as traders, asset managers or providers of brokerage and custody services—and thus a collective vision may not emerge, leading to the loss of important, network-related returns to scale. At this stage, the authorities should, as a first step, foster effective competition and choice by promoting and enforcing the principles of interconnectivity and unrestricted access to post-market services.
- **The existing single market framework for investment funds needs further development, especially given Europe's need for retirement savings ahead of the**

**looming demographic shock.** The European fund management industry is believed to represent over euro 10 trillion in assets, roughly the size of EU-15 GDP. Despite a succession of regulatory steps, including the recent UCITS III directive, the asset management industry in Europe still operates in a largely fragmented environment, where legal and tax barriers hamper the development of crossborder investment products. In 2003, only 18 percent of investment funds, representing 31 percent of assets under management, were considered “true” crossborder funds. The industry has identified some priorities, including simplifying notification procedures for “passporting” funds; facilitating crossborder fund mergers; recognizing asset pooling techniques; allowing flexibility in the choice of depository and fund administrators; and eliminating discriminatory tax barriers.<sup>101</sup> But this process is likely to take time. The creation of a “26<sup>th</sup> regulatory regime” (i.e., investment products that would largely “bypass” national regulations in favor of a common body of core European rules in terms of investor/consumer protection) could accelerate the provision of cross-border investment services and foster the convergence of national regulations.

- **An EU framework for alternative investment vehicles may be required too.** Considering the evolution of the financial services industry and the changes in asset markets in recent years, the scope of the single passport for investment companies may need to be adjusted and complemented to cover hedge funds, private equity and venture capital funds, and real estate and commodity funds. Specific regulations covering these funds have been implemented in various European countries in recent years, in a rather uncoordinated and unharmonized way, adding to the fragmentation of the industry.
- **The benefits of financial integration have been hardly felt on retail markets up to now, and the FSAP contains few retail-oriented initiatives.**<sup>102</sup> In retail finance, language and legal systems, in particular consumer protection issues, play an important role. Since retail financial products are not standardized, these background elements complicate the integration process, and make the outcome of regulatory initiatives far less certain. Considering the significant information asymmetries in retail credit markets and the limited effect of deregulation and technological progress on crossborder retail business thus far, a local presence may well remain necessary to access new retail markets. Ensuring that obstacles to crossborder consolidation in the

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<sup>101</sup> See “Towards a Single European Market in Asset management,” May 2003, ZEW, and “FSAP: Progress and Prospects. Final report from the Asset Management Expert Group,” May 2004.

<sup>102</sup> While there is little cross-border competition among banks in the retail sector, within national markets competition has increased in recent years.

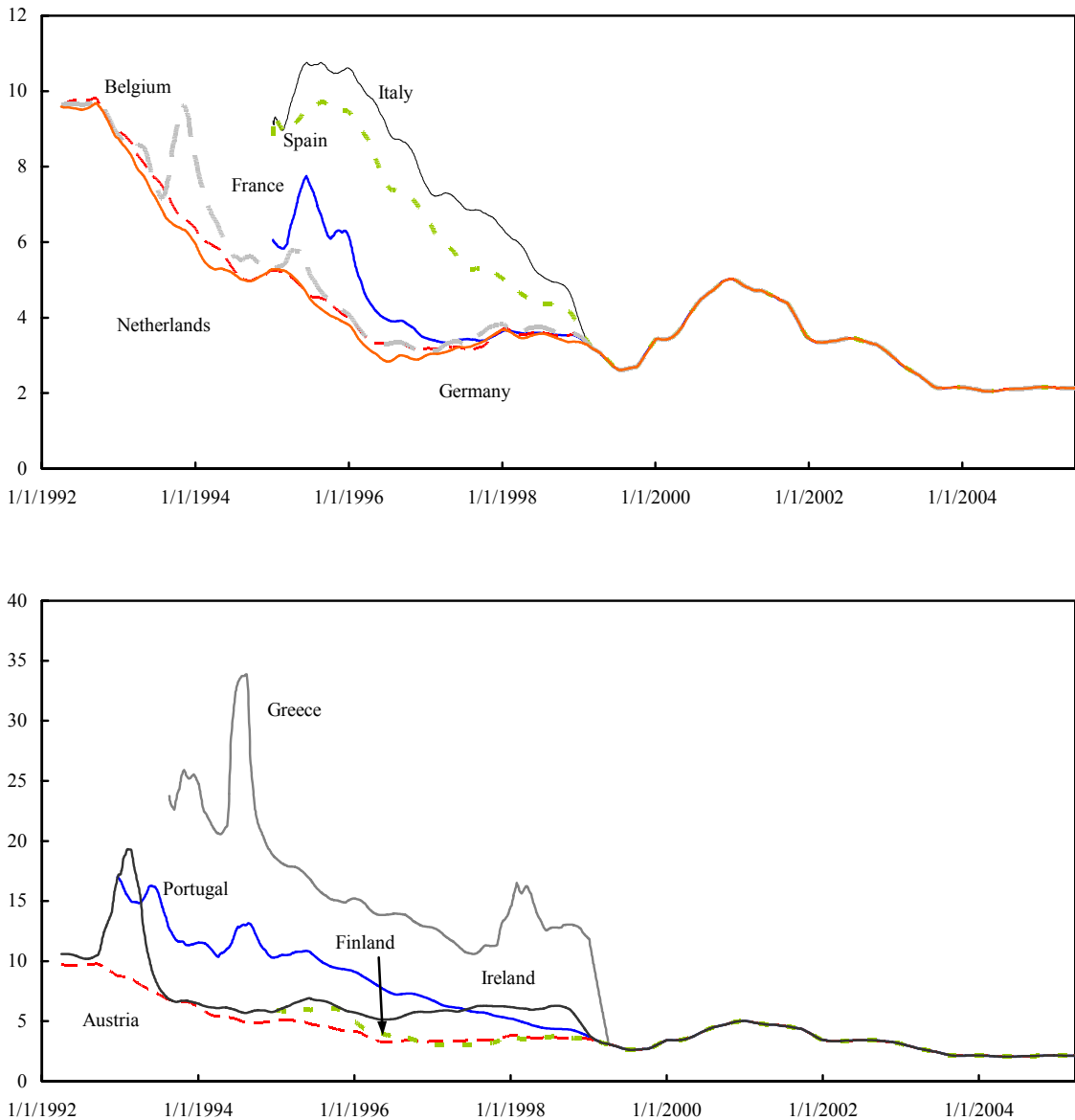
banking sector are effectively removed will therefore have to remain a priority for EU authorities.

**126. Progressing towards deeper financial integration in the “post-FSAP” period will require renewed efforts.** The European Commission has acknowledged that there would not be an “FSAP-2.” But the work on integrating markets will continue, as proposed in the Green Paper, particularly with the implementation of the many ongoing initiatives. The Lamfalussy process is the key tool to achieve a homogeneous implementation of FSAP regulations, but the success of the process cannot be taken for granted. The Lamfalussy approach (in particular Level 2 and 3 committees) relies heavily on consensus-building and the willingness of different stakeholders to move forward. An important concern is that the whole process can be derailed by “national interests” or lose momentum as regulatory fatigue takes its toll. Carefully calibrating the articulation of Level 2 and 3 committees, and maintaining the dynamics of regulatory and supervisory convergence will have to remain among the top priorities of the Commission.

**127. Keeping up the pace of eliminating legal and regulatory hurdles will be challenging.** Issues related to taxation and differences in legal systems—notably between civil and common law approaches—are now among the main obstacles to further integration. The purely technical obstacles to financial integration have been or are being addressed. Tax and legal obstacles, however, will be much harder to overcome. Thus, the progress in removing legal and tax-related obstacles to deeper integration will likely slow relative to the rapid pace of the past 10-15 years.

**128. As the integration of European financial markets deepens and markets develop, new risks for financial stability may emerge.** New risks for financial stability may emerge in the period ahead as financial markets continue to grow in size and complexity at a time of ongoing transition to a more integrated market. This may facilitate the spreading of shocks across countries. In addition to completing the existing technical agenda to limit or eliminate remaining obstacles and sources of friction, a thorough and rapid convergence of regulatory and supervisory doctrine and practices is crucial to managing these risks. Such a convergence should improve the ability of the authorities to weather crisis situations. Also, it would enhance the attractiveness and effectiveness of European financial markets in intermediating between savers and investors.

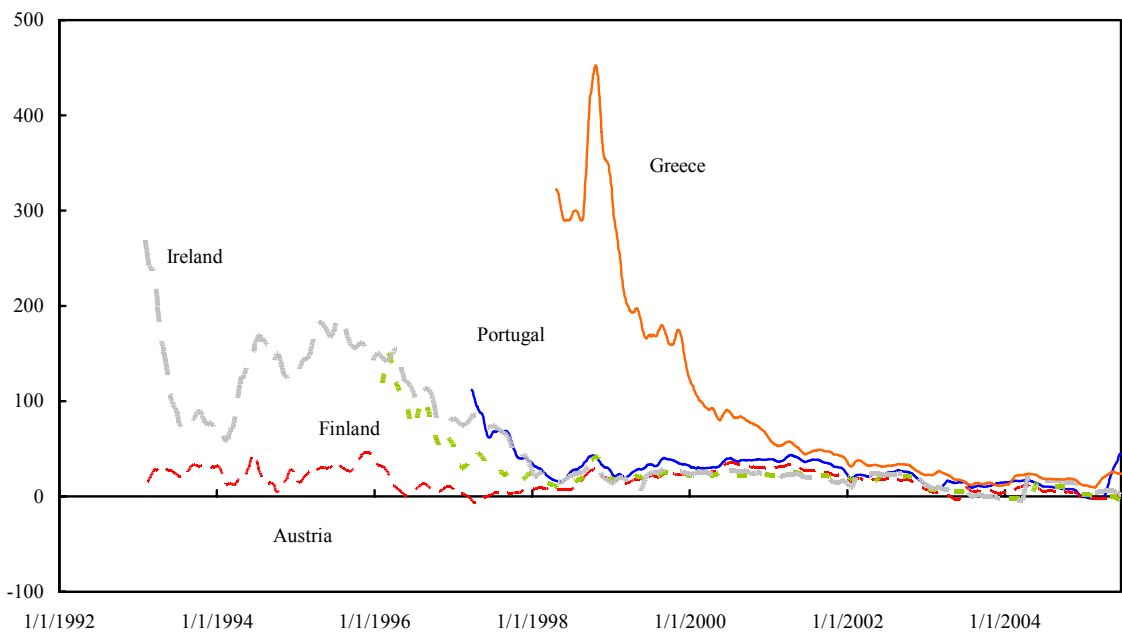
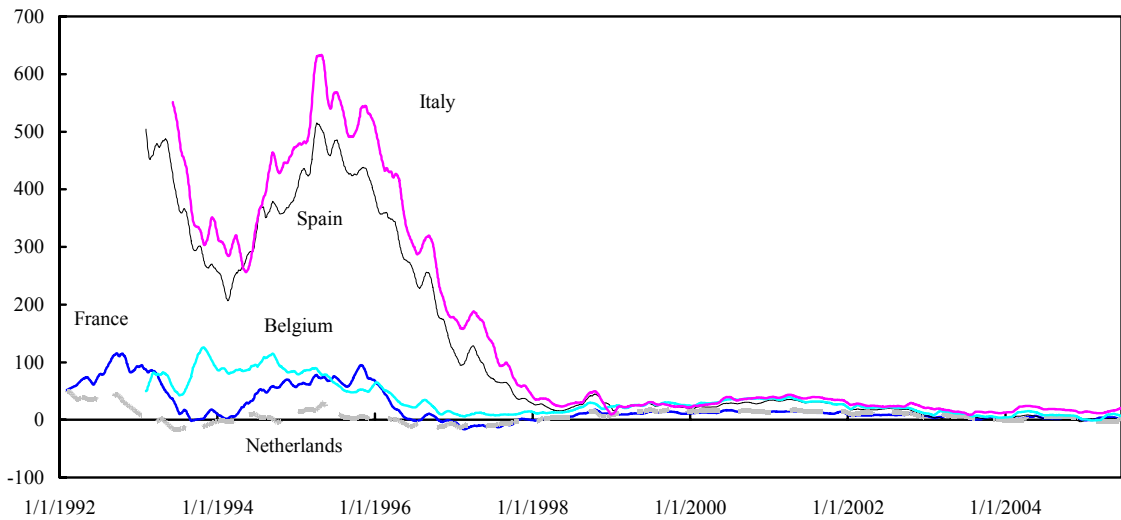
Figure IV.1. Euro Area: Three-Month Interest Rates <sup>1/</sup>  
(In percent)



Source: Bloomberg L.P.

1/ Three-month interbank borrowing rates. For euro area, the domestic borrowing rates are replaced by EURIBOR starting January 1, 1999.

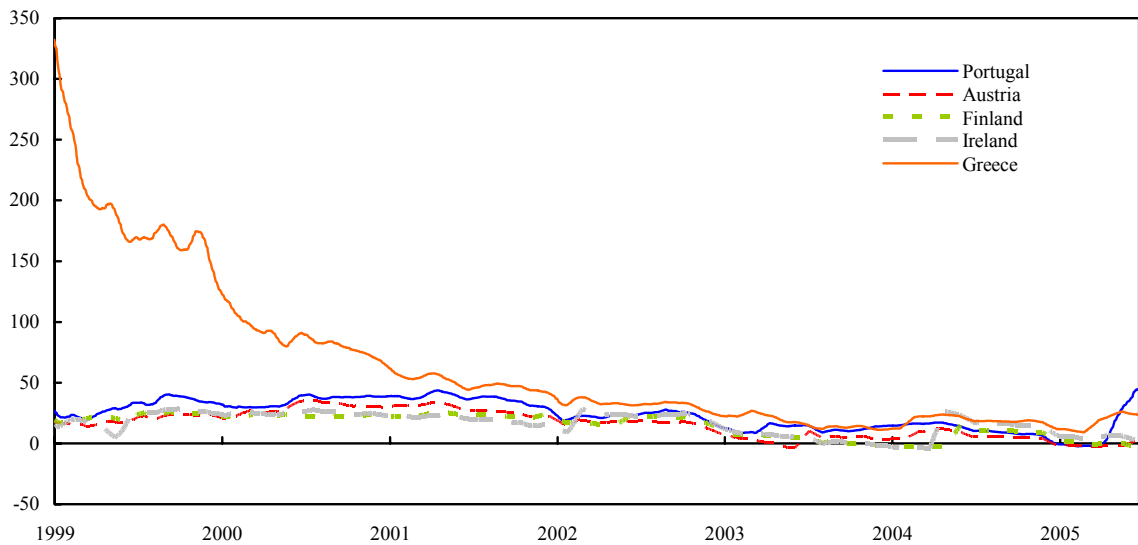
Figure IV.2. European Union: Long-Term Government Bond Spreads <sup>1/</sup>  
(In basis point)



Source: Bloomberg L.P.

<sup>1/</sup> Spread between yield on 10-year government bond and 10-year German government bond.

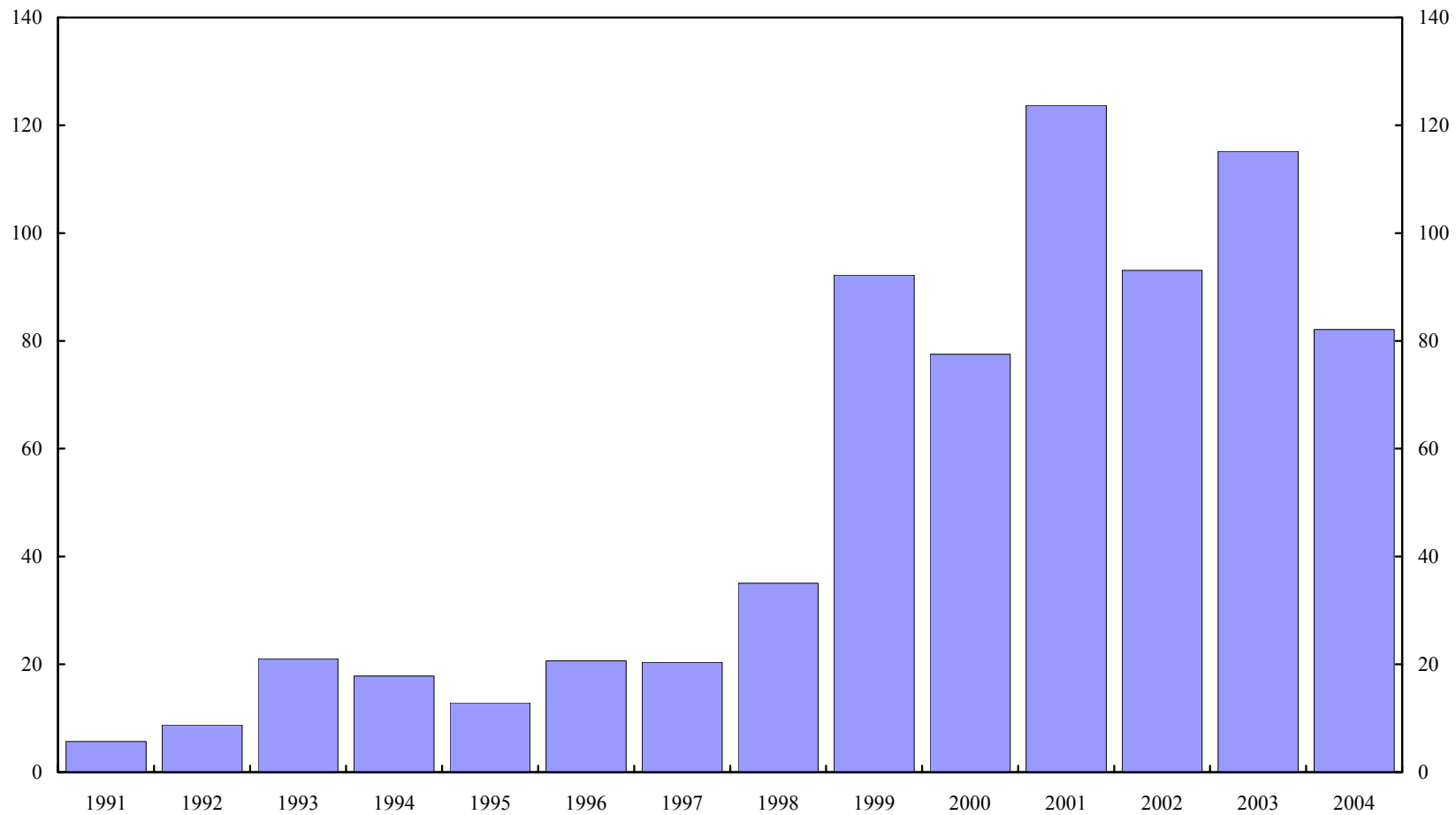
Figure IV.3. European Union: Long-Term Government Bond Spreads<sup>1/</sup>  
(In basis points)



Source: Bloomberg L.P.

1/ Spread between yield on 10-year government bond and 10-year German government bond.

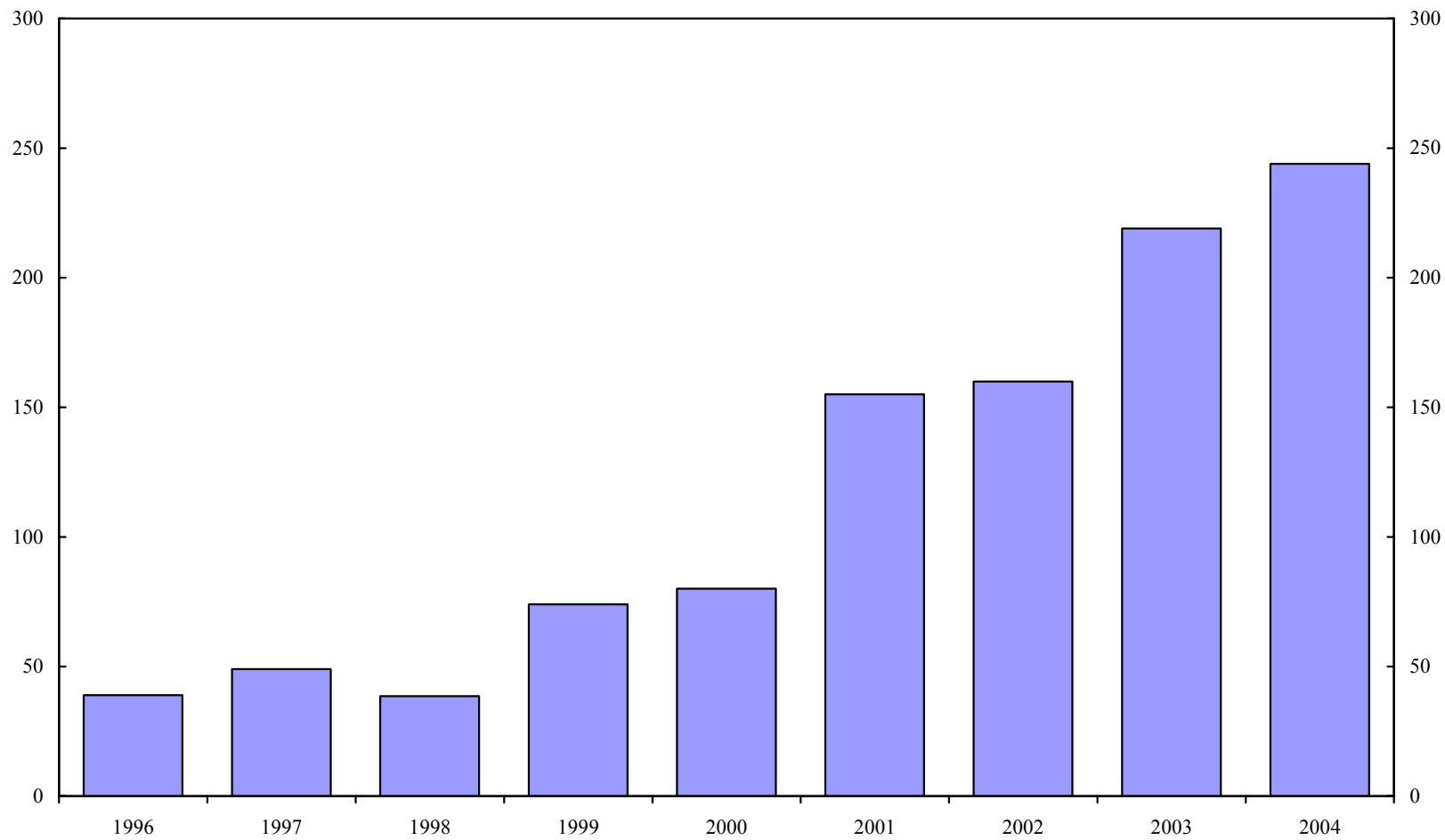
Figure IV.4. Euro Area: Euro-Denominated Nonfinancial Corporate Bond Issuance  
(In billions of euros; issuance in national currencies before 1999)



Source: Dealogic Bondware.

Figure IV.5. European Securitization

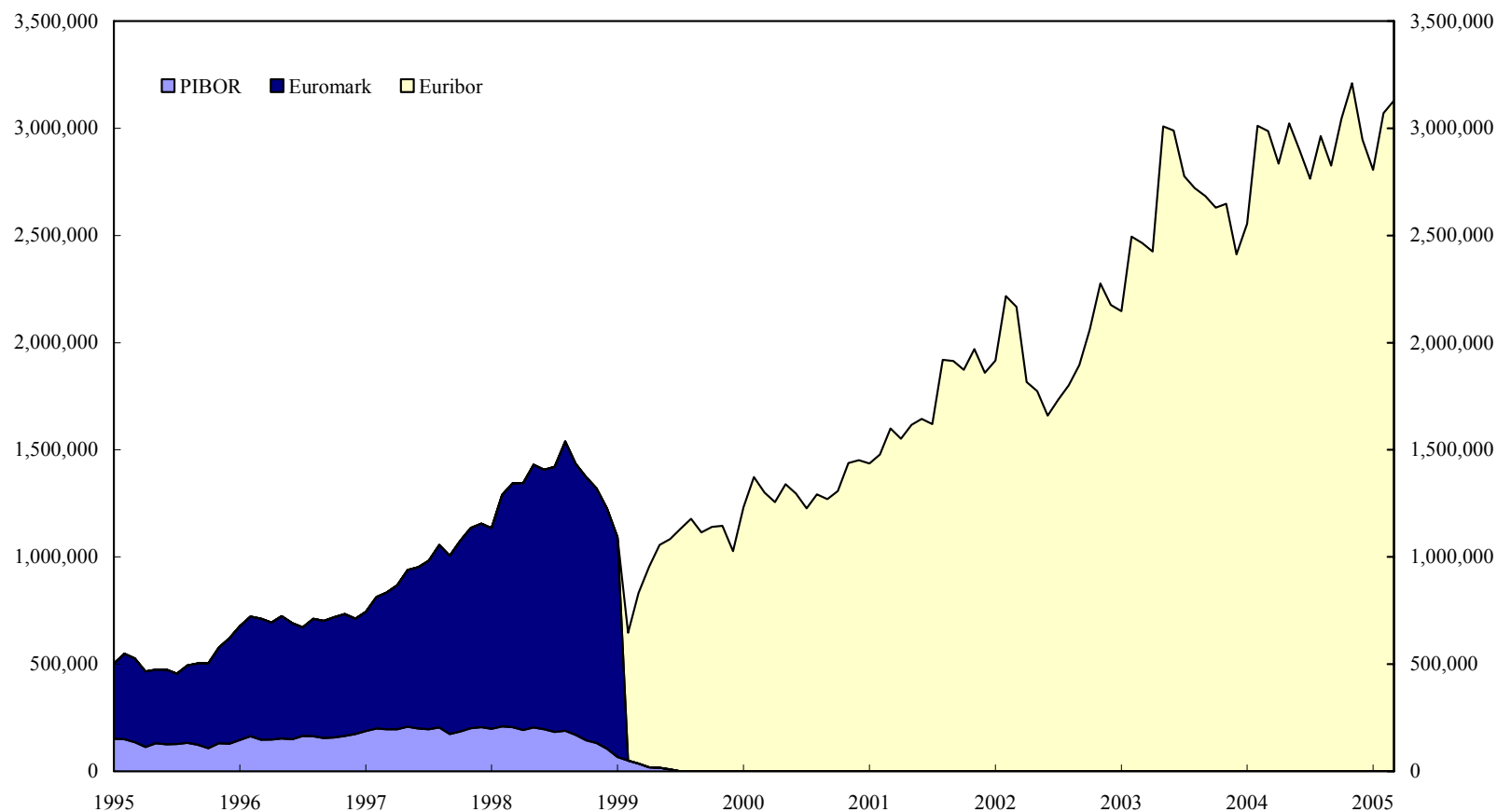
(Issuance in billions of euros)



Source: ESF Securitization Data Report.



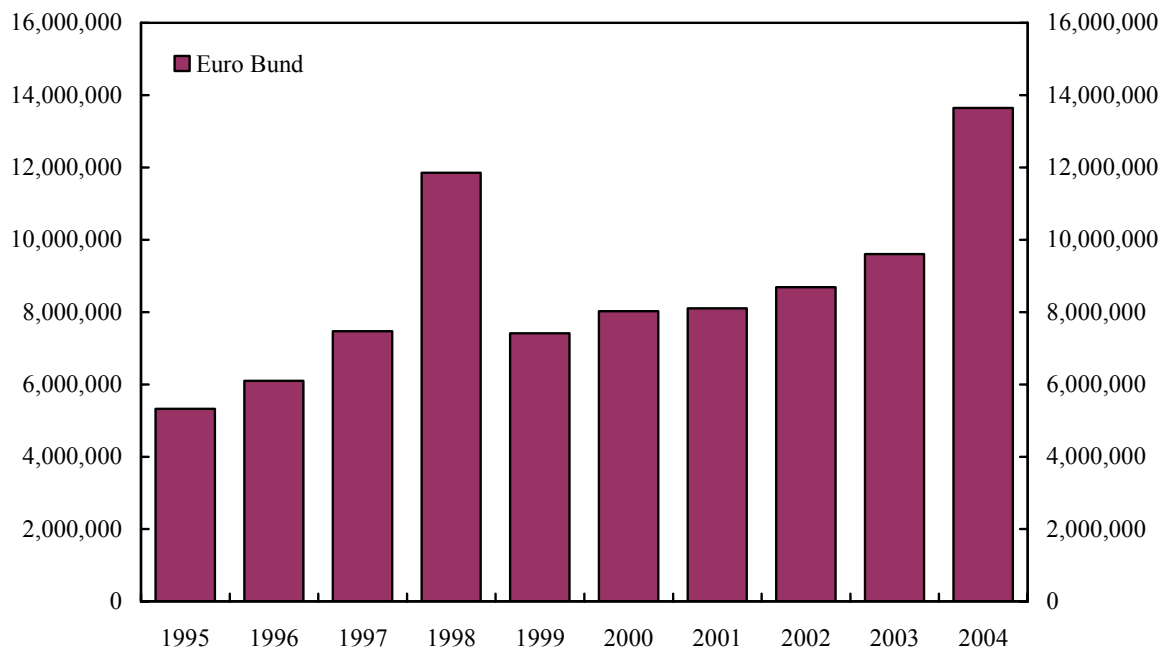
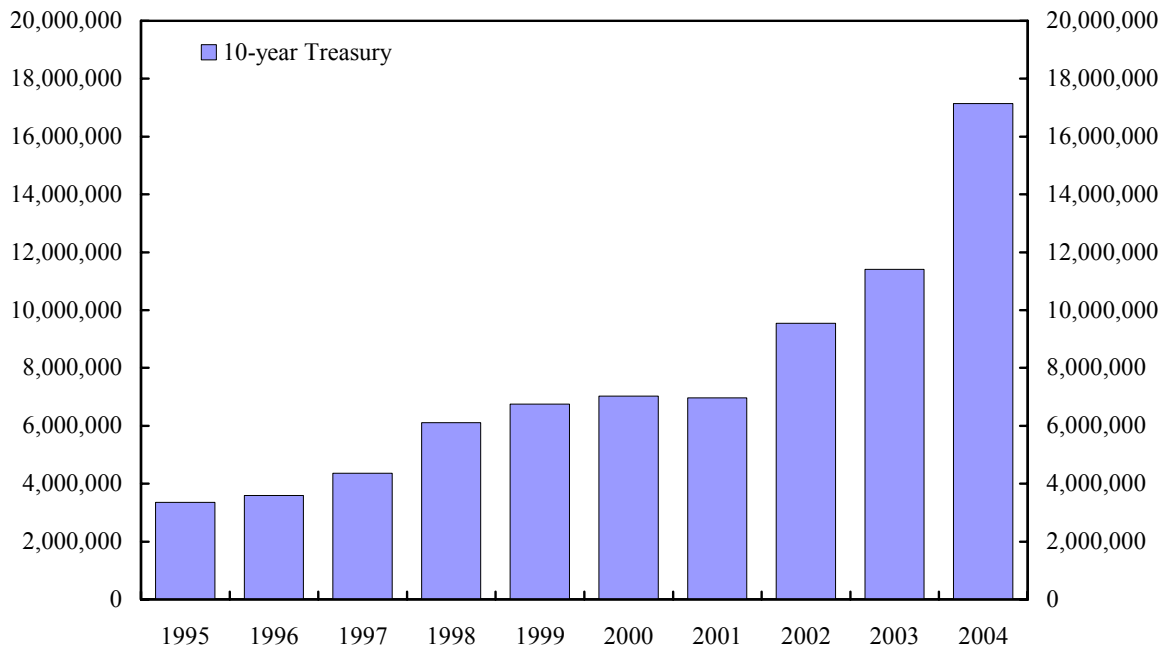
Figure IV.6. Three-month Interest Rate Future Contracts: Evolution of Open Interest <sup>1/</sup>



Source: Datastream.

<sup>1/</sup> In Euribor equivalent number of contracts.

Figure IV.7. Open Interest: 10-Year Treasury and 10-Year Euro Bund <sup>1/</sup>



Source: Datastream.

1/ Prior to 1999 data refer to German Bund; in Euro Bund equivalent number of contracts.

Table IV.1. Distribution of European Corporate Bond Issuers by Whole Letter Rating

	1985	1990	1995	2000	2002	2003
Aaa	17	59	50	59	61	59
Aa	2	73	152	247	274	244
A	10	43	180	328	363	385
Baa	1	2	31	135	180	191
Ba	1	3	13	34	33	44
B	1	1	8	63	65	67
Caa-C	0	0	1	19	30	22
Investment grade	30	177	413	769	878	879
Speculative grade	2	4	22	116	128	133
All issuers	32	181	435	885	1006	1012

Source: Moody's Investors Service.

## MAIN BARRIERS TO CROSS-BORDER CLEARING AND SETTLEMENT OF SECURITIES (GIOVANNINI REPORTS)

### Nature and form of Barriers

### Impacts

#### ***Technical Requirements, Market Practices***

*Information technology and interfaces:* lack of standardization (connection and messaging protocols, reporting requirements) among platforms

Multiplication of back office interfaces (duplication of costs), investors constrained in the choice of custodians

*National clearing and settlement restrictions:* Investors required to use designated domestic systems, or exclusive links between the different elements of a national securities market.

Market participants prevented from centralizing their clearing and settlement operations

*Domestic rules related to corporate actions, beneficial ownership and custody of securities:* Management of corporate actions and definition of beneficial ownership differs from one country to another

Impediment to the centralization of settlement and custody, difficulties in the treatment of open transactions

*Impediments to remote access to national clearing and settlement systems:* Rules may differ for the cash and security legs of a transaction

Remote access unworkable in practice, or remote participants at a disadvantage

*Differences in settlement periods and operating hours:* Differences in operating hours, either between national systems, between cash and security settlement systems, or within a settlement system

Mismatches in the settlement of obligations, requiring specific funding arrangements

*Securities issuance practices:* Uneven capability across securities market to allocate ISIN numbers in real-time

Absence of an efficient same-day distribution mechanism

*Restrictions on the location of securities:* Requirement/practice to deposit issues/settle trades in local systems

Issuers constrained in the placement of their issues

*Restrictions on the activity of primary dealers:* Primary Dealers required to set up a local presence and use local settlement systems

Inability to centralize cross-border settlements

#### ***Tax Related Barriers***

*Domestic withholding tax regulations:* Need to use a local agent for the provision of withholding tax services

Uneven playing field between intermediaries

*Organization of transaction tax collection:* Collection of transaction tax through the local settlement system

Constraint on the choice of a settlement system

***Legal certainty of transactions:*** National differences in the legal treatment of securities, the definition of the finality of securities' transfers, the legal treatment, and availability, of netting, conflicts of applicable law

Uncertainties in the legal status of transactions

# FSAP: MAIN ISSUES IN WHOLESALE FINANCIAL MARKETS AND PRUDENTIAL SUPERVISION

Themes	Content
<b>Market Abuse</b>	Harmonized rules on the prevention of insider dealing and market manipulation on regulated and unregulated markets
<b>Financial Markets Instruments</b>	Regulation of the authorization, behavior and conduct of business of securities firms and exchanges
<b>Prospectus</b>	Single passport for issuers of equity and debt securities on the basis of the prospectus approved by the regulatory authorities of the issuer's country
<b>Transparency</b>	Financial reporting and dissemination of information by securities issuers. Security providers required to provide detailed semi-annual information, and quarterly updates
<b>Accounting</b>	Implementation of IFRS
<b>Regulation of UCITS depositaries</b>	Progressive reduction in differences in national rules regarding the depositaries of assets in UCITS, including depositaries' liability, the convergence of prudential requirements, transparency and investor information
<b>Implementation of UCITS directives</b>	Content and presentation of the simplified prospectus; clarification on the use of derivatives instruments by UCITS and the need to adapt risk management standard and investor protection
<b>Occupational Pension Funds</b>	Guidance principles for asset allocation, in line with the "prudent person rule," and call for the elimination of discriminatory tax provisions
<b>Settlement Finality</b>	Reduction of systemic risk in payment and securities settlement systems
<b>Status of Collateral</b>	Increased legal certainty regarding the validity and enforceability of collateral arrangements backing cross-border transactions
<b>Cross-Border mergers</b>	Rules governing take-over bids and the protection of minority shareholders
<b>Statutory Audit</b>	Clarification of the duties and responsibilities of statutory auditors, independence and ethics; Criteria for national public oversight of the audit profession
<b>Capital Framework for Banks and Investment Firms</b>	Implementation of Basel II
<b>Financial Conglomerates</b>	Identification of "significant financial groups" and designation of a supervisory co-coordinator for each conglomerate
<b>Reinsurance Supervision</b>	Harmonization of supervisory methods, removal of the remaining barriers for intra-EU cross border reinsurance activities, and increased protection of policy holders
<b>Insurance Solvency</b>	Creation of a consistent risk-based insurance solvency system

Sources: EU commission; BOE Quarterly Bulletin

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## V. EUROPEAN FINANCIAL INTEGRATION, STABILITY AND SUPERVISION<sup>103</sup>

### A. Introduction

129. **Technological advances, deregulation and the establishment of the Economic and Monetary Union (EMU) have contributed to European financial integration, although progress has been uneven.** Most studies conclude that integration of money, bond and equity markets has proceeded apace, while integration of bank credit markets has been slower, and bank retail markets remain highly segmented.<sup>104</sup> Estimates of the “growth dividend” from European financial integration would appear large, as a wider variety of sources of finance for firms and households becomes available (Guiso and others, 2004). To date, the implications of integration for financial stability remain largely unexplored.

130. **This paper explores the impact of financial integration for system-wide risk profiles of publicly-traded European financial institutions and assesses the implications for supervision and regulation.** It begins with an overview of indicators of banking market penetration (Section B), which point to increasing cross-border exposures and ties in banking. Section C then asks whether the benefits of risk diversification arising from integration are reflected in convergence of financial institutions’ risk profiles to lower risk levels. It documents the evolution and convergence of risk profiles of publicly traded banks and insurance companies, offering insights into the role of financial integration as a driver of risk profile dynamics. Section D reviews recent developments in the European regulatory and supervisory framework and identifies the challenges posed by the evolving risk profiles in the context of increasing financial integration. Conclusions are summarized in Section E.

131. **A key finding is that the risk profiles of financial institutions have indeed converged, but *not* to lower risk levels.** Convergence has likely been driven by increased exposures to common financial shocks. Increased links stemming from integration of European capital markets may have played a role, as increased exposures have occurred despite the still lagging integration of the relevant retail markets. The lack of improvement in risk profiles suggests that diversification benefits have been offset by higher risk-taking. The convergence of risk profiles across institutions potentially adds a new element of systemic risk that supervisors will need to be attuned to—a challenge that is not unique to Europe.

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<sup>103</sup> Prepared by Gianni De Nicoló (RES), Robert Corker, Alexander Tieman, and Jan-Willem van der Vossen, with research assistance from Marianne El-Khoury (all MFD).

<sup>104</sup> See Barros and others (2005), Baele and others (2004), Adjaouté and Danthine (2004), and Adam and others (2002) for definition of indicators of financial integration and relevant evidence. See also Chapter IV.



132. **The regulatory and supervisory framework will need to continue adapting to the evolution of cross-border business and risk in the EU banking system.** At this point, coherent structures that rely heavily on information exchange have evolved in the EU and appear to work well in normal times. But their fitness for more troubled times in an increasingly integrated EU can be less comfortably asserted. Given the complexities, the ongoing centralization of authority may need to be accelerated and carried further to deal with the supervision of cross-border financial institutions and to ensure speedy and efficient crisis management.

## **B. Aspects of Integration of Bank Credit Markets**

133. **National barriers to cross-border banking appear to be only slowly breaking down in the European Union.** Foreign bank penetration has proceeded most rapidly in Central and Eastern Europe (CEE), as the less-developed financial systems of transition countries offered significant growth opportunities and a high return on direct investment (Focarelli and Pozzolo (2003), European Central Bank (2004b)). As a result, western European banks expanded rapidly into CEE well before the recent enlargement of the EU eastward and are now important players in the new member states (Box V.1). But cross-border banking penetration has been less visible within the original EU-15 countries.<sup>105</sup> It has been comparatively intense in some countries where language and cultural factors hastened cross-border ties as banks expanded and consolidated to take advantage of economies of scale. And as large European multinational corporations ignore borders, they bank where they can get the most favorable credit terms and the services they need—including outside of Europe. However, as noted in Degryse and Ongena (2004), small- and medium-sized enterprises and households still tend to bank with their local bank, which typically has home-country origin.

134. **Nonetheless, indicators of cross-border banking activity point to a steady increase in banking integration in the EU-15 in recent years** (Table V.1). Volume-type proxies for integration can be constructed from data on cross-border holdings of credit institutions and foreign exposures from the European Central Bank (ECB) and the Bank for International Settlements (BIS).<sup>106</sup> They show:

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<sup>105</sup> The EU-15 comprise: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

<sup>106</sup> For a discussion of quantity-type measures of integration, see Manna (2004). Annual data from the ECB on assets of EU branches and subsidiaries of foreign credit institutions from countries inside the European Economic Area is available from 1997 to 2003. Quarterly data from the BIS on foreign exposures is available from 1999:Q2 to 2004:Q3 for most countries in the euro zone and the United Kingdom

- **Cross-border activity of euro-area banks progressed unevenly across different types of activities.** It progressed most rapidly in the area of securities holdings, less in the interbank loan market, and least in loans to non-banks (ECB (2004b)).

#### **Box V.1. Foreign Bank Penetration in Central and Eastern Europe**

Foreign bank penetration in Central and Eastern Europe developed in a markedly different way from cross-border penetration in the EU-15 countries. When the markets for financial services in the 8 CEE countries that joined the EU in 2004, and the three CEE accession candidates Bulgaria, Croatia, and Romania, opened up in the 1990s, western European banks grasped the opportunities for expansion.

This resulted in substantial foreign ownership of well over half of (and in some cases practically all) banking sector assets in almost all of the CEE countries. German, Dutch, and Austrian banks were especially quick to enter the CEE markets, with each having 10 percent or more of total EU-15 exposure to the CEE markets by 1999. Swedish and Finnish banks were also quick to enter the Baltic markets. During 2000-2004, further expansion followed, as Italian banks built up substantial exposure to the markets in Hungary, Poland, the Slovak Republic, and the EU-candidate countries. Most western European banks make substantial profits in their CEE markets. In Austria, for example, CEE activities account for roughly 10 percent of total assets but about one fourth of total Austrian bank profits. However, for most EU-15 countries, the exposure to the CEE countries remains a limited share of their total foreign exposure. Only Austrian and Italian banks currently have more than 10 percent of their foreign exposure in these countries.

- **Assets of branches and subsidiaries of credit institutions from other European Economic Area (EEA) countries have increased significantly in the banking systems of most EU-15 countries since 1997.**<sup>107</sup> The average amount of nonhost EEA banking sector assets has risen from the equivalent of less than 30 percent of GDP in 1997 to over 41 percent of GDP in 2003, with most of the expansion occurring through the increase of activities of subsidiaries.<sup>108</sup> An increase took place in all countries, with the exception of Belgium and Luxembourg—although in both these cases, banks from other European countries were already well established. For most of the smaller countries and the United Kingdom, the assets of other EU banks

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<sup>107</sup> EEA countries are selected for consistency with the relevant statistics produced by the ECB for earlier years.

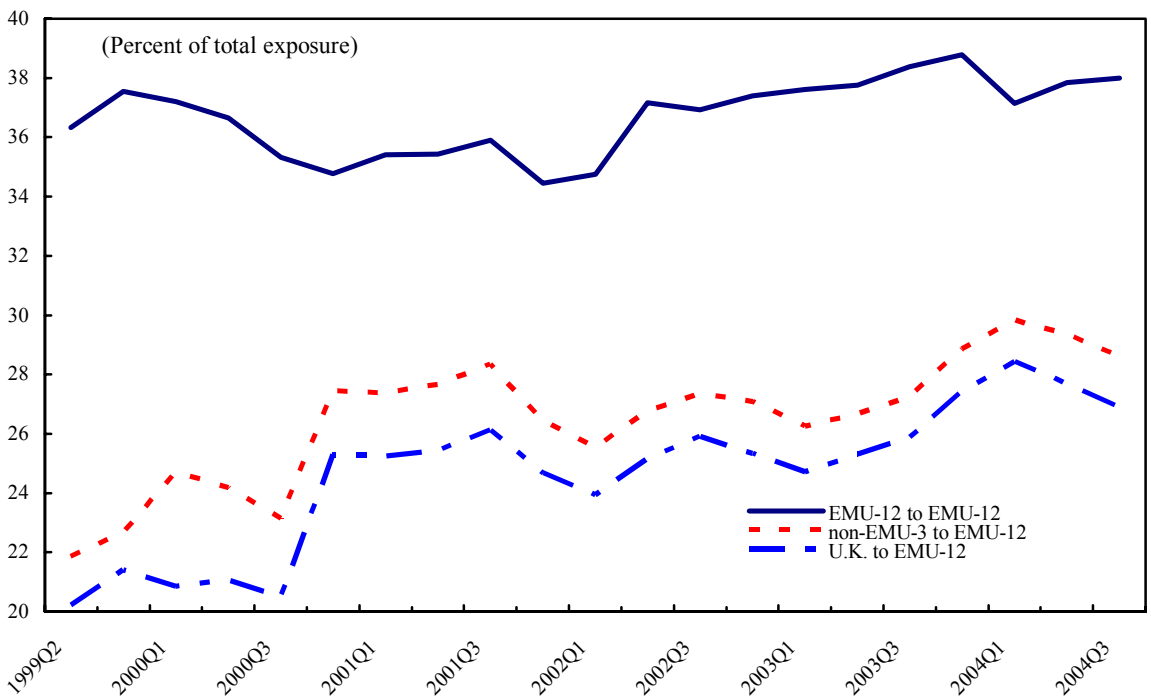
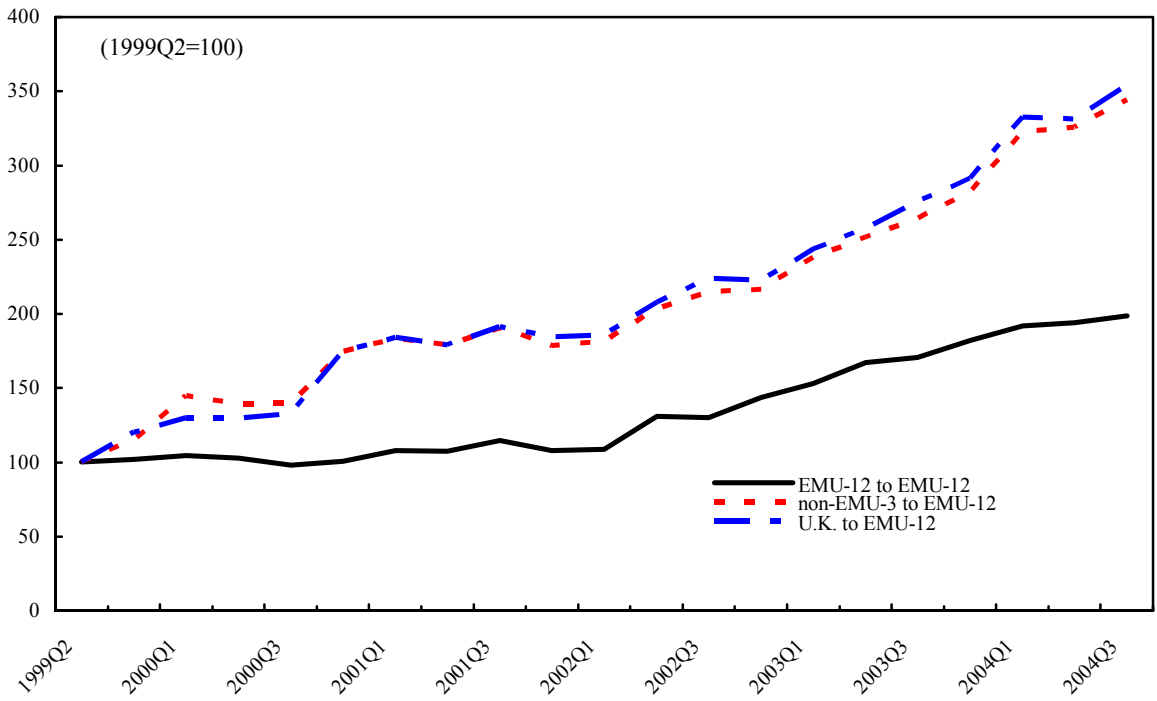
<sup>108</sup> This despite the fact that for branches the European ‘single passport’ applies. The single passport enables a bank to branch into other EU member states’ markets based on its home country banking license, without requiring additional licensing by the host country authority.

and subsidiaries are now a sizable share of their domestic GDP but the asset base of other EEA banks remains relatively small in the large continental countries.

- **Foreign branches and subsidiaries are increasingly likely to come—in some cases almost exclusively—from other EU-15 countries.** The share of total foreign branches' and subsidiaries' assets that are European has risen on average from about 75 percent to close to 90 percent. The main exception is the United Kingdom, where the rapid expansion of EEA bank branches and subsidiaries has been matched by expansion from other localities, keeping the United Kingdom a large, geographically diverse international center.
- **Cross-border exposure of EU-15 banks to euro area countries has risen sharply.** This rise is driven in large part by banks in London, which is a major financial center, increasing their exposure to euro-area countries. As a result, exposure from the United Kingdom drove total euro-area exposure of banks in the three non-euro EU-15 countries up by over 240 percent in nominal terms from 1999 to 2004. This raised the share of euro-area country exposure in total foreign exposure of the three non-euro countries from 22 percent to 29 percent (Figure V.1). Within the euro area, growth of cross-border exposure of banks to other euro area countries was also rapid, rising some 90 percent in nominal terms in this period. However, this was only sufficient to raise the share of total foreign exposure to other euro-area countries modestly.
- **European banks, especially those outside the euro area, have increased their share of euro-denominated assets.** For many continental countries, the share of euro-denominated banking sector assets has inched up since the introduction of the euro and is at a high level—80–90 percent, for example, in Germany, France and the Netherlands (Figure V.2). For the United Kingdom, the percentage of euro-denominated assets in total assets remains much lower at around 40 percent. However, this percentage increased from just over 30 percent in 1999–2001. Taken together with the data on foreign exposures, it seems that the euro outsiders' banks have been diversifying into the euro area whereas euro-area banks have primarily been expanding domestically or within the region.

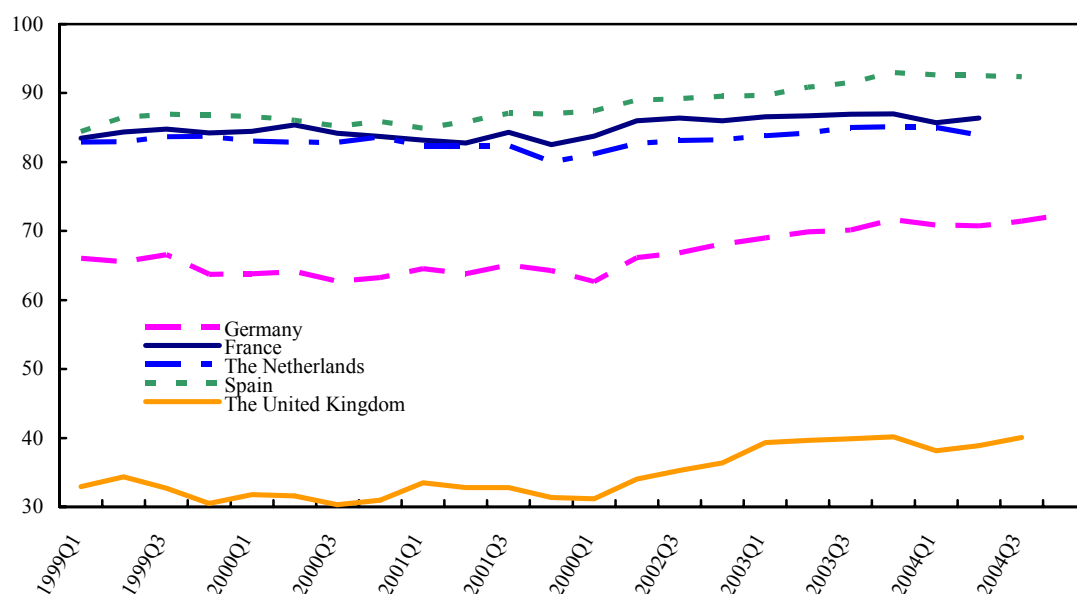
135. **Large banks in particular have increased their balance sheet, in part through cross-border activities, and expanded their links to financial markets** (Table V.2). In recent years, similarities in business strategies can be detected for large banks in all the major EU-15 countries. Most have pursued rapid growth, either organically or through mergers and acquisitions, and have significantly raised their share of noninterest income. Through this process, banks' incomes have increasingly relied on income generated through financial markets activity. However, whereas the direction of change has been consistent, substantial differences in the structure of balance sheets, as well as in profitability, remain across

Figure V.1. Consolidated Foreign Exposure



Source: BIS.

Figure V.2. Euro-Denominated Assets of the Banking System  
(In percent of total assets)



Source: ECB.

countries. For example, the average share of noninterest income ranges from 38 percent in France and Germany, to over 50 percent in the United Kingdom and returns on equity in 2003 varied from -6 percent in Germany to over 18 percent in the Netherlands.

136. **In summary, the data support a picture of increased cross-border penetration indicative of increasing integration of European banking.** Branches and subsidiaries from other EU-15 countries are a rising presence. Cross-border exposures are continuing to grow rapidly. Driven in large part by the banks in London, outsiders are diversifying into euro assets and raising their exposure to euro area countries. That said, the picture remains far from one in which the banks found on High Streets across Europe typically come from a kaleidoscope of countries. Rather, banks from other countries are more likely to be found in a country's financial center.

### C. Evolution and Convergence of Risk Profiles

137. **Financial integration may affect individual and system-wide risk profiles of financial intermediaries differentially as it expands their investment opportunities.** On the one hand, financial integration may enhance diversification opportunities relative to specialization for *individual* intermediaries, which may rely on an enlarged set of investments across activities and borders to enhance expected returns for the same amount of risk. On the other hand, a *system* of intermediaries can become less diversified as a whole if

intermediaries either choose greater exposure to the same risks, or the risks they are exposed to become more similar. As such, the probability increases that a large number of financial institutions would adjust in a similar way to an adverse shock, thereby amplifying the overall impact on the economy or financial markets.

**138. The extent to which financial institutions' business strategies tilt toward specialization or diversification has different implications for the evolution and convergence of their risk profiles.** If specialization strategies dominate on net, then intermediaries' risk profiles should exhibit heterogeneity and a lack of convergence. Conversely, if diversification strategies dominate on net, then their risk profiles should become more similar and exhibit convergence. Whether convergence is toward lower or higher risk profiles will be determined by the desired risk-return combination embedded in their business strategies.

**139. The dynamics of system-wide risk profiles and their convergence are explored here through the construction of distance-to-default measures for a set of publicly traded European financial institutions during 1991–2003.** The distance-to-default (DD) measure is constructed for a “portfolio” of banks and insurance companies belonging to each of the available Datastream stock indices of 13 of the EU-15 countries.<sup>109</sup> The DD varies positively with market-determined returns on assets and capitalization and negatively with the volatility of assets (Box V.2). Thus, an increase (decrease) in DD indicates a lower (higher) risk profile, which can result from higher expected profitability, better capitalization, lower asset volatility, or a combination of these factors. Cross-country convergence (or divergence) in system-wide risk profiles is measured by a decrease (or increase) in the cross-sectional standard deviation of DDs.<sup>110</sup>

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<sup>109</sup> Distance-to-default type measures are routinely used in leading financial stability reports, such as the ECB and the Bank of England Financial Stability Reviews. The number of *banks* in the available index of each country is: Austria (8), Belgium (7), Denmark (9), France (8), Germany (16), Greece (9), Ireland (3), Italy (29), the Netherlands (4), Portugal (7), Spain (15), Sweden (5), and the United Kingdom (11). The number of *insurance companies* in the available index of each country is: Austria (3), Denmark (3), France (6), Germany (15), Greece (1), Ireland (1), Italy (10), the Netherlands (2), Spain (2), and the United Kingdom (15).

<sup>110</sup> As illustrated in Solnik and Roulet (2000), the evolution of the cross-sectional standard deviation for a set of variables captures the degree to which correlation among these variables changes through time.

### Box V.2. The “Portfolio” Distance-to-Default Measure

The basic structural valuation model by Black and Scholes (1973) and Merton (1974)—hereafter BSM—underpins the “portfolio” distance-to-default (DD) measure used in this paper. In the BSM model, the portfolio’s equity is viewed as a call option on the portfolio’s assets, with strike price equal to the current book value of total liabilities. When the value of the portfolio’s assets is less than the strike price, its equity value is zero. The market value of assets is not observable, but can be estimated using equity values and accounting measures of liabilities. The monthly DD measures used here are estimated with the methodology described in Vassalou and Xing (2004) using daily equity data and annual accounting data.

Under BSM assumptions, the distance-to-default of a *portfolio* of  $N$  firms is given by:

$$DD_t = \frac{Ln(V_t^P / L_t^P) + (\mu_P - 0.5\sigma_P^2)}{\sigma_P}$$

where  $V^P = \sum_i V_t^i$  and  $L_t^P = \sum_i L_t^i$  are the total value of assets and liabilities respectively. The mean and variance of the portfolio are respectively given by  $\mu_P = \sum_i w_t^i \mu^i$  and  $\sigma_P = \sum_i \sum_j w_t^i w_t^j \sigma_{ij}$ , where  $w_t^i = V_t^i / \sum_i V_t^i$  and  $\sigma_{ij}$  is the asset return covariance of firm  $i$  and  $j$ . Thus, the “portfolio” DD embeds the structure of risk interdependencies among firms. “Default” at date  $t+1$  occurs when  $V_t^P < L_t^P$ . Thus, the DD indicates how many standard deviations  $Ln(V_t^P / L_t^P)$  has to deviate from its mean in order for default to occur. Since  $V_t^P = L_t^P + E_t^P$ , where  $E_t^P$  is the value of equity, declines in  $V_t^P / L_t^P$  are equivalent to declines in capitalization ( $E_t^P / L_t^P$ ).

The “portfolio” DD can be viewed as a risk profile measure tracking the evolution of the joint risks of failure of the firms composing a portfolio. Lower (higher) levels of the DD imply a higher (lower) probability of firms’ joint failure. Since positive and negative variations in the individual firms’ DD are allowed to offset each other owing to firms’ return correlation, the *DD of a portfolio is always higher* than the (weighted) sum of the DDs of the individual firms. As a result, the *probability of “failure” associated with the “portfolio” DD is always lower* than that associated with the *actual* probability of joint failures of sets of firms in the portfolio. Thus, the “portfolio” DD can be viewed as tracking the evolution of a *lower bound* to the joint probabilities of failure.

Despite the strong underlying assumptions, the dynamics of the “portfolio” DD provide useful information regarding the market valuation of systemic risk potential. The *basic* DD measures are constructed assuming that asset values follow a lognormal process, which does not capture extreme events adequately, and that the liability structure is composed of only equity and debt with fixed maturity for all firms, and no rollover of debt. As a result, the implied estimates of probability of failure at a point in time may be imprecise. Moreover, without additional assumptions, the measures do not allow an identification of supply and demand factors that may drive their components. However, their *dynamics* have high informational content in signaling (forward-looking) market valuations of financial distress, as their predictive content for financial distress has been found significant. They have been shown to predict supervisory ratings, bond spreads, and rating agencies’ downgrades in both developed and developing economies (see Krainer and Lopez (2001), Gropp, Vesala, and Vulpes (2004), and Chan-Lau, Jobert, and Kong (2004)). Importantly, they have been found to have significant predictive power for actual defaults, even superior to measures based on “reduced form” statistical models of default intensities (see Arora, Bohn and Zhu (2005)). As a result, they have become a standard tool of surveillance kits for financial as well as nonfinancial sectors.

140. **The risk profiles for the sample of banks considered do not in general appear to have improved over the past 15 years.** In none of the countries do bank DDs exhibit a systematic or significant upward trend (Figures V.3a-b). Indeed, in 11 out of the 13 countries analyzed, distance-to-default has tended to narrow—although such narrowing is statistically significant only for Belgian, Dutch, and German banks. This suggests that, in most countries, risk reductions achieved through diversification have likely been offset by higher risk-taking. This finding does not appear to be unusual, as similar patterns can be detected for large US banks in this period (see De Nicoló et al. (2004)).

141. **Reflecting their wide differences in size, business focus and market penetration, the evolving risk profiles of publicly traded European banks over time are far from homogeneous.** In Belgium, Germany, and the Netherlands, and to some extent Spain and the United Kingdom, the DDs exhibit a downward trend since 1991. In most other countries the trend has typically been downward since the mid 1990s, often reversing a preceding upswing.<sup>111</sup>

142. **However, the largest banks exhibit more similar patterns, as increases in asset return volatility have not necessarily been offset by increases in capitalization and improvements in asset returns** (Figure V.4). With the exception of German banks, large banks in France, Italy, Spain, the Netherlands, and the United Kingdom have experienced significant increases in asset return volatility since the beginning of the 1990s. Substantial increases in capitalization and improvements in returns have occurred as well, but they have not been sufficient to offset increases in risk-taking captured by the rise in asset return volatility. Put differently, large European banks may have supported higher risk/higher return investments with larger capital buffers. Yet, risk-adjusted asset returns and overall risk profiles have not improved.

143. **Qualitatively, the dynamics of system-wide risk profiles for insurance companies in most European countries present a similar picture to that of banks** (Figure V.5). The distance-to-default has also, if anything, tended to decline rather than increase. Compared to banks, the dynamics of the DD for insurance companies are more heterogeneous across countries. However, the dynamics of risk profiles for banks and insurance companies have become more similar both *within* countries, and, as documented below, *between* countries, in part as a result of on-going or increased conglomeration.<sup>112</sup>

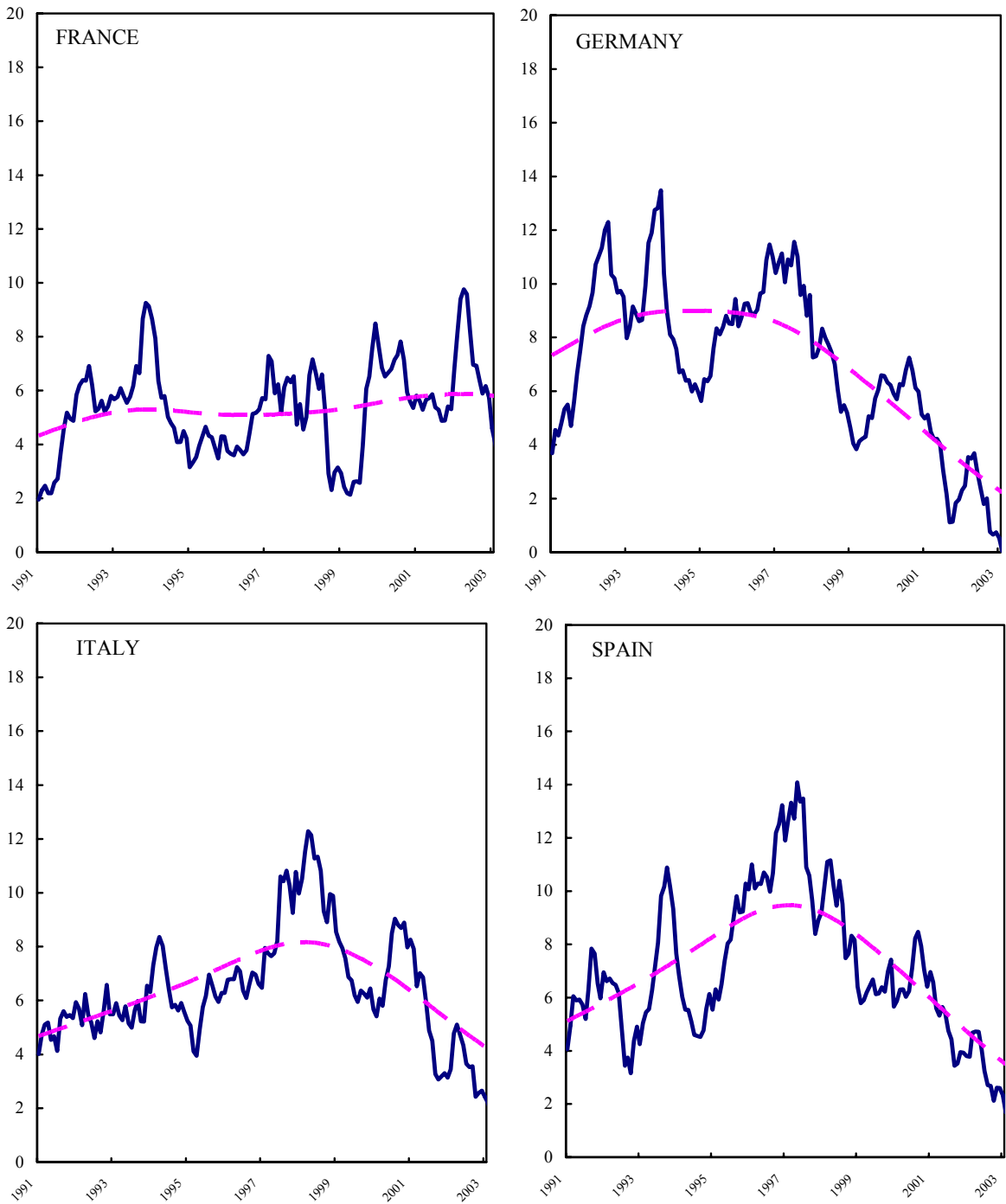
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<sup>111</sup> The initial upward trend in Sweden is essentially the outcome of the banking crisis of the early 1990s, when financial institutions experienced a large drop in the DD measure.

<sup>112</sup> See Deutsche Bundesbank (2005). On the relationship and evidence between conglomeration and risk in an international context, see De Nicoló et al. (2004).

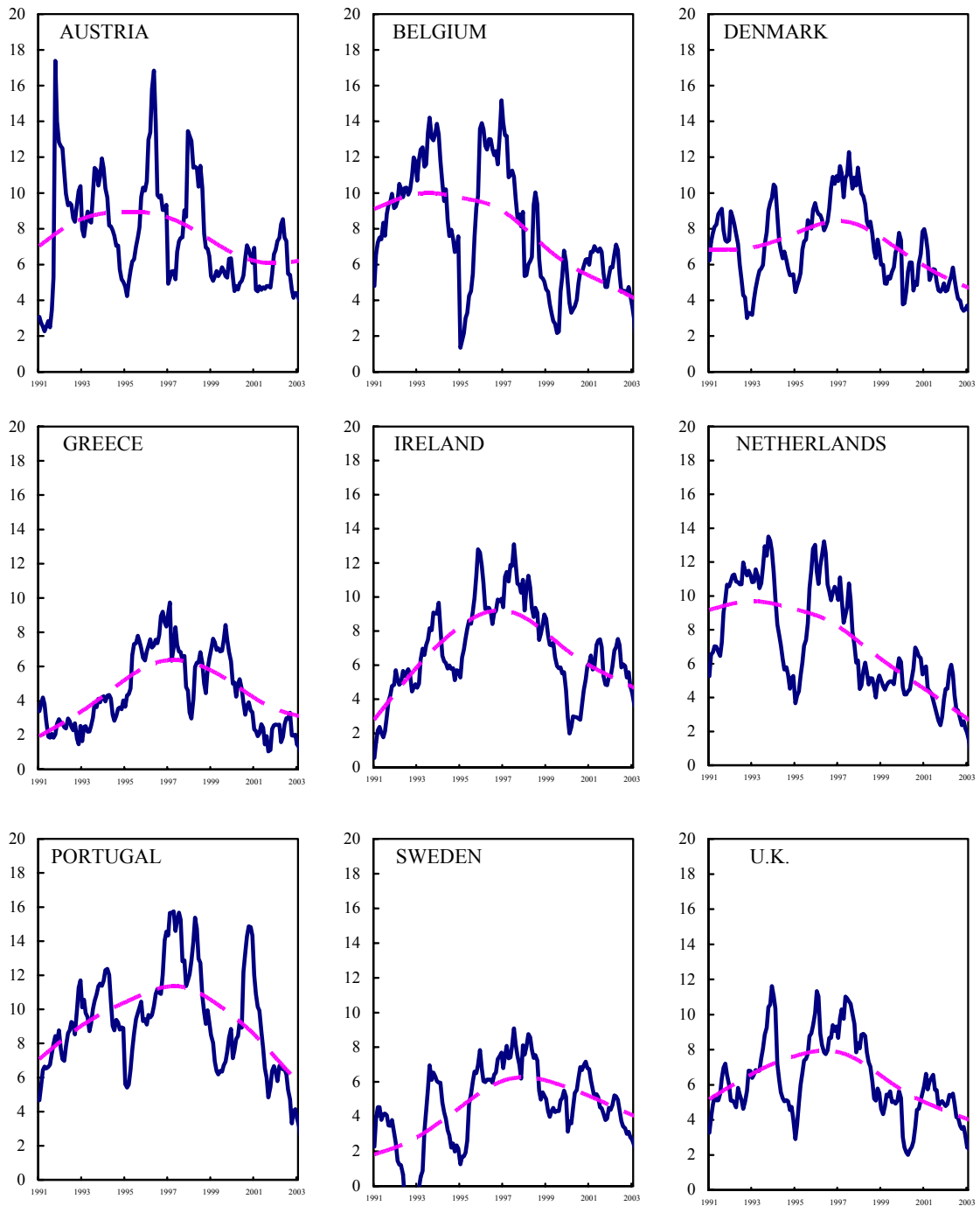


Figure V.3a. Bank Distance to Default and Trend Component  
(Large EMUs)



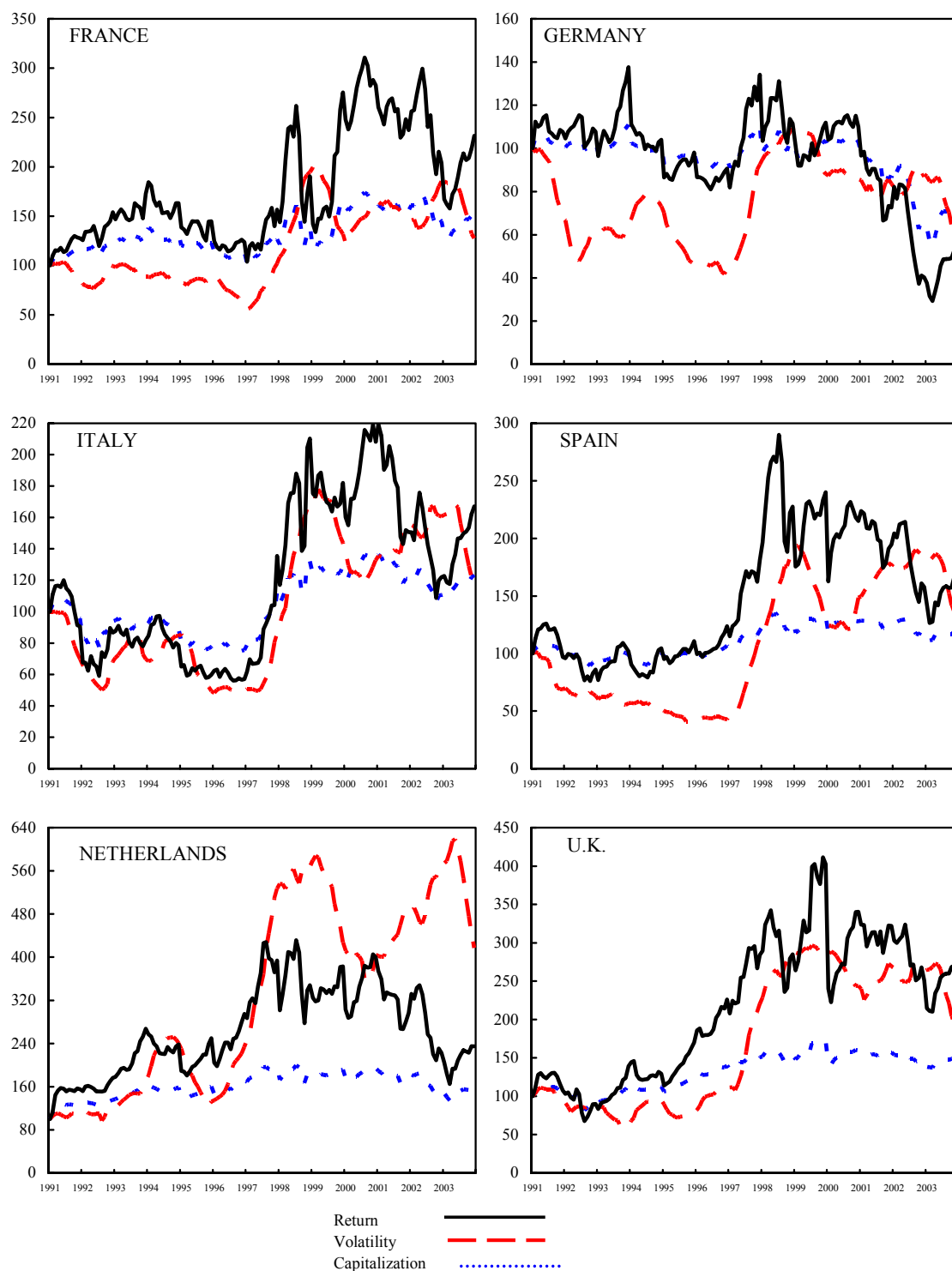
Sources: Datastream; and IMF staff estimates.

Figure V.3b. Bank Distance to Default and Trend Component  
(Small EMUs and Others)



Sources: Datastream; and IMF staff estimates.

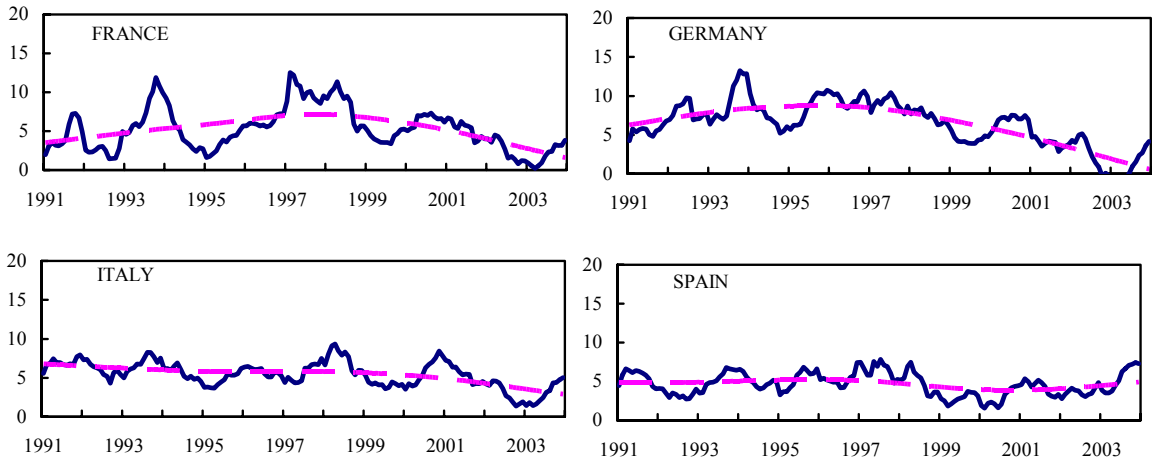
Figure V.4. Large Banks: Market-based Returns, Volatility and Capitalization  
(January 1991=100)



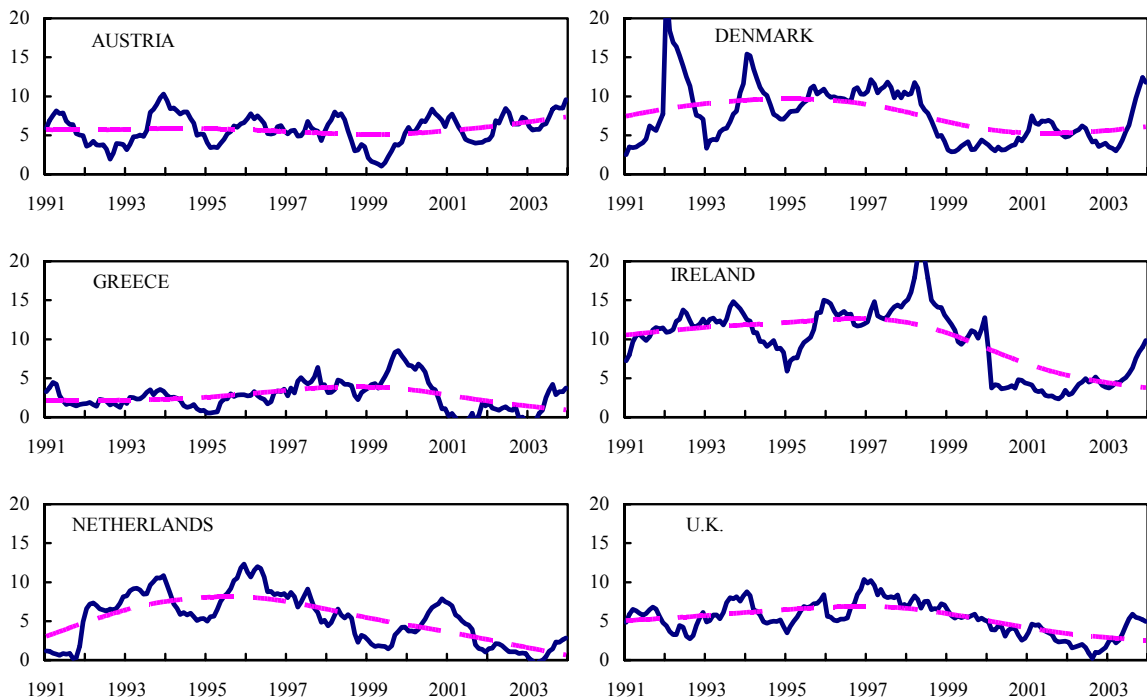
Sources: Datastream; and IMF staff estimates.

Figure V.5. Insurance Distance to Default and Trend Component

Large EMUs



Small EMUs and Others



Sources: Datastream; and IMF staff estimates.

**144. Real business cycle developments do not appear to provide a systematic explanation of risk profile dynamics of bank or insurance companies across countries.** The correlation of the cyclical component of the bank DD with the cyclical component of GDP growth varies widely in magnitude. It is significantly negative in 7 countries (Belgium, Germany, Greece, Ireland, the Netherlands, Portugal, and the United Kingdom), while it is positive in Austria, and not significantly different from zero in the remaining countries.<sup>113</sup> This correlation also varies widely for the insurance sectors.

**145. Notwithstanding cross-country heterogeneity, the risk profiles of banks and insurance companies converged markedly during 1991–2003** (Figure V.6). Convergence of banks' risk profiles has occurred steadily, with the standard deviation of DDs dropping by over 40 percent (from 3 in 1991 to 1.8 in 2003). Insurance sectors exhibit a similar pattern, with the standard deviation of DDs dropping by 38 percent (from 4.5 in 1991 to 2.8 in 2003). Moreover, the bulk of convergence in the overall DD measures has reflected a decline of the standard deviation of trend, as opposed to cyclical, components. Together with the lack of a systematic correlation across countries between DDs and the business cycle, this suggests that convergence in risk profiles across countries is unlikely to have been driven to an important extent by increased synchronicity in real business cycles.<sup>114</sup>

**146. Increased exposure to financial cycles would appear a significant, although by no means unique, driver of convergence in risk profiles at large listed banks.** Integration of money, bond and equity markets may have played a role, as it has likely favored the diversification of institutions' securities portfolios, which in turn may have increased their exposures to common financial shocks.<sup>115</sup> European banks have exhibited a substantial increase in noninterest income (ECB (2004a)). This increase has been accompanied by a volatility of noninterest income growth significantly higher than that of interest income growth at large banks since 1997 (Table V.3). Moreover, the correlation between interest and noninterest income growth has been high (0.79 for the EU-15), indicating decreasing diversification benefits across traditional and nontraditional business lines. These facts, as well as the dominance of convergence of the trend components of DDs, suggest that

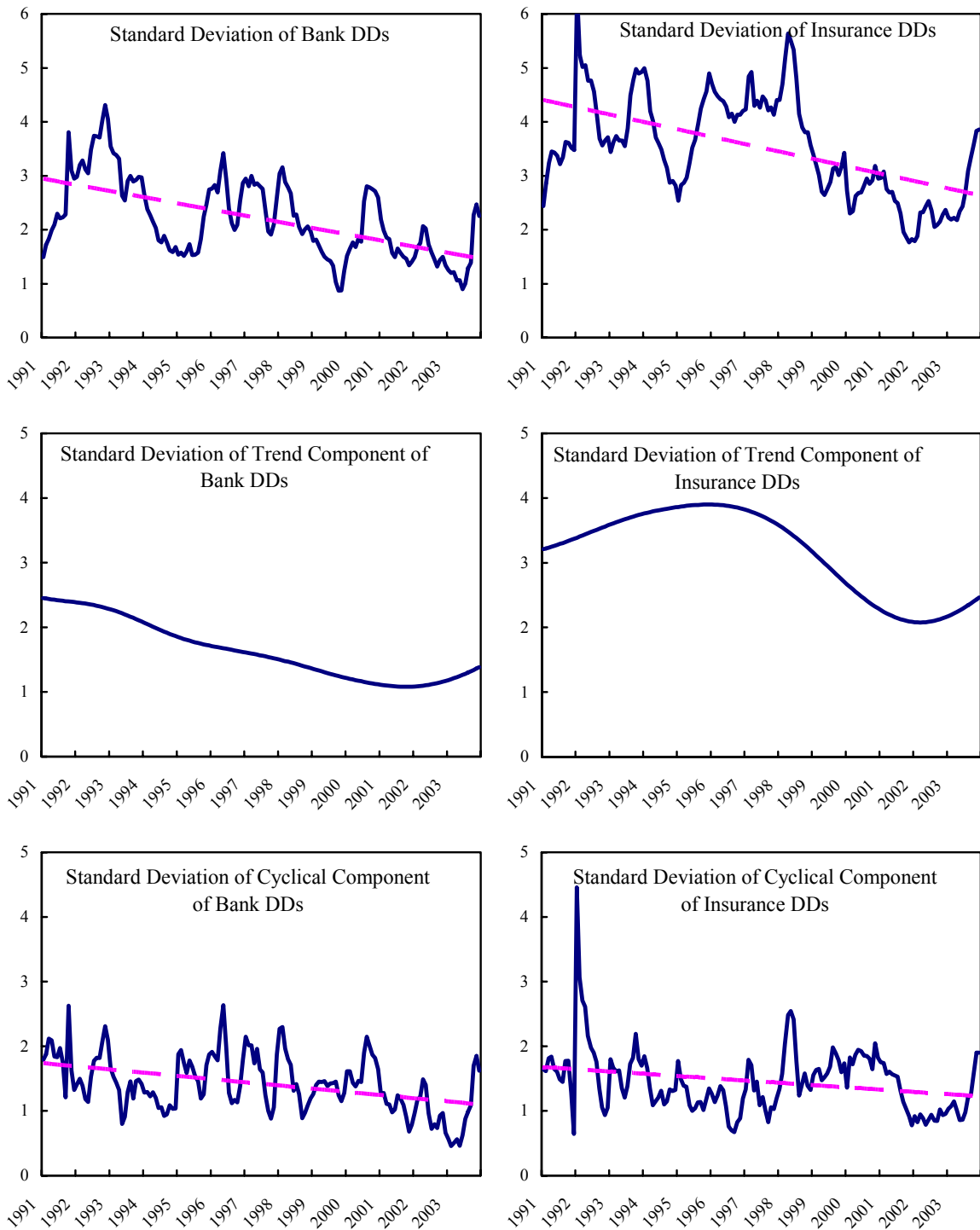
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<sup>113</sup> Trend and cyclical components are constructed by applying the Hodrick-Prescott filter to monthly frequency data, adopting the value of the smoothing parameter used in Ravn and Uhlig (2002). The filter is applied to interpolated quarterly GDP growth data for the 1985.1-2003.4 period.

<sup>114</sup> Other factors potentially at work may be a clustering of traders' strategies increasing co-movements in volatility, as well as converging market valuations of risk management practices.

<sup>115</sup> Potential increases in direct risk interdependencies in the form of heightened exposures to potential contagion have been documented in ECB (2004d).

Figure V.6. Convergence of Bank and Insurance Distant to Default



Sources: Datastream; and IMF staff estimates.

intermediaries' business strategies, albeit different in many dimensions, may have produced the same outcome: a heightened exposure to common financial shocks.<sup>116</sup> Again, similar results are found for US banks (see Stiroh (2004)). The much less pronounced convergence of the cyclical component suggests that exposures of European banks to common sources of real shocks do not appear to have played a critical role yet, consistent with the current segmentation of the European bank retail markets. Thus, common exposure to financial shocks, as opposed to real shocks, seems to be an important factor explaining the convergence of risk profiles.

**147. Nevertheless, European banks have undertaken a strengthening of their capital positions and improvements in risk management in the past few years.** For instance, the ECB (2004c) reports recent improvements in distance-to-default measures for 37 large EU banks, particularly since end-2003 (chart S43). Such strengthening may have supported increased risk-taking in many instances, but it also helped them to weather a sequence of adverse financial shocks during 2000–03 (ECB (2004a) and ECB (2005)).

**148. In sum, convergence of risk profiles of listed banks and insurance companies has occurred despite the still lagging integration of the relevant retail markets.** Convergence appears to be the result not of more synchronized business cycles but of increased similarity in income sources and exposures to financial shocks, as financial institutions have pursued common growth strategies. In turn, such strategies may have been favored by integration of money, bond and equity markets and the ensuing diversification of securities portfolios. The similarity of the U.S. and European trends suggest that other drivers not necessarily related to integration *per se*, such as developments in technologies, may have had an important role.

#### **D. Implications for Regulation and Supervision**

**149. It is essential that the financial sector regulatory and supervisory system—still largely nation-based—keep pace with the evolving nature of cross-border financial institutions and changing risk profiles.** Large firms are increasingly organized along business lines, irrespective of national boundaries and legal corporate structures. Banking regulation and supervision must take account of these structures. Furthermore, the prudential infrastructure must also be designed to accommodate different levels of financial intermediation—and the associated process of catch-up—across different member states,

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<sup>116</sup> Some caution about generalizing the conclusions to the entire European banking sector is warranted. Whereas the Bankscope data cover the largest banks in the EU, in some countries (e.g., Germany) with low banking concentration a large share of banking assets is not represented. That said, ECB (2000) documented the similarity in volatility of interest and noninterest income with data up to 1998 for *all* banks and highlighted the possibility that bank operational, reputation and strategic risks associated with the increased importance of activities generating noninterest income may have heightened at that time.

most notably between the EU-15, the new member states, and the accession countries. The priority areas continue to be: (a) coordinated supervision of cross-EU financial institutions, and especially of conglomerates; (b) development of crisis management mechanisms; and (c) convergence of regulatory and supervisory practices. Moreover, progress in the integration of financial markets will benefit from the lower regulatory burdens that will result from greater regulatory and supervisory convergence. The recent Green Paper issued by the European Commission raises a number of these issues and seeks input from the industry and other practitioners on its suggestions how to move forward.<sup>117</sup>

### **Supervision of cross-EU financial institutions**

**150. Financial institutions operating across borders add a degree of complexity to a nation-based system of supervisory bodies.**<sup>118</sup> In the case of a conglomerate with tri-sector activities in many of the 25 member states, for example, potentially dozens of agencies across the EU could have a supervisory interest. Key questions include: (i) who should take prime responsibility for supervising any particular financial institution with cross-border activities? (ii) is coordination among supervisory bodies both within and across member states satisfactory? (iii) are supervisors' powers to intervene in problem cases clear? and (iv) are incentives across different supervisory bodies sufficiently compatible?

**151. The fundamental principle enshrined in the Codified Banking Directive (2000/12/EC) is that home countries supervise their banks' foreign branches while host countries supervise foreign subsidiaries, notwithstanding the existing obligation of home country supervisors to also exercise supervision on a consolidated basis.** The approach encourages financial integration by essentially permitting a bank to open branches in other member countries under a single license of the head office of the branch. However, supervisory responsibilities are not entirely black and white. A host-country supervisor is responsible for enforcing local liquidity requirements on foreign branches and can take measures to protect depositors in an emergency situation. At the same time, the home-country supervisor is responsible for supervising a parent bank as well as its foreign subsidiaries, on a consolidated basis, while the host supervisor retains responsibility over EU as well as non-EU foreign subsidiaries in its own jurisdiction.

**152. For conglomerates, the coordination of supervision has been further clarified in the Financial Conglomerates Directive (2002/87/EC) of December 2002.**<sup>119</sup> Under the Directive, solvency requirements are imposed upon each conglomerate as a whole, in order to avoid "double gearing."<sup>120</sup> All significant intra-group transactions must be reported at least

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<sup>117</sup> See European Commission (2005).

<sup>118</sup> For an overview of the supervisory framework for conglomerates, see Dierick (2004).

<sup>119</sup> The Directive has yet to be fully implemented in all countries.

<sup>120</sup> Also see Directive 2002/87/EC, Annex I.



once per year. Each conglomerate has to have adequate risk management processes and internal control mechanisms. The member state that provided the license to the top regulated entity in the conglomerate is responsible for coordination and overall supervision. When requested, the coordinating supervisor and the supervisors of regulated entities within a financial conglomerate shall exchange information essential or relevant to the exercise of supervision. Essential information shall even be volunteered. The coordinating supervisor also gathers and disseminates information in emergency situations.<sup>121</sup> Application of sanctions should also be coordinated. With regard to issues related to the implementation of the Directive, the Commission is assisted by the Financial Conglomerates Committee and the Mixed Technical Group (MTG), chaired by the Commission.

**153. In practical terms, however, management of the supervisory process by the coordinating supervisor can be a forbidding task.** The appointed agency needs to continually coordinate information gathering and dissemination across all countries and financial sectors in which the conglomerate is active. The range of information to be gathered is broad, as described in Article 12 (1), (a) through (h) of the Financial Conglomerates Directive, which covers identification of the group structure, strategic policies, risk management, adverse developments with regard to the group, and supervisory measures undertaken against the group. The reporting burden of the conglomerate also potentially increases above what is needed to satisfy its national sector reporting requirements, notwithstanding the principle that the coordinating supervisor first take recourse to national sector supervisors when obtaining information (Article 11 (1), final paragraph).

**154. Furthermore, lines of responsibility might not always be fully clear.** While Article 11 (1) (e) provides the coordinating supervisor with the authority to plan and coordinate supervisory activities with regard to a conglomerate, Article 12 (2) confirms the authority of national sector supervisors to take certain actions with regard to their supervised entities, although consultation with the other involved supervisors is required unless the situation is considered urgent.

**155. While the procedures envisaged in the Financial Conglomerates Directive work under routine conditions, their effectiveness could be challenged in a crisis.** The procedures rely on good, collegial cooperation and the responsibilities of the coordinating supervisor involve a very considerable up-front investment in supervisory capacity, which

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<sup>121</sup> In this connection, questions have been raised whether national regulatory and supervisory authorities provide sufficient information on individual institutions and groups to the ECB. In an article in the April 29, 2005 Wall Street Journal, for example, G. Thomas Sims remarks that many national central banks “refuse to regularly share [with the ECB] information about the banking sector [sic] because they say it would break confidentiality agreements with banks in those countries.” The article quotes Mr. Padoa-Schioppa as saying that, as a result, the ECB “lacks a full view” of the financial system.

will require time and effort to build. Moreover, crisis management is not explicitly covered by the Directive, except possibly in cases of “adverse developments which could seriously affect regulated entities” (Article 12 (1) (g)). Even then, the authority of the coordinating supervisor will not go beyond collecting and disseminating information. The question also arises as to whether, in a crisis situation, the coordinator is best placed to do this, rather than the supervisor closest to the crisis. Crisis management will in any case place cooperation and coordination processes under a considerable amount of stress.

**156. As a positive response to potential supervisory coordination problems, various member states have negotiated bilateral or multilateral memoranda of understanding (MoUs).** Some examples are provided in Box V.3. The MoUs go beyond the requirements in the Directives. They further clarify responsibilities and actions in the supervision of large financial institutions whose activities could have stability implications for either country. Obviously, any form of cross-border supervision, and in particular intervention, raises issues of responsibility and accountability at a national level.

**157. Nonetheless, a remaining fundamental challenge is to better align the incentives of supervisors in different countries.** For example, the home supervisor of a large conglomerate may be less concerned than the host supervisor about the activities of a small branch or subsidiary in a small member state, even though the branch or subsidiary may have systemic importance in the host market. Moreover, a home supervisor could be influenced by national interests that could deter timely intervention in a bank operating in another country: reputational issues could be at stake for a marquee financial institution or tax payer funds could be at risk if solvency became a problem.<sup>122</sup>

**158. Given the complexity of the coordination exercise and given that the incentive compatibility problem cannot be entirely eliminated, a case may exist for centralizing elements of supervisory authority at the EU level.** It may be that further MoUs, in concert with growing acceptance of a lead supervisor approach, can tie down the key stability concerns where the most important financial conglomerates are involved. However, the potential number of bilateral MoUs is vast and each MoU would in principle need to be continually revised to reflect changes in the financial landscape. And there would remain a risk that reporting lines and obligations would be both unclear and onerous on financial institutions. Thus, some form of centralization of authority may be desirable. Or, as a minimum, the role of national supervisors, as for instance laid down in the Financial Conglomerates Directive and the MoU among supervisors and central banks, may need to be

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<sup>122</sup> See also Walkner and Raes (2005) for further discussion of incentive issues.

### **Box V.3. Bilateral Cooperation on Prudential Supervision and Crisis Management**

The EU features many MoUs between supervisors. First, an extensive network of some 80 bilateral MoUs exists between supervisors on the exchange of supervisory information relating to home-host issues. Second, a multilateral MoU was concluded on information exchange during times of crisis. This MoU sets out broad modalities of cooperation, and information sharing, and enumerates the types of information to be shared. It also provides for coordination of media communications. Third, the ECB and country authorities recently concluded an MoU on cross-border and systemic issues, involving both supervisors and the ministries of finance of the member states.

In addition, there are various examples of cooperation between European supervisors going well beyond the minimum standards described above. These include:

In the **Nordic countries**, cooperation goes furthest. The Nordea Group, whose parent company is Swedish and which is in the process of adopting European company status,<sup>1</sup> has subsidiaries in all the Nordic countries. In terms of lending, Nordea bank is the largest bank in Finland, the second-largest in Denmark, the third-largest in Norway and the fourth-largest in Sweden (Swedish Riksbank 2003). Supervisory cooperation between the Nordic supervisors is extensive, with a multilateral memorandum of understanding on crisis management in place (Nordic Central Banks, 2003).

Going forward, Nordea's planned simplification of its legal structure into a European company would mean that Nordea's present subsidiaries would become branches of the Swedish parent bank. By the home country principle, this would mean that the Swedish Finansinspektionen would be supervising major parts of the Danish, Finnish, and Norwegian banking sectors. Supervisory authorities from these countries argue that in this case, it would be justifiable that the role and power of the host country authority are broader than what they presently are. Against this background, the Nordic supervisory authorities have launched investigations concerning the impact of the restructuring on cooperation between supervisors (Bank of Finland, 2004).

In the **Benelux countries**, the formation of the Belgian-Dutch Fortis bancassurance conglomerate in 1990 drove the need for consolidated supervision at the conglomerate level. Against this background, the Belgian and Dutch banking and insurance supervisors concluded specific MoUs covering reporting requirements, the location of activities within the conglomerate, and the modalities of information exchange and consultation between supervisors (Banking, Finance, and Insurance Commission, 1995). Going beyond the specifics of the MoUs, information exchange and cooperation on a practical level are considered to be smooth and effective.

The merger in 2000 between the Austrian Bank, Austria-Creditanstalt, and Germany's HypoVereinsbank spurred closer cooperation between **Austrian and German supervisors**. Supervisors from the two countries concluded MoUs in the areas of banking and securities supervision (BaFin, 2004) and work closely together in practice.

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<sup>1</sup> The European company statute enables the setup of a European public limited-liability company (Societas Europaea or SE). SE status is designed to greatly facilitate cross-border presence of multinationals, or even the movement of the SE's head office between member states (Council of the European Union (2001)).

expanded with a mandate to implement actions across the EU, bypassing in certain cases the role of other national authorities.<sup>123</sup>

159. **More centralization does not necessarily mean the creation of an omnibus EU-wide supervisory agency.** Various options could be considered that would fall well short of an “EU FSA,” not least because the case for bundling supervision of the different financial sectors under the same roof even within a single country is not clear-cut. And the merits of centralizing supervision of specific sectors, e.g., EU banking, would need careful consideration and in the end would have to rely on some form of local information gathering and supervision.

160. **An intermediate option would be to have a two-tiered structure in which the supervision of only the largest European financial institutions is placed in the hands of a centralized body.** Such a body would be charged with monitoring the activities of a handful of large banks/conglomerates from a perspective of ensuring EU-wide stability, along the lines of the US Federal Reserve’s Large Complex Business Organization program; the supervision of by far the majority of EU financial institutions would remain with national authorities.<sup>124</sup> As a first step, the main supervisory authorities involved in monitoring large financial groups could set up more regular sharing of information on strategies, risk profiles and the potential for contagion risks. The EU supervisory committees could also have access to a basic set of information on major EU financial groups in order to be more aware of the conditions and risks of the institutions that are most relevant for the EU as a whole.<sup>125</sup>

161. **To be fully effective, however, any centralized supervisory body would need to have clearly defined powers and responsibilities.** Thought might also have to be given to whether some other relevant powers, such as lender of last resort (LOLR) function, solvency support, and winding up rules should remain within the competence of national authorities.

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<sup>123</sup> For an interesting discussion of this and other options for the institutional setting for financial supervision in the EU, see Schoenmaker and Oosterloo (2005).

<sup>124</sup> For example, in 2004, the 13 most internationally active banks in the EU accounted for about one fourth of total EU banking assets. In the EU-15, there are more than 7,000 other credit institutions.

<sup>125</sup> These ideas for information sharing were advocated by ECB Executive Board Member Padoa Schioppa in a speech in March 2004 (<http://www.ecb.int/press/key/date/2004/html/sp040322.en.html>).

## **Crisis management mechanisms**

162. **Crisis management mechanisms are currently being revamped in response to the second Brouwer Report of 2001.**<sup>126</sup> The report concluded that the framework of MoUs on supervisory cooperation in Europe was functional but did not adequately address crisis management. It laid down arrangements for supervisory cooperation (lists of contact persons, conduct of on-site inspections and information exchange, etc). On March 1, 2003, the ECB, banking supervisors and EU national central banks agreed on a non-legally binding MoU that sets out high-level principles on dealing with cross-border financial crises in the EU.<sup>127</sup> The MoU is based on the principle of home country responsibility to inform other involved supervisors and to take most of the crisis management decisions. Host authorities, however, also remain authorized to use their own crisis management tools. In general terms, the MoU sets out the broad modalities of cooperation and information sharing, enumerates the types of information to be shared, and provides for coordination of media communications.

163. **The March 2003 MoU, while a positive beginning, is unlikely to be the last word.** The framework does not go far beyond information sharing. Individual member states in principle retain their own freedom of action and will be compelled by different national interests and incentives, as discussed above. At the level of the individual member states, the division of responsibilities remains at the discretion of each member state. The MoU does, however, leave the option to conclude “ex-ante agreements” on crisis management between the authorities of the member countries involved in supervising a specific cross-border institution. The MoU does not address the implications of a systemic crisis.

164. **A recent additional MoU among Ministries of Finance, national central banks, the ECB, and EU banking supervisors addresses crisis management issues.** The focus of the MoU, which was concluded at the ECOFIN meeting of May 14, 2005 and entered into effect on July 1, 2005, remains on information sharing, although it also promotes the development of crisis management tools. Reaching agreement on modalities is a difficult process and the nomination of a lead crisis manager for systemic crises can be expected to be even more difficult than for individual institutions. Member states are likely to want to retain their individual intervention authority, which could hinder effective resolution at the EU level.

165. **LOLR issues in a systemic crisis also need to be clarified.** The EU member countries are served by the European System of Central Banks (ESCB), consisting of the ECB, and the national central banks. The central banks of the countries participating in the euro area are clearly the largest group, covering roughly half of the countries. National

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<sup>126</sup> Report on Financial Crisis Management, Brussels, April 17, 2001, EFC/ECOFIN/251/01-en-Final.

<sup>127</sup> Cooperation with non-EU authorities is outside the scope of the MoU, the full content of which has not been disclosed to the public.

central banks would generally have sufficient resources to cover liquidity problems that individual institutions might face in many cases. In a systemic crisis, however, coordination of LOLR functions would be essential. The present system relies on good communication and understandings between central banks and supervisory agencies.<sup>128</sup> At the EU level, no formal crisis management committee or similar type of institutional structure has been announced—unlike in some regions, e.g. the Nordics. Operational modalities are, however, tested periodically in “war games” in which failures of systemically important financial institutions are simulated. The war games provide important lessons to central bankers about potential weaknesses in the coordination of responses to a crisis, and provide pointers on how to manage systemic liquidity and avoid breakdowns in payments systems.

**166. In order to ensure appropriately prompt resolution of insolvent financial institutions, greater ex ante clarity about the apportionment of fiscal costs would also be helpful.** A failure of a large financial institution could exhaust a local deposit insurance system, prompting questions as to “who pays what” and “who receives what.” The cost of cross-border systemic crises can be widely different from country to country, certainly when knock-on effects such as credit access and impact on labor markets are taken into account. Crises with EU-wide systemic importance can cause serious disruption in one country, and much less in another. Deciding fiscal responsibilities is not easy: (i) Should the costs somehow be pro-rated? (ii) Should the home country of a large conglomerate—even if the crisis did not originate in that country—be compelled to contribute more than others? (iii) Should there be provisions to protect smaller markets, where a conglomerate may have systemic dimensions, or to ring-fence assets of the conglomerate in that country? (iv) What should the relationship be between supervisory responsibility and responsibility for bearing the resolution costs in case of problems? It will not be easy to build consensus on answers to such questions.

### **Regulatory and supervisory convergence**

**167. Further convergence of laws, regulations, and supervisory practices across EU countries would level the playing field, minimize the regulatory burden on the industry and help lessen some of the conflicting incentives that might arise in a crisis situation.** As such, regulatory convergence can contribute to the integration of financial markets, facilitate more effective supervision, and create greater clarity. Such a process will need to be subject to appropriate accountability and transparency arrangements.

**168. The streamlining of rulemaking is taking place under the so-called Lamfalussy process.** The Lamfalussy process was initially designed to streamline the regulatory process of the securities sector within the EU. However, in response to pressures to integrate EU financial markets, the Council of Ministers of Finance of the EU invited the European Commission to extend the Lamfalussy process to banking, insurance and investment funds in

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<sup>128</sup> In principle, the ECB has not made a commitment to provide LOLR facilities beyond the euro area so as not to engender moral hazard problems.

order to establish a new financial services committee organizational structure.<sup>129</sup> The key concept of the Lamfalussy process is to move much of the discussion on technical aspects and supervisory practices “downstream” to technical committees, thereby avoiding lengthy discussions at the political level. It distinguishes four levels in the EU financial rulemaking architecture: Level 1 (legislative)—adoption of principle-based directives by the EU Council of Ministers and the European Parliament in “co-decision” procedures; Level 2 (technical implementation)—secondary legislation based on the directives, proposed by the European Banking Committee (EBC),<sup>130</sup> with technical advice from the Committee of European Bank Supervisors (CEBS), to the Commission for enactment by the latter; Level 3 (exchange of information, cooperation and convergence of supervisory practices)—CEBS<sup>131</sup> with a mandate to promote consistent implementation of level 1 and 2 rules by member states; Level 4 (strengthened enforcement)—enhanced enforcement of EU financial rules by the European Commission, member states, regulatory bodies and the private sector. Although a preliminary assessment by the Commission suggests the Lamfalussy process is having a positive impact on securities markets regulation, it is too soon to assess whether it is achieving its objective of greater rulemaking flexibility and efficiency in banking.

**169. Even so, the rulemaking process remains populated by numerous committees and advisory bodies, which detracts from its efficiency.** In the banking area, for example, eight different agencies and bodies are involved in maintaining banking sector soundness and stability (Box V.4). The structure ensures inputs from most relevant parties. However, inclusiveness and multiple layers of decision-making may become a liability when too many conflicting interests need to be reconciled—a problem that has increased with the accession of ten new member states. Therefore, a new round of restructuring may be worth considering, possibly in the context of the second evaluation of the Lamfalussy process in 2007, as envisaged in the Commission’s Green Paper.

**170. Convergence of regulatory and supervisory practices and standards has proceeded on a number of fronts.** Some of the most important initiatives undertaken, with

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<sup>129</sup> Directive of the European Parliament and of the Council of Ministers amending Council Directives 73/239/EEC, 85/611/EEC, 91/675/EEC, 93/6/EEC and 94/19/EC; 2002/83/EC and 2002/87/EC.

<sup>130</sup> Commission Decision of November 5, 2003, 2004/10/EC.

<sup>131</sup> Commission Decision of November 5, 2004, 2004/5/EC.

### Box V.4. Key Bodies in the EU Banking Sector Supervision and Stability Architecture

**European Banking Committee (EBC):** high-level representatives of the Ministers of Finance of member states, chaired by the Commission; the ECB, the chair of CEBS, and (optionally) national central banks may participate as observers. The EBC advises the Commission on policy issues related to banking activities and on Commission proposals in the banking area. The EBC is a “Level 2” Lamfalussy Committee.

**Committee of European Banking Supervisors (CEBS):** representatives of supervisory authorities and central banks of the EU member states and the European Central Bank (ECB) as a non-voting member; only supervisory authorities have voting rights. CEBS’ main focus is regulatory and supervisory convergence. Tasks include promoting supervisory cooperation, exchange of information on individual institutions including in distress situations, issuance of nonbinding interpretative guidelines and recommendations on regulations, setting standards in areas not covered by Level 1 or 2 legislation. Supporting working groups comprise: the former *Groupe de Contact* of European supervisors;<sup>1</sup> technical working groups on capital requirements, accounting and auditing; a Task Force on Supervisory Disclosure; and a temporary committee on bank reporting. A Consultative Panel of market participants has been formed to secure input from market practitioners. CEBS is a “Level 3” Lamfalussy committee.

**European Central Bank (ECB):** Financial stability monitoring in cooperation with national central banks and supervisory agencies (annual report on “EU Banking Sector Stability”); publication of the Financial Stability Review; advice on financial rulemaking within the “Lamfalussy” structure; participation in the Basel Committee on Banking Supervision, the EBC and CEBS (observer status). For a central role of the ECB in banking supervision in the EU, the EU Council must activate Article 105 (6) of the Treaty. This is politically unlikely at this time.

**ESCB Banking Supervision Committee (BSC):** National central banks, banking supervisory authorities and the ECB; BSC plays a key role in the preparation of supervisory MoUs between EU supervisors. It also performs macro-prudential and structural monitoring of the EU financial system, and analyzes the impact of regulatory and supervisory requirements on financial stability. Preparatory work is performed in four working groups: macro-prudential analysis; structural developments in the EU banking sector; crisis management, and credit registers.

**Economic and Financial Committee (EFC):** Deputy-Ministers of Finance, the European Commission, the ECB and the national central banks; it provides high-level assessments of developments in financial markets and services, and advises the ECOFIN and the Commission.

**Financial Stability Table (FST):** twice per year (April-September), the EFC meets in a special composition, including CEBS, the other level-3 Committees for securities and insurance (CESR and CEIOPS), as well as the BSC, under the heading “Financial Stability Table,” to discuss financial stability issues. The discussion of banking issues is based mainly on ECB reports and the ECB Financial Stability Review, and on ad-hoc input from CEBS. The FST has recently prepared, with the assistance of the FSC, an MoU on systemic crisis management among Ministers of Finance, banking supervisors, national central banks and the ECB, which was adopted at the ECOFIN on May 14, 2005.

**Financial Services Committee (FSC):** previously the Financial Services Policy Group, the FSC is composed of representatives of the Ministries of Finance, the Commission, the ECB and the chairpersons of the Level 2 and 3 Committees of the three sectors (ECB and Committee chairs have nonvoting observer status). It discusses and provides guidance on cross-sector strategic and policy issues, especially technical and political aspects, and assists the EFC in preparing ECOFIN meetings.

**Financial Conglomerates Committee (FCC):** created by Directive 2002/87, the FCC provides guidance to EU supervisory authorities on the implementation of conglomerate supervision.

<sup>1</sup> The *Groupe de Contact* was initially created in 1972 and recognized by the First EU Banking Directive of 1977.

CEBS carrying much of the agenda, include the introduction of International Financial Reporting Standards (IFRS) in the EU per January 1, 2005 and reinforcement of rules on



statutory audits. These measures will provide an important contribution to the elimination of differences in accounting systems across the EU. Furthermore, in the context of the debate on IAS 39, CEBS has drafted a proposal to IFRS for the development of prudential adjustments (“prudential filters”) in order to avoid any unintended changes in prudential computations under IAS 39 which could be counterproductive from a supervisory point of view. The Commission’s “Green Paper” on post-FSAP financial services policy suggests a number of measures to further level the playing field for financial services, including a “Financial Services Rulebook” to simplify and consolidate all relevant (national as well as EU) financial services rules.

**171. The EU also envisages a synchronized and largely harmonized adoption of Basel II.** This would encompass common guidance on the supervisory review process (Pillar 2 of the new Basel Capital Adequacy Framework; consultation draft forthcoming), as well as guidance for validation of internal ratings-based credit risk and operational risk approaches. The risk of an unlevel playing field under Basel II has been further reduced by a limitation of the number of items of national discretion. The adoption of the concept of the “consolidating supervisor” will facilitate dealing with home-host issues, as will the issuance of common guidelines on home-host issues (consultation draft forthcoming). Common implementation of Pillar 3 of Basel II will be further facilitated by the issuance of a common framework for supervisory disclosure. Building on the common introduction of IFRS and Basel II, CEBS is also developing a common framework for bank balance sheet and income statement data and common reporting of the solvency ratio; reporting is to take place using XBRL (Extensible Business Reporting Language), facilitating consistent compilation of capital data across the EU.

**172. Further convergence in deposit insurance and legal frameworks for bank resolution remains necessary.** Although consistent with the Deposit Insurance Directive (94/19/EC), deposit insurance schemes vary widely on important issues such as amount of coverage—even within countries, between domestic banks and branches of banks from other EU countries—co-insurance, risk-based premiums, and funding (see Garcia and Nieto (2005)). In about a fourth of member countries, institutions can offset claims on depositors, providing a disincentive to depositors from abroad. These essential differences are not only a source of uncertainty for depositors, and hence a barrier to more integration of retail banking, but also complicate the “who pays what” problem described in the preceding section. Likewise, the need to further develop common legal frameworks for resolving problem banks adds to the complexity of managing failed institutions operating in more than one European country. These issues are partially dealt with in Directive 2001/24/EC on the Reorganization and Winding-up of Credit Institutions.

## **E. Conclusions**

**173. Supervision and regulation will need to continue to evolve to keep up with the changing shape of the financial system, changing corporate structures and management practices, as well as evolving risk profiles.** Although the EU is far from a single market in banking and insurance services, internal borders are increasingly porous. Financial

institutions have grown rapidly in size and their cross-border ties are becoming increasingly complex, as they follow the transnational development of their large corporate clients. At the same time, market-based indicators suggest that aggregate risk among large banks in the system has not necessarily declined while the convergence of risk profiles across institutions and countries is a potential new source of systemic risk. Against this background, the EU is adapting the supervision of cross-border financial conglomerates, strengthening crisis management, and rationalizing the legislative and regulatory process through the Lamfalussy process.

**174. Under the current system of nation-based supervision, the challenge will be to align the incentives of different supervisory bodies and continue to improve coordination.** However, while the specter of “too many cooks” retains its relevance, the EU has already taken a number of steps in this direction. Aside from the regulatory convergence already undertaken within the regulatory committees such as CEBS, the Maastricht Treaty itself—subject to activation of the relevant provision by the European Council—potentially envisages a more important role of the ECB in financial supervision. Moreover, individual member countries and regional groups are responding to the challenge through closer cooperation and the use of bilateral MoUs. An EU-wide MoU on crisis management has been concluded in 2003, and an MoU on how to deal with systemic crises was recently concluded. The ECB and other central banks also conduct war games to test crisis readiness. Nonetheless, further steps toward some form of more centralized supervision, perhaps at least of the largest financial conglomerates, should be considered. Meanwhile, efforts should continue to promote convergence of laws and regulations across EU countries, including the harmonization of deposit insurance schemes and bank resolution frameworks.

**175. The trend towards a more integrated prudential system is driven by the financial sector integration process itself, which in turn follows integration developments in the real sector.** The markets demand a regulatory and supervisory system that avoids unnecessary regulatory burdens, complexity, and constraints. At the same time, the gradual transition of the nation-based supervisory system in the EU to a more integrated system, while advancing, is encountering more resistance.

**176. Clearly, the current debate is not about “national versus central” regulation and supervision, but about (i) how far and (ii) how fast to move in the direction of centralization.** An “organic” approach to further centralization may be attractive from some perspectives but leaving supervision to catch up with business practices may in the end prove not only more costly, but also leaving supervisors without the necessary tools in time of need.

Table V.1. Assets of Branches and Subsidiaries from EEA Countries

	1997	1998	1999	2000	2001	2002	2003	1997	1998	1999	2000	2001	2002	2003
	(In percent of GDP)							(In percent of total foreign assets)						
France	14.6	15.4	21.7	29.3	28.4	27.5	24.9	57.5	65.3	76.2	79.1	81.3	86.0	87.0
Germany	6.0	7.3	7.2	7.6	9.7	14.3	13.9	54.7	62.0	62.7	61.4	67.9	78.3	77.6
Italy	8.5	10.3	10.1	8.8	7.4	8.3	8.7	78.2	89.1	92.4	89.8	89.1	89.3	92.1
Spain	15.4	15.0	12.8	13.3	15.1	16.5	20.2	72.0	75.4	78.6	80.4	84.5	86.2	89.9
<b>Large EMU 1/</b>	<b>11.1</b>	<b>12.0</b>	<b>13.0</b>	<b>14.8</b>	<b>15.2</b>	<b>16.6</b>	<b>16.9</b>	<b>65.6</b>	<b>72.9</b>	<b>77.5</b>	<b>77.7</b>	<b>80.7</b>	<b>84.9</b>	<b>86.6</b>
Belgium	69.5	63.3	62.0	62.5	69.4	65.0	63.6	74.6	78.9	86.3	89.1	91.3	90.7	89.9
Greece	11.9	12.4	15.7	23.5	21.7	25.4	26.5	59.4	63.8	70.3	74.1	76.1	82.2	86.4
Ireland	121.6	146.8	166.5	170.8	178.0	127.8	145.1	87.1	86.9	86.2	85.4	81.5	73.6	75.8
Luxembourg	2798.7	2810.0	2822.6	2617.6	2902.5	2617.4	2495.4	90.3	92.9	93.5	93.3	93.5	94.6	95.1
Netherlands	11.4	12.0	9.3	26.9	28.9	27.2	33.2	68.1	72.2	67.8	84.0	86.8	86.9	88.0
Austria	5.0	3.9	4.2	4.2	50.5	52.9	49.5	65.5	60.9	62.8	58.2	96.3	97.1	96.4
Portugal	31.0	53.9	34.6	57.9	67.7	65.8	68.8	88.4	89.8	84.3	95.3	95.8	96.2	97.2
Finland	8.2	7.7	9.5	7.9	8.2	10.8	9.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<b>Small EMU 1/</b>	<b>382.2</b>	<b>388.7</b>	<b>390.6</b>	<b>371.4</b>	<b>415.9</b>	<b>374.0</b>	<b>361.5</b>	<b>79.2</b>	<b>80.7</b>	<b>81.4</b>	<b>84.9</b>	<b>90.2</b>	<b>90.2</b>	<b>91.1</b>
<b>EMU-11 (ex LX) 1/</b>	<b>26.2</b>	<b>30.0</b>	<b>30.6</b>	<b>35.6</b>	<b>41.7</b>	<b>38.2</b>	<b>40.1</b>	<b>72.6</b>	<b>76.4</b>	<b>78.8</b>	<b>81.2</b>	<b>86.0</b>	<b>87.6</b>	<b>88.9</b>
<b>Total EMU-12</b>	<b>21.3</b>	<b>23.1</b>	<b>24.8</b>	<b>28.3</b>	<b>31.9</b>	<b>31.6</b>	<b>31.7</b>	<b>74.0</b>	<b>79.3</b>	<b>82.5</b>	<b>83.3</b>	<b>85.6</b>	<b>87.2</b>	<b>87.8</b>
Denmark	9.6	14.4	10.0	13.2	44.0	48.8	48.3	100.0	100.0	100.0	99.4	99.7	99.8	99.7
Sweden	4.2	6.7	5.7	8.4	10.2	11.7	13.8	93.3	95.7	94.6	92.4	93.4	93.6	93.9
U.K.	77.7	82.0	81.6	85.4	89.8	81.2	88.5	45.2	50.9	49.6	48.5	48.8	48.6	45.7
<b>Total non-EMU-3</b>	<b>60.6</b>	<b>65.5</b>	<b>64.9</b>	<b>69.1</b>	<b>76.1</b>	<b>69.9</b>	<b>75.0</b>	<b>45.8</b>	<b>51.8</b>	<b>50.3</b>	<b>49.3</b>	<b>50.5</b>	<b>50.7</b>	<b>47.8</b>
Total EU-15	29.6	32.2	33.7	37.8	42.0	40.4	41.2	58.5	64.4	64.8	64.4	66.4	67.9	65.8

Source: ECB (2004b)

1/ Unweighted average.

Table V.2. Balance Sheet Data from Individual Banks

	1997	1999	2001	2003	1997	1999	2001	2003	1997	1999	2001	2003
	France				Germany				Italy			
Income												
Interest (percentage of total)	75.3	70.4	68.9	61.3	75.1	74.5	72.6	62.0	68.7	59.2	60.4	52.4
Operating (percentage of total)	24.7	29.6	31.1	38.7	24.9	25.5	27.4	38.0	31.3	40.8	39.6	47.6
Asset growth in 2 years (percentage)		27.5	5.8	64.8		3.9	18.1	11.7 2/		8.0	0.7	36.8
Liabilities growth in 2 years (percentage)		27.2	5.6	64.2		3.7	18.0	11.7 2/		7.9	0.0	36.0
Return on Equity	9.5	10.4	13.2	10.2	7.0	6.0	1.5	-6.2	-2.9	13.3	10.4	8.0
Total Capital Ratio	10.5	10.9	10.9	12.4 1/	9.3	9.9	10.9	12.3	10.0	8.9	8.8	10.3 3/

	1997	1999	2001	2003	1997	1999	2001	2003	1997	1999	2001	2003
	Netherlands				Spain				United Kingdom			
Income												
Interest (percentage of total)	66.4	65.4	65.8	57.6 4/	64.7	61.9	62.2	55.0	58.8	56.4	54.9	47.8 6/
Operating (percentage of total)	33.6	34.6	34.2	42.4 4/	35.3	38.1	37.8	45.0	41.2	43.6	45.1	52.2 6/
Asset growth in 2 years (percentage)		25.5	19.4	51.6		0.7	17.1	42.5		13.5	74.2	53.5 6/
Liabilities growth in 2 years (percentage)		25.4	22.3	51.9		0.5	15.8	42.9		13.0	72.9	54.2 6/
Return on Equity	12.8	16.2	17.7	18.5	13.0	16.2	14.3	15.1	22.7	20.8	13.3	16.8
Total Capital Ratio	10.7	10.9	11.0	11.8 4/	11.9	10.1	11.2	10.5 5/	12.0	13.0	11.9	12.0

Source: FitchIBCA database.

1/ Excluding Credit Agricole because of missing data.

2/ Excluding Deutsche Bank for the comparison between 1999 and 2001 and between 1997 and 1999, because of missing data.

3/ Excluding Banca Intensa and UniCredito because of missing data.

4/ Excluding ING because of missing data.

5/ Excluding BBVA (1997 and 1999) and Santander (1997) because of missing data.

6/ Excluding HBOS because of missing data.

Table V.3. Volatility of Income Growth for Large Listed Banks, 1997-2004\*

	# of banks	Net Interest Income (NII)	NIR minus Loan Loss Provisions	Non-Interest Income (NONII)	Net Income	Correlation NII with NONII
France	13	17.4	19.1	18.1	27.7	-0.30
Germany	8	8.2	17.4	12.3	103.6	0.66
Italy	20	6.8	7.4	16.1	254.9	0.15
Spain	9	9.1	8.4	10.7	13.1	0.49
The Netherlands	4	18.8	17.1	26.6	31.8	0.68
U.K.	15	9.2	9.2	11.8	17.8	0.79
EU 15	101	8.3	7.2	12.1	17.7	0.79

\* Source: Bankscope. Volatility is measured by the sample standard deviation.

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## VI. BANKS AND MARKETS IN EUROPE AND THE UNITED STATES<sup>132</sup>

### A. Overview

177. **Financial integration promises a cheaper and better allocation of resources and risk, increased liquidity, and greater financial stability.** The fragmentation of many banking markets dates back to public policies adopted in response to the financial crises of the 1930s. Following the crises, the consensus was that restraining competition would help in preserving the stability of the banking and financial industry. Accordingly, banks were often forbidden to operate across states or regions or to offer a full array of financial services. The allocation of credit was controlled and credit ceilings played a key role in monetary policy. However, attitudes have since evolved, partly because of developments on the ground that were driven by profit maximization and technological progress. Policymakers and supervisors now emphasize the benefits of competition and market discipline, supported by capital adequacy regulation and close supervision; and the academic literature agrees that there is no simple trade-off between competition and financial stability.<sup>133</sup>

178. **This paper reviews the EU and US histories of financial integration and analyzes the current state of play through the prism of efficiency and competition.** Section B presents the milestones of financial integration in Europe and the United States and briefly reviews remaining obstacles. Section C explores the differences between the roles of banks and markets in Europe and the United States. The main argument is that Europe's financial markets are less complete and thus the division of tasks between money and capital markets on the one hand and banks on the other may not have gone as far as in the United States. Section D presents evidence suggesting that EU banks are less effective in raising revenue than their US counterparts, with differences in their business mix and specialization potentially playing an important role. Section E explores competition, finding that larger, internationally-active banks engage in more competition in Europe than smaller banks; also, European banks appear to engage in less competition than their US counterparts. Section F reflects further on the reasons for the observed, lower revenue effectiveness of EU banks, suggesting that less competition, missing financial markets, and various other factors might play a role. Section G discusses policy implications.

179. **While US financial markets offer a natural benchmark, they do not necessarily represent a model for convergence.** Financial markets in the United States offer a natural benchmark for assessing integration in the European Union partly because of the country's size and level of economic development, but also because banking markets were highly

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<sup>132</sup> Prepared by Jörg Decressin and Beata Kudela (both EUR).

<sup>133</sup> For a succinct review of changing attitudes, see Padoa-Schioppa (2001). Integration is not without risks for financial stability, however, as Chapter V discusses.

fragmented in both areas until the drive for integration accelerated in the late 1980s. Money and capital markets, by contrast, as well as regulation and supervision were always highly integrated in the United States but not in the European Union. This is likely to have influenced the relative developments of banks and markets, a theme that is revisited below. One caveat is that financial market structures differ quite considerably across countries in Europe. In that sense, by focusing on Europe as a whole, various complexities of the area's financial sector are not discussed. Instead, whenever particularly relevant, this paper draws on the existing evidence on country specificities.<sup>134</sup>

## **B. History of Integration**

**180. Through the late 1980s, capital and banking markets in the European Union were highly fragmented but this changed quickly with the quest for a single currency.** Aside for the Treaty of Rome, key milestones for European financial integration include, the Directive on Liberalization of Capital flows (1988), the Second Banking Directive (1989), and the Maastricht treaty (1992). The Maastricht treaty set the stage for the single currency and the eventual integration of bank, money and capital markets but left regulatory and supervisory powers with national authorities. The 1988 directive opened capital flows effective July 1990 but allowed the reimposition of controls under emergency circumstances. The Second Banking Directive entered into force starting in 1993 and set out the key drivers of banking market integration: home-country control and mutual recognition, resulting in a "single passport". Any bank licensed in an EU country was subsequently free to open branches in any other EU country provided it met some common, minimum standards.

**181. Banking market integration in the United States was a more gradual bottom-up process, taking place against the backdrop of a single currency and integrated money and capital markets.** The federal law that prohibited commercial banks from operating across state lines dated back to 1927: the McFadden Act did, however, permit cross-border banking through multibank holding companies with state approval. In 1978, Maine took the first step and allowed entry of bank holding companies from other states, provided these states reciprocated. By 1992, virtually all states had passed reciprocal entry laws of some sort.<sup>135</sup> The Riegle-Neal Interstate Banking and Branching Efficiency Act capped this development, allowing national bank branches across state lines after June 1, 1997. As a result, between the mid-1970s and mid-1990s, the ratio of a typical state bank's assets held by an out-of-state bank holding company climbed from 10 to over 60 percent.<sup>136</sup> In addition,

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<sup>134</sup> For example, see Allen and Gale (2000), as well as the many references therein for further information on country specificities.

<sup>135</sup> See Morgan, Rime, and Strahan (2004).

<sup>136</sup> More recent data cannot be produced because since the mid-1990s holding companies can consolidate their assets at their headquarters.

the Gramm-Leach-Bliley Act of 1999 ended the separation between commercial and investment banking that dated back to the Glass-Steagall Act of 1933.

**182. Reciprocity and the mutual recognition of standards were key drivers of financial integration in both Europe and the United States.** In the United States, this was, to some extent, driven by loopholes in federal legislation and fostered by the highly integrated legislative and regulatory frameworks. In Europe, mutual recognition offered a much quicker vehicle for integration than the harmonization of laws and regulations. Nonetheless, a minimum of harmonization is required for an integrated financial market to emerge. Also, the mutual recognition extends only to branches and not subsidiaries: the latter avenue for entering foreign markets remains more costly to pursue. More generally, the process of integration in Europe was multilateral and part of a wider, top-down program to achieve a single market. As a result, ownership of some EU countries might not have been as strong as that of single US states entering “bilateral” agreements. But ultimately financial integration will have to ensure the free flow of services across EU member countries foreseen by the Treaty of Rome.

**183. Notwithstanding significant progress, many observers thus come to a mixed assessment of what has been achieved in Europe.**<sup>137</sup> Integration has proceeded furthest at the wholesale level, while the market for retail services is lagging behind.<sup>138</sup> Also, regulation and supervision continue to differ significantly.

- Regarding financial markets, wholesale money and bond markets are now relatively well integrated. However, a fully satisfactory degree of integration has only been achieved in the unsecured euro money market. The markets for corporate bonds and commercial paper are expanding rapidly. But other markets, such as those for asset-backed securities, lag far behind. Equity markets are converging, as evidenced by less home bias and increasing correlations of returns but the process is incomplete. However, many small exchanges continue to operate, even within countries. Crucially, crossborder clearing and settlement are far from integrated.
- Banking remains fragmented. The Single Passport has fostered crossborder branching: the market share of crossborder branches in the EU reached some 24 percent of GDP in 2002. But the attractive avenue of entering markets through subsidiaries is complex. Relatedly, crossborder mergers and acquisitions (M&A) face significant hurdles and thus have not featured prominently: during 1987–2003, they accounted for less than 10 percent of all bank M&A activity in 13 years out of the 17 years in the sample and reached peaks of close to 30 percent only in 1987 and

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<sup>137</sup> For example, see Padoa-Schioppa (2004).

<sup>138</sup> For further details, see Chapter IV.

2000.<sup>139</sup> Also, only some 5 percent of bank credit is granted across borders and the variety of mortgage products, for example, is presently rather limited in many EU countries.<sup>140</sup> However, retail banking will probably retain a strong geographic component. Even in the United States no bank presently operates a dense branch network across the entire country. While some 538 organizations operated branches in more than one state as of mid-2003, only fourteen had branches in more than ten states. The institutions with the widest geographic reach had branches in only about half the states.<sup>141</sup>

- Regulation and supervision of banks, insurance companies, and securities markets still differ significantly across EU countries, slowing the pace of integration. While considerable progress has been made with the FSAP and the Lamfalussy process, a single rules book and uniform supervisory practices are still a long way off.
- Institutional differences continue to hamper the development of a unified market for financial services. Crossborder barriers derive from tax legislation, for example, from double taxation of income flows of associated companies established in different countries; or from the taxation of savings, including tax breaks and other vehicles to support personal savings, notably for retirement. In addition financial reporting standards differ across countries for non-listed companies; European private law is not sufficiently consolidated, making it difficult to arrange crossborder collateral pledges; and different consumer protection regimes stand in the way of the introduction of EU-wide retail banking products.<sup>142</sup>

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<sup>139</sup> See Walkner and Raes (2005) for further evidence.

<sup>140</sup> Similarly, the 1985 UCITS Directive, which tried to facilitate crossborder offers of investment funds to retail investors, has not been very successful.

<sup>141</sup> See Hirtle and Metli (2004). By those numbers, Europe is not doing obviously less well: some 40 groups are operating in five to six member countries; five of these groups are present in ten or more countries. However, numbers can be deceiving: EU countries are larger than US states and thus the comparison is not entirely fair. Furthermore, judging by discussions among market players, observers, and policymakers, contestability—particularly of key markets—appears lower in Europe. This issue is explored further in Section E.

<sup>142</sup> See Walkner and Raes (2005) for more information.

### C. Structural Characteristics

#### Banks and capital markets

184. **Bank- and market-based systems offer different advantages.** An extensive literature discusses the relative merits of each system without reaching definitive conclusions.<sup>143</sup> One key argument in favor of banks is that their long-term relationship with firms helps overcome the inefficiencies related to adverse selection and moral hazard (Stiglitz and Weiss, 1983). Hence banks may better smooth intertemporal risk than markets. However, solid empirical evidence on these intertemporal risk sharing properties is lacking and countries have a variety of public programs that are likely to share risk more effectively across time (for example, defined benefit pension systems). Market-based systems, by contrast, are viewed as providing better cross-sectional risk sharing. Also, such systems generate more information and thus are seen by some to better fit advanced economies, as these economies explore new production possibilities rather than catch up with existing frontiers (e.g., Boot and Thakor, 1997). However, markets are very volatile and require a complex legal and regulatory infrastructure to work well.

185. **Relative to the economy, EU capital markets are much smaller and bank balance sheets much larger than in the United States** (Table VI.1). The absence of a single currency and legal/regulatory hurdles in the European Union contributed to the area's smaller capital markets. Thus, the EU financial system is typically labeled bank-based and the US system market-based.

186. **It is not clear, however, whether the distinction between bank- and market-based systems is very relevant for an EU-US comparison.** For example, while EU banks hold larger balance sheets, the data point to less bank lending to the nonfinancial private sector by EU banks rather than US banks. EU banks only hold a relatively small lead with respect to lending to firms. Because of securitization—which took off during the 1980s with the development of collateralized mortgage obligations—loans to the nonfinancial private sector in the United States do not necessarily show up on banks' balance sheets as assets (Table VI.1). Specifically, US banks no longer fund directly much of their household lending (home mortgages and, more recently, consumer credit), which is well suited to standardization and thus securitization. Since US banks also face rising competition from bond markets for unsecuritized business lending, they increasingly hold loans that are less well suited to standardization, notably business loans collateralized by real estate.<sup>144</sup> Accordingly, US banks increasingly engage in placing risk in financial markets, keeping only those risks on balance sheets for which they enjoy a particular comparative advantage.

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<sup>143</sup> For an excellent survey, see Allen and Gale (2001).

<sup>144</sup> See Samolyk (2004) for a comprehensive review.

Notwithstanding the large difference with respect to balance sheet size, EU and US per capita banking sector employment is thus quite similar (Table VI.2). From that perspective, banks are similarly important in both economies. Where Europe leads is in the accumulation of bricks and mortar (branches) and where it lags is in equity markets.

**187. The data on employment and lending put a different spin on the public debate about consolidation.**<sup>145</sup> The European Union is often viewed as overbanked and in need of consolidation—not least owing to the large number of credit institutions in Germany, France, and Italy—amid accelerating disintermediation spurred by growing money and capital markets. But, the per capita number of banks and banking sector employment in the United States are similar or higher than in the European Union. Furthermore, although the number of banks has been falling significantly, total banking sector employment has actually risen in the United States over the past five years.<sup>146</sup> Over a horizon spanning the past three decades, the number of banks was virtually halved in the United States. However, the number of branches doubled and continues to grow.

### **Bank performance**

**188. EU banks do not display better financial strength indicators than their US counterparts** (Table VI.3). Data for 2003 suggest that the pre-tax return on assets (ROA) of EU banks reached only one third of the level of that of US banks. Reflecting a greater importance of off-balance sheet activities for US banks the gap with respect to return on equity (ROE) is considerably smaller but still quite significant. While the cost ratios of EU banks are lower, the revenue ratios fall short of those of US banks by an even wider margin, with interest and other revenues contributing in similar proportions. Cross sectional data on the top 100 EU and US banks paint the same picture (Table VI.4): not only does the median bank appear less profitable and capitalized in the EU, the same holds for the 10 percent weakest banks in the sample. Also, these data suggest that the relation between size on the one hand and financial strength indicators on the other is unclear, as evidenced by a comparison of larger (top 50) and smaller (lower 50) banks in the sample.<sup>147</sup>

**189. EU banks appear to engage in less risky activities than US banks and hold somewhat lower risk-adjusted capital.** This can be gleaned from the relation between the simple equity-to-asset ratio and the risk-based capital ratios. The simple equity-to-asset ratio

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<sup>145</sup> See, for example, Walkner and Raes (2005), Cecchini (1998), Davis and Salo (1998), and White (1998).

<sup>146</sup> Data for 1948-2001 also point to a broadly stable employment share of credit agencies in the United States (Samolyk, 2004).

<sup>147</sup> In the empirical literature on banking, the label “small” is typically reserved for a set of banks that hold much fewer assets than those ranked between 50 and 100.

of US banks is more than twice as high as that of EU banks but not the regulatory solvency ratio (Table VI.3). In other words, for regulatory purposes the assets of EU banks carry lower risk weights, suggesting that they engage in less risky activities. By contrast, capitalization of US banks has reached the highest level in some 50 years, owing to greater risk exposures and the market's increased demand that banks' default risk be adequately priced (Flannery and Rangan, 2004). The high level of capital cuts the return on equity (ROE) of US banks relative to that of EU banks but still leaves it some 50 percent higher.

**190. The gap of EU relative to US financial strength indicators opened in the 1990s and appears to reflect a trend rather than cyclical development** (Figure VI.1). Several factors might explain the improved performance of US banks, including market exit of weaker players,<sup>148</sup> cross-state M&A activity, and the accelerated development of new financial markets, including securitization, that enabled banks to better leverage their comparative advantages. By contrast, over the past decade the financial strength indicators for the European Union have moved broadly sideways. Section D sheds further light on the performance differences.

#### **D. Productive Efficiency**

**191. The lower profitability of EU banks could be related to lower efficiency or other factors, including different business models with lower risks.** Profitability of EU banks could have been lower because banks (for various reasons) face less pressure to use their inputs efficiently—this would be captured as a lower X-efficiency. Simple comparisons of profitability, revenue, and cost indicators do not provide enough information to judge the operational effectiveness of EU relative to US banks. For example, EU banks may, over the period under study, have faced higher labor costs and a less favorable yield curve than their US counterparts. Notwithstanding an efficient use of inputs, EU banks' profits may have been lower as a result. In other words, to judge efficiency it is important to hold constant for different input costs, which requires estimating revenue and cost functions. Furthermore, differences in business models and risks need to be considered as well. This section follows an approach that has been widely used in the literature to estimate X-efficiency.<sup>149</sup>

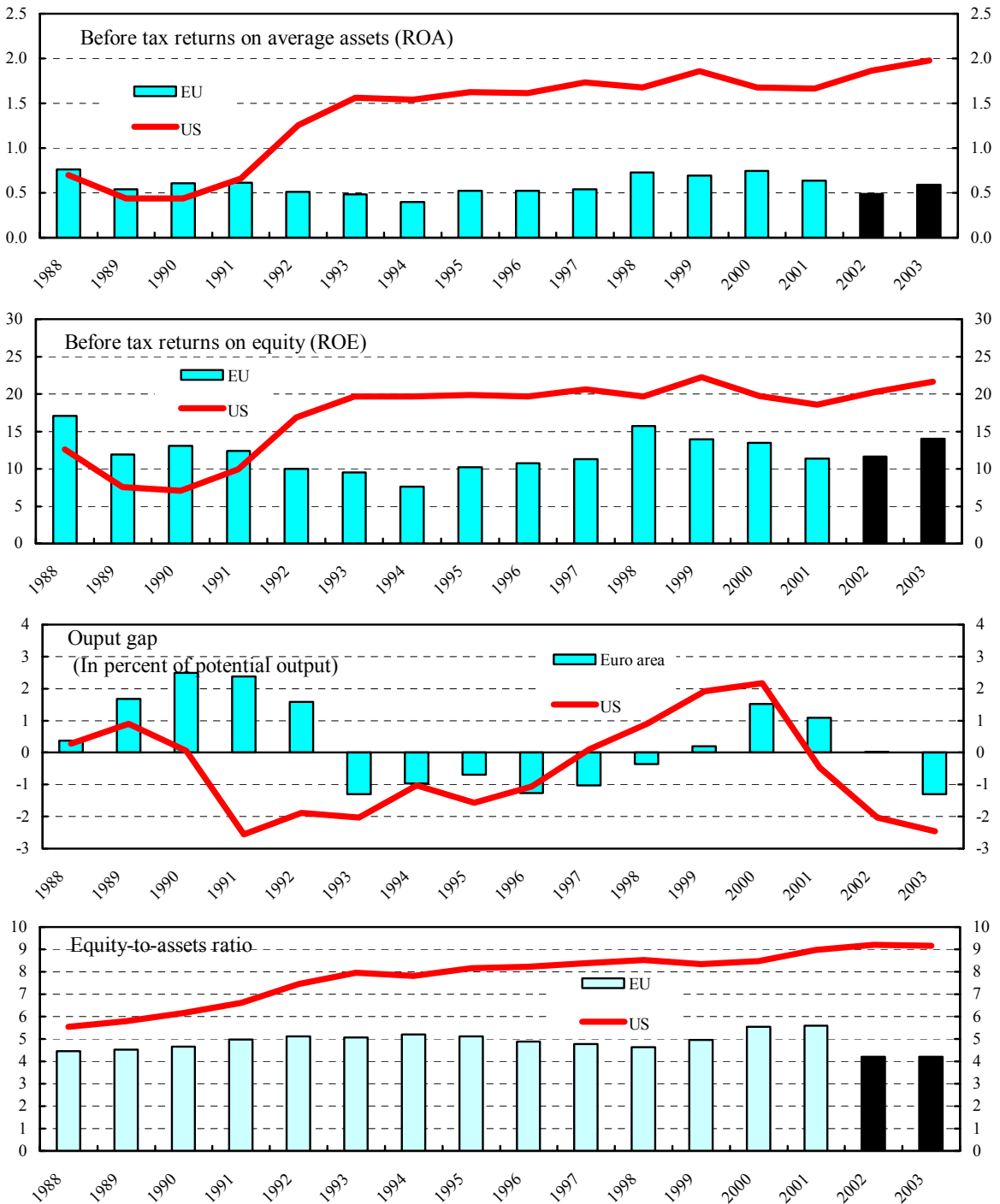
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<sup>148</sup> During 1980s, US banks failed in numbers not seen since the Great Depression, with the return on assets reaching a trough of 0.2 percent in 1987. The total number of FDIC-insured commercial and savings banks that were closed or received FDIC assistance reached 1,617 during 1980–94. See Hane (1998) for further information. The numbers do not include failed savings and loans associations.

<sup>149</sup> For survey of bank efficiency studies based on parametric and nonparametric frontier approaches see Berger and Humphrey (1997).



Figure VI.1. EU and US: Profitability and the Economic Cycle  
(In percent, unless otherwise noted)



Sources: ECB; OECD, Bank Profitability, 2002; and Federal Deposit Insurance Corporation.

Note: Data for the European Union from 1988 to 2001 refer only to Germany, France, Italy, UK, and Spain.

192. **Gauging productive efficiency requires that an assumption be made about banks' activities.** According to the “intermediation approach,” which is followed here, banks intermediate financial services using labor and capital as inputs, with the values of loans and investments used as the output measure. Given that labor and capital are the inputs, operating costs plus interest expenses are the relevant cost measures. The relevant revenue measure is operating revenue, excluding interest expenses.<sup>150</sup>

193. **A stochastic “best practices” frontier is a useful tool to gauge banks' efficiency.** This approach specifies the functional form of the efficient frontier as a translog cost or revenue function to investigate, respectively, the effectiveness of cost control and revenue generation.<sup>151</sup>

$$x_{it} = \alpha + \beta_{EU} + \sum_{j=1}^2 \beta_j^1 D_j + \sum_{j=1}^J \beta_j^2 Z_{ijt} + \sum_{j=1}^2 \beta_j^3 y_{ijt} + \sum_{j=1}^3 \beta_j^4 p_{ijt} + \frac{1}{2} \sum_{j=1}^2 \sum_{k=1}^2 \beta_{jk}^5 y_{ijt} y_{ikt} \\ + \frac{1}{2} \sum_{j=1}^3 \sum_{k=1}^3 \beta_{jk}^6 p_{ijt} p_{ikt} + \frac{1}{2} \sum_{j=1}^2 \sum_{k=1}^3 \beta_{jk}^7 y_{ijt} p_{ikt} + \varepsilon_{it} ,$$

with lower case letters denoting natural logarithms. Specifically, each bank *i* produces two outputs *y* (loans and other earning assets) and relies on three inputs with prices *p* (labor, interest expenses, and other operating costs). In addition, the equation includes a set of exogenous variables *Z*, two time dummies *D* (which proxy for changes in the macroeconomic environment), and a constant  $\alpha$ . The dependent variable *x* denotes either operating revenue, excluding interest expenses or operating cost plus interest expenses for bank *i* in year *t*; and the dummy  $\beta_{EU}$  for European banks measures their relative management effectiveness on both accounts.

194. **Importantly, an effort needs to be made to hold constant for differences in banks' business models for a fair comparison of effectiveness.** Section C shows that banks are similarly important in Europe and the United States. However, US banks increasingly

<sup>150</sup> According to the “production approach,” output is given by the total number of accounts and transactions and the relevant inputs are again the same as under the “intermediation” approach, except for interest expenses. Clearly, this approach is difficult to implement, as the scope of financial services has been expanding rapidly. It has thus largely fallen out of favor.

<sup>151</sup> For similar approach see Brunner and others (2004); and Hardy and Banaccorsi di Patti (2001).

keep only those assets on balance sheet for which they enjoy a particular comparative advantage (selling off other assets in markets), and these appear to be riskier ones. The set of exogenous variables  $Z$  in the regression equation tries to capture these differences in business models between banks. These variables comprise the loan-to-asset (L/A), deposit-to-liability (D/L), asset-to-employee (A/E), and the equity-to-asset ratios (C/A), depending on the specific regression. Several examples illustrate the role of these variables: (i) one bank may engage extensively in securitization of less risky assets and keep more risky assets on its balance sheet. Another engages in the same lending but keeps all assets on balance sheet. The former bank would have to hold more equity relative to assets than the latter and this would be captured by the equity-to-asset-ratio; (ii) one bank might rely relatively more on deposits as a source of funding than others that, instead, tap the bond market. This difference would be captured by the deposit-to-liability ratio; and (iii) one bank may be more active in investment banking and other services than others that, instead, focus on firm/household lending. This would be captured by a lower loan-to-asset ratio. Furthermore, the regressions distinguish between the top 50 and the lower 50 banks, as their size differs considerably and so might their business models in ways not captured by the  $Z$  variables. Nonetheless, the exogenous variables  $Z$  and the splitting of the sample clearly cannot proxy perfectly the differences in business models of banks, including their risks.<sup>152</sup>

**195. The EU sample of banks is more homogenous than the US sample and the EU banks tend to hold more assets.** The data sample comprises the 100 largest banks in the European Union and the United States, respectively, for 1997, 2000, and 2003, drawn from Bankscope. It is difficult to put an exact number on the market share of these 100 banks in each area but it exceeds 50 percent, probably by a substantial margin. The combined assets of the top 50 banks (“large” banks) are about four (seven) times as large as those of the lower 50 banks (“small” banks) in the European Union (United States). While the EU-to-US ratio of median assets equals 3.2, the same ratio for median employment only reaches 1.5, again pointing to the greater role of off-balance sheet activities among US banks.

**196. Ordinary least squares estimates of the efficient frontier suggest that EU banks are less effective in generating revenue, while costs appear well behaved.**<sup>153</sup> On average, EU banks exhibit 5 percent lower costs than their US counterparts, regardless of the regression specification (Table VI.5). However, they also generate up to about 18 percent

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<sup>152</sup> More fundamentally, the stochastic frontier has further limits when applied to banks, notwithstanding its wide use in the banking literature. Specifically, it relies on a traditional production function which is, obviously, less well suited to modern financial institutions than to, say, a typical manufacturing firm.

<sup>153</sup> In estimating the translog cost function the standard restrictions are imposed (see, for example, Johnston, 1988). Notice that in theory the error term should have a skewed, non-normal distribution. But in practice studies have found that using ordinary least squares does not make much difference, partly because the skewness is limited, which is the case here too.

less revenue, with the gap falling to about 12 percent upon including the capital-to-asset ratio in the regression (Table VI.6).<sup>154</sup> Recall that US banks feature considerably higher standard capital ratios than EU banks, while their regulatory capital ratios are broadly comparable. This is because they engage in more off-balance sheet activities and hold riskier assets. The capital-to-asset ratio proxies for this difference in asset-mix and thus reduces the revenue effectiveness gap of EU banks. Further differentiating between the larger and the smaller banks cuts the revenue efficiency gap of EU banks to some 7 percent, while the cost advantage falls to some 3 percent.

197. **Overall, the evidence suggests that differences in business models explain a substantial part of the revenue gap of EU relative to US banks.** The remaining gap could reflect a lower X-efficiency. Alternatively, the gap may be due to other factors, not considered by the explanatory variables, for example, greater competition in Europe, missing capital markets that hinder more effective intermediation, or differences in risk that are not captured by differences in equity ratios. Section E explores the role of competition in more depth.

## **E. Competition**

### **Changing Attitudes and Policies**

198. **Competition policy is a key vehicle to integrate Europe's financial market.** During the 1980s, the European Court of Justice established that banking could not be excluded from the application of EU law envisaging "...the abolition, as between Member States, of obstacles to the free movement of goods, persons, services, and capital." More specifically, the 2000 Banking Directive states that "...any discriminatory treatment with regard to the establishment and the provision of services, based either on nationality or on the fact that an undertaking is not established in the Member State where the services are provided, is prohibited." There is a "prudential carve-out," which stipulates that the acquirer of a credit institution must be "fit and proper."<sup>155</sup> In addition, the Banking Directive allows leeway to block acquisitions if, as a result of a purchase, the "general good" in the host state

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<sup>154</sup> Opposite findings for cost and revenue efficiency are not unusual. See, for example, Maudos and others (2002) for further evidence and explanations.

<sup>155</sup> Obviously, this carve-out cannot be used to disguise discrimination on the basis of nationality.

might be imperiled. Neither of these conditions, though, should be impinging on a broad majority of mergers or acquisitions.<sup>156</sup>

199. **The EU Commission has recently become more active in enforcing competition and state aid law in banking.** First, the free public sector guarantees for commercial banking activities—the specific case concerned the German Landesbanken and Sparkassen—was considered unlawful and these guarantees can no longer be provided for free as of July 19, 2005. Second, in the context of the “Champalimaud Affair” of 1999 the Commission stated that it could not allow national interests to stand in the way of restructuring the EU’s financial sector. In the event, the takeover by a Spanish bank of key Portuguese banks went ahead.<sup>157</sup> And third, the Commission is planning to review the competitive practices in the retail banking and business insurance.<sup>158</sup>

200. **While policymakers take an increasingly favorable view of competition in the financial sector, the academic debate is not settled.** Various papers emphasize the harmful effects of competition for financial stability, while other stress the benefits. For example, Hellmann, Murdock, and Stiglitz (2000) show that competition lowers franchise values and thus fosters more risk-taking, notwithstanding capital requirements. Keeley (1990) argues that the rise in bank failures in the United States during the 1980s was due in part to deregulation and more competition. However, others argue that risk-incentive mechanisms exist that run exactly in the opposite direction (e.g., Boyd and De Nicoló, 2005); or underscore that competition raises productive efficiency, considering that economies of scale are running out beyond a fairly limited size.<sup>159</sup> This fosters a more efficient allocation of resources and risk and thus higher economic growth. They also take a different view on the reasons for the banking crisis in the United States.<sup>160</sup> All in all, if there is agreement on one

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<sup>156</sup> A credit institutions that is “fit and proper” in one member state but not in another should, in principle, be the exception rather than the rule; and standard commercial banks do not display the characteristics of public goods.

<sup>157</sup> For further information see Fitch Ratings, 2005.

<sup>158</sup> See the recent speeches by Commissioners McCreevy (Speech 05/159) and Kroes (Speech 05/157) and the Green Paper (2005).

<sup>159</sup> G10 (2001) offers a comprehensive summary of the literature on scale economies.

<sup>160</sup> See Hane (1998) for a survey of the US banking crises of the 1980s and early 1990s and key lessons.

point, then it is on the absence of a simple trade-off between competition and financial stability.<sup>161</sup>

## Gauging Competition Among Banks

**201. The US banking market offers a natural benchmark for comparing competition among EU banks, given its size and level of development.** Much of the literature has focused on measures of concentration to determine the amount of competition in a banking market. By one such measure, the per capita number of banks, there appears to be more competition in the US market than in the EU 15. Furthermore, to preserve competition, no bank in the United States is to have a share of the market for deposits that exceeds 30 percent in a single state or 10 percent nationwide. The largest banks are far away from a 10 percent limit in the US but not in some smaller EU states. However, such measures of competition can be misleading for various reasons. For example, contestability might be more important than concentration. Alternatively, many banks might be operating as a group, not competing in each other's markets, as is the case, for example, for cooperative and savings banks in some EU countries.

**202. The relationship between a bank's costs and revenues provides better information on competition than standard indicators of concentration.** First, it does not require direct data of prices and comparable services, which is particularly tricky in the financial services industry. Second, there is no need to specify a geographic market. The Panzar and Rosse (1987) H-statistic—which captures this relation—is given by:

$$H = \sum_{i=1}^I \frac{\partial R}{\partial w_i} \frac{w_i}{R}, \text{ where } R = R(d, c, w), \text{ denotes a bank's revenue as function of a vector of}$$

input prices  $w$  as well as exogenous variables that shift demand  $d$  or cost  $c$ . A number of standard assumptions need to be satisfied for the H-statistic to be useful, including (i) profit maximization; (ii) homothetic production functions; (iii) exogenous factor prices; (iv) an elasticity of demand that rises with the number of rivals in the market; and (v) a market that is in long-run equilibrium. Notice that conditions (ii) and (v) can potentially cause problems, notwithstanding the widespread assumption in the literature that they are satisfied. Since the analysis here focuses on the top 100 banks in each area, homotheticity should not be a major issue as these banks are fairly large and returns to scale are seen as running out at smaller levels.<sup>162</sup> Long-run equilibrium might be a different matter, however, given the rapid pace of change in the financial services industry. Notice that under conditions (i) to (v):

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<sup>161</sup> See, for example, Allen and Gale (2004), Northcott (2004), and Carletti and Hartmann (2002) for reviews of the literature and evidence.

<sup>162</sup> See G10 (2001).

- $H \leq 0$  for a monopoly market. Intuitively, any increase in cost prompts the monopolist to cut back output, which leads to a loss in revenue—the relation between cost and revenue is negative.<sup>163</sup>
- $0 < H < 1$  for a market characterized by monopolistic competition. An increase in a bank's costs prompts an increase in prices but revenues do not rise one for one, as the bank's demand curve slopes downward. Notice that a larger H-statistic implies a more elastic demand curve and thus less market power (Vesala, 1995).
- $H = 1$  for perfect competition. If the market is perfectly competitive then there must be free entry and exit, which sets the price equal to minimum average cost; thus, any increase in cost must be matched one-for-one by revenue.

203. **Implementing the Panzar-Rosse method also requires that an assumption be made about banks' activities.** As in Section D, the “intermediation approach” is followed here. Accordingly, the following regression is run:

$$rev_{it} = \alpha + \beta_1 pers\_exp_{it} + \beta_2 int\_exp_{it} + \beta_3 oth\_exp_{it} + \beta_4 assets_{it} + \sum_{j=1}^2 \partial_j D_j + \sum_{j=1}^J \gamma_j Z_{jit} + \varepsilon_{it},$$

where the subscripts  $i$  and  $t$  denote bank  $i$  at time  $t$ ;  $rev$  denotes operating revenue, excluding interest expenses;  $pers\_exp$  personnel expenditure divided by employment;  $int\_exp$  interest expenditure divided by liabilities;  $oth\_exp$  is other expenditure divided by assets. These variables, including total assets, are in natural logarithms. The H-statistic is given by:  $H = \beta_1 + \beta_2 + \beta_3$ . The exogenous variables  $Z$  are the same as those in Section D. The time dummies  $D$  proxy for changes in the macroeconomic environment.

204. **The key finding is that the small EU banks behave less competitively both relative to large EU banks and small US banks.** The estimate for the H-statistic for the full sample of EU banks is about 0.5 while that for US banks is about 0.7 (Table VI.7). The confidence intervals permit the rejection of the hypotheses of pure monopoly or perfect competition in both cases, suggesting that monopolistic competition prevails. The results are in line with the findings of Brunner and others (2004), who used a much larger sample of banks and a similar estimation methodology for single EU countries, as well as with other findings in the literature for the United States.<sup>164</sup> Standard test statistics point to similar

<sup>163</sup> If the cutback in output were not to lead to a loss in revenue, the monopolist would not have been profit maximizing to begin with.

<sup>164</sup> Notice that the full sample estimate for the US H-statistic, which is about 0.7, is in line with the results of De Bandt and Davis (2000) and Bikker and Haaf (2002). It is higher than the estimate for the top 25 US banks in Ivaschenko (2005), which is about 0.3, mainly

(continued...)

competition among large EU and US banks (Table VI.8). However, the smaller EU banks appear to behave significantly more monopolistically than their US counterparts.<sup>165</sup> Furthermore, at the 10 percent significance level large banks exhibit a higher H-statistic than their smaller counterparts in the EU (Table VI.9). The reverse appears to be the case in the US banking industry.

**205. The results suggest that the smaller, less-internationally-oriented banks appear to operate under more sheltered conditions in the EU.** The literature provides further evidence on this. Bikker and Haaf (2002), for example, using data on 23 countries find that competition is weaker among small banks—operating in local markets—than among large banks—operating predominantly in international markets, while medium-sized banks take an intermediate position.<sup>166</sup> They also show evidence for the conventional wisdom that competition and concentration are inversely related, although this finding does not receive unambiguous support in the literature, which stresses the importance of contestability.<sup>167</sup> Furthermore, Guevara, Maudos, and Perez (2005) show that the problems with competition in European banking markets are more pronounced in the retail sector, indicating that national entry barriers continue to exist.

**206. Losses related to market power have been found to be large in the EU banking system.** Guevara and Maudos (2004, 2005), for example, estimate the welfare losses in the European banking system related to excessive market power at the equivalent of between 1½–2½ percent of GDP. Evidence in the literature suggests that subjecting banks to more competition may have beneficial effects for household and firms.<sup>168</sup> In that sense, allowing

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because of the use of wages (rather than personnel expenses as a share of liabilities) for the cost of labor. Furthermore, Ivaschenko (2005) uses net income as the dependent variable. Net income comprises net rather than gross interest revenue as well as loan loss provisions and extraordinary items—the contemporaneous relation between these items and input costs does not provide much information on competition.

<sup>165</sup> This is achieved by running the regression with a set of interactive slope dummies, which take on a value one for EU banks and zero otherwise, and then testing whether the dummies for  $\beta_1$ ,  $\beta_2$ , and  $\beta_3$  sum to a number that lies two standard deviations below zero.

<sup>166</sup> Their sample comprises 5,444 banks and the smallest 50 percent of all banks (by asset size) are considered “small;” the top 10 percent are considered “large.” Hempell (2002) and De Bandt and Davis (2000), for example, also find less competition among smaller banks.

<sup>167</sup> For a literature review, see Northcott (2004).

<sup>168</sup> See, for example, Claessens and Laeven (2005), Beck and others (2003), Corvoisier and Gropp (2002), Hannan (1991), and Berger and Hannan (1989).



cross-border mergers and acquisitions as well as foreign entry would produce higher growth and welfare.

## **F. Efficiency, Competition, and Financial Market Structure**

**207. More competition as a reason for lower bank revenues in Europe is not an explanation that is consistent with the empirical evidence presented above.** Perfect competition among banks does not appear to be the rule either in the European Union or the United States. However, judging by per capita employment in banking, the number of banks, the competition from other sources of funds, and the results of more sophisticated techniques to gauge competition (the H-statistics), EU banks—particularly the relatively smaller, more nationally-oriented ones—appear to operate in a more sheltered environment.

**208. Various other factors could explain the lower revenue effectiveness of EU banks.** This section briefly explores potential explanations, including: (i) less financial innovation because of less competition; (ii) less market exit; (iii) more stringent laws and regulations governing the supply of financial services; (iv) less scope for reaching a broad base of customers; (v) more public sector intervention; and (vi) missing, complementary capital markets that would allow banks to specialize further, fostering the adoption business models that are more suited to their comparative advantages. All these explanations are consistent with the evidence on the revenue gap of EU banks presented in Section D and it is difficult to assess their relative importance.

**209. Less financial innovation because of less competition:** Regarding innovation, with less competition the pressure among banks to come up with new financial services is likely to be lower. Relatedly, there might be less of an incentive for markets to come up with new sources of funding. Interestingly, Altunbas and Marquéz Ibáñez (2004) find that over 1992–2001, bank mergers in the EU have led to improved returns on capital, particularly in cross-border cases.

**210. Less bank turnover, particularly less market exit:** The issue is not necessarily excess capacity, as argued by many, but an ineffective use of existing capacity. Controlled market exit goes hand in hand with more competition in fostering efficient bank business.<sup>169</sup>

**211. More stringent laws and regulations:** In many countries, legal or regulatory obstacles hinder the supply of a broad range of mortgage products. Similarly, usury laws might inhibit the emergence of a broader market for consumer credit. And tax laws, for example, might discourage securitization, as was the case until recently in Germany.

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<sup>169</sup> Stiroh (1999) emphasizes that the dynamic reallocation effects—entry and exit—increased the US banking industry's return on equity by several percentage points in the late 1980s.

212. **Less scope for reaching a broad customer base:** Differences in the legal and regulatory environment across countries hamper the provision of financial services to firms and households across national borders. This may reduce the payoff to innovation and thus revenues.

213. **More public sector intervention in EU banking:** Intervention can be explicit—through ownership of credit institutions, or implicit—by influencing the decision making of major banks, notably those that were formerly publicly-owned. Explicit intervention is still fairly widespread in Europe, although much less so among the sample of banks considered here. Furthermore, cooperative banks—which, although not state-owned, do not necessarily have profit maximization and innovation as their primary objective—are more widespread in Europe.

214. **Missing or less-developed markets and thus a less efficient division of tasks between banks and markets:** EU banks absorb in their balance sheets financing activities that US banks typically channel through financial markets and instruments. These activities likely require less specialized banking knowledge and are probably less risky, generating lower income streams and requiring less capital. The results in Section D show that upon holding constant for the lower capital held by EU banks, the revenue gap relative to their US counterparts shrinks considerably. Nonetheless, a gap remains. Be that as it may, EU banks likely have a larger proportion of assets in their balance sheets that, in the future, could be sold off in markets, including, for example, large corporate loans or mortgage related lending to households, both of which are largely off US banks' balance sheets. Thus, what is captured here as a lower revenue effectiveness might merely be a reflection of missing, complementary capital markets in Europe, where securitization, for example, has gained a strong foothold in a few countries only.<sup>170</sup>

215. **The interplay between government intervention, market forces, and the regulation of financial activity might be at the root of the different allocation of tasks between banks and markets in Europe and the United States.**<sup>171</sup> In general, government intervention in Europe was relatively less market- and more bank-friendly than in the United States. Many European authorities entered credit markets directly, via ownership of a large number of banks and thus their intervention can be considered bank friendly. In the United States, the public sector played a crucial role in developing the market for securitization,

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<sup>170</sup> In some European countries, notably Germany, banks instead rely more on covered bonds as a source of funding.

<sup>171</sup> For a review of developments in the United States, see De Young, Hunter, and Udell (2003).

notably with the introduction of mortgage-backed securities by Ginnie Mae in the 1960s.<sup>172</sup> Securitization along-side the integration of state banking markets has played an important role in integrating regional housing markets in the United States (Box VI.1).

## **G. Conclusions and Policy Implications**

216. **A long history of fragmentation means that much sand remains in the wheels of Europe's financial system, notwithstanding significant progress recently.** Aside from the degree of political union, the absence of a single currency in Europe until recently is perhaps the crucial factor. As a result, money and capital markets and their regulatory and supervisory infrastructure were, for a long time, highly fragmented in Europe. Fragmentation remains an issue today, including both actual and perceived obstacles to crossborder activities.<sup>173</sup> This fragmentation comes at the price of a less efficient and resilient financial sector. On the latter, available evidence for the United States might offer some useful lessons: among the causes of the banking crises of the 1980s feature laws that inhibited competition, geographic diversification of risks, and consolidation of units.<sup>174</sup>

217. **The result is a financial system in Europe that presently appears to offer less scope for banks and markets to leverage their comparative advantages.** Capital markets are smaller in Europe. In relative terms, banking sector employment is similar in Europe and the United States. However, EU banks are doing business differently. Their balance sheets are larger, less risky, and they hold less equity. The key reason is that they engage less in placing risks in financial markets than their US counterparts. In many countries, the types of markets that are necessary for banks to pursue such activities, for example, securitization, are only in their infancy.

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<sup>172</sup> Two government-sponsored enterprises (GSEs)—Fannie Mae and Freddie Mac—are the largest players in the markets for securitized assets today. The role of government has been criticized, triggering a debate about reforming the GSEs.

<sup>173</sup> Notice that even in the United States supervision of the insurance industry is still largely done at the state level and thus is fairly fragmented.

<sup>174</sup> See Hane (1998).

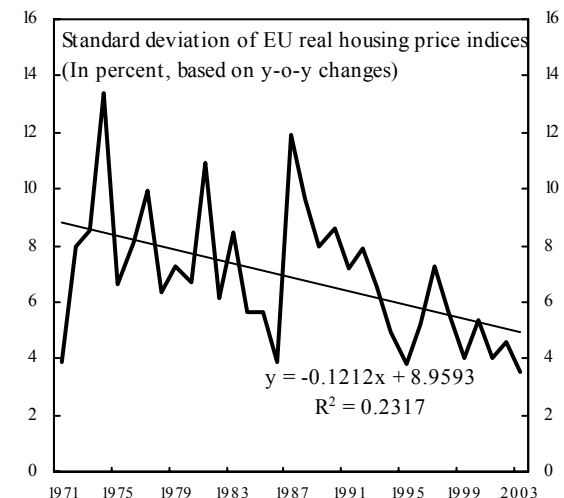
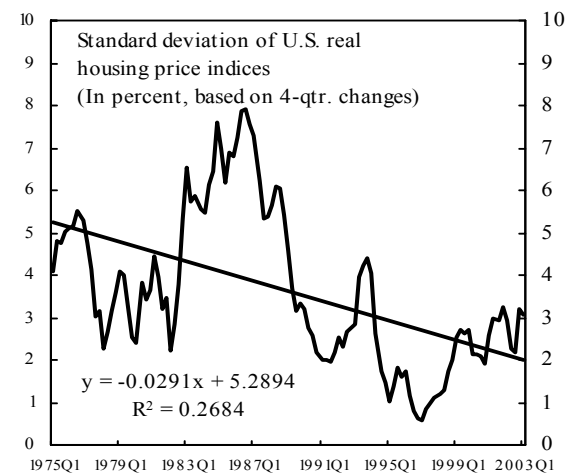
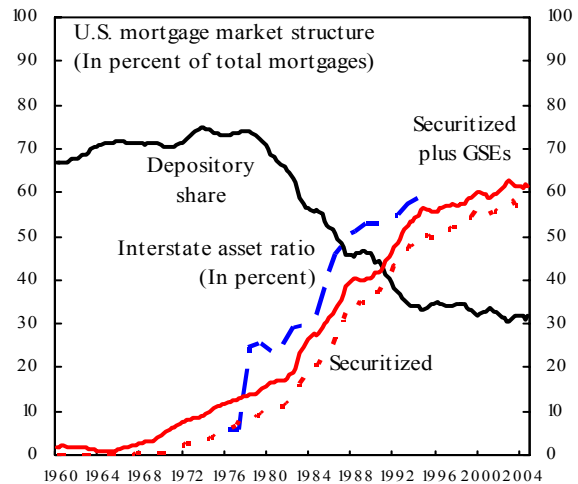
### Box VI.1. Securitization and the Integration of Local Housing Markets

Both the integration of banking markets and securitization played a role in reducing the divergence of house price increases across the nine OFHEO (Office of Federal Housing Enterprise Oversight) regions in the United States.

The integration of state banking markets is evidenced by the increase in the weighted average of interstate asset ratios (i.e., the percent of bank assets held by out-of-state bank holding companies). Morgan, Rime, and Strahan (2004) show that interstate banking has made state business cycles smaller.

Concomitantly, securitization of mortgage loans rose rapidly and the share of deposits that fund mortgages fell significantly—from over 70 percent to less than 40 percent recently—as shown by Schnure (2005). He establishes a significant negative relation between the share of securitized mortgages on the one hand and the cross-sectional standard deviation of increases in the OFHEO house price indices (for nine regions) on the other hand.

Interestingly, notwithstanding much lower interregional migration, house prices appear to diverge more across the EU countries than across the nine OFHEO regions in the United States. Nonetheless, the BIS data show falling divergences over time.



**218. A balanced integration of EU banking and capital markets would be desirable.**

This will require coordination among market players and some policy intervention by public authorities. The evidence here would support action on two fronts:

- Governments may have to play a role in fostering the development of new financial markets. The Commission's Green Paper (2005) recognizes that Europe's capital market is underdeveloped. The current setting, with significant legal and regulatory differences across EU countries, fragmented clearing and settlement systems, and continued government intervention in banking is likely to hinder the development of markets. Banks are better equipped to operate in a less homogenous regulatory environment. But an integration that is skewed toward banks rather than markets may well be less beneficial for firms and households.
- Governments should foster crossborder banking to boost competition and incite banks to pass along effectiveness gains to their customers. The Green Paper rightly emphasizes that competition policy is an important complement to financial integration measures. Europe's internationally active banks already appear to engage in more competition than their smaller counterparts. Thus allowing such banks to contest new markets would foster more efficient and innovative financial intermediation. The flipside of fostering crossborder banking is to promote crossborder shopping for financial services by firms and households. The Green Paper's objectives in this domain should be welcomed. More specifically, broadening the range of mortgage products available to households—an issue to be covered in a future Green Paper—would help in integrating this important market. Ideally, it should be supported with an integrated market for securitization.

**219. A wider array of markets and more competition among banks offer a number of**

**benefits for the economy but developments in this direction need to be monitored.** Key among the benefits are (i) a more efficient use of bank capital; (ii) better risk management; (iii) a greater resiliency of the financial system to sudden increases in the demand for liquidity; and (iv) an improved pass-through of monetary policy to the real economy.

Ultimately, the efficiency gains accrue to real economy and to the consumer in the form of a higher returns on savings, which is crucial in the context of an aging society. However, the transition to a more complete and complex financial system in an environment of rising competition among financial intermediaries will require special vigilance by supervisors.

Table VI.1. Euro-Area and United States: Banks and Markets, 2004  
(In percent of nominal GDP)

	Euro area	United States
Bonds	123	149
Government	58	37
Banks 1/ 2/	48	6
Non-bank financial institutions	10	27
Non-financial corporations	8	25
Agencies	0	53
Other	0	0
Equity	53	147
Bank assets 1/	208	92
Bank loans to nonfinancial private sector	92	118
Firms	42	30
Households	50	87
Bank loans to general government	11	0
Bank loans to non-bank financial corporates	8	...
Memorandum item:		
Asset-backed securities (stock)	...	59
Asset-backed securities (new issuance)	4	...

Sources: US FED, ECB, and European Securitization Forum.

1/ For euro area, including Eurosystem. For US, commercial banks only.

2/ From consolidated balance sheet of euro-area MFIs.

Table VI.2. EU 15 and United States: Structural Indicators, 1997–2003

		1997	1998	1999	2000	2001	2002	2003
Number of banks	US	10,923	10,464	10,223	9,904	9,615	9,354	9,182
	EU 15	9,624	9,337	8,872	8,433	8,084	7,751	7,444
( Per million people)	US	41	39	37	36	34	32	32
	EU 15	26	25	24	22	21	20	19
Number of bank branches	US	73,366	74,798	76,576	76,567	78,123	78,503	79,756
	EU 15	202,092	200,319	198,973	197,513	194,349	190,279	186,009
( Per million people)	US	273	276	280	278	274	272	274
	EU 15	539	534	529	523	512	500	487
Number of bank employees	US 1/	1,784,482	1,863,910	1,901,596	1,914,517	1,967,622	2,017,645	2,045,976
	EU 15	...	...	2,820,563	2,821,845	2,862,338	2,823,784	2,774,175
( Per million people)	US	6,651	6,883	6,960	6,946	6,889	6,994	7,023
	EU 15	...	...	7,493	7,467	7,543	7,417	7,264
Banking system assets 2/	US	73	75	74	76	78	80	82
(In percent of GDP)	EU 15	184	185	195	203	213	211	214

Sources: ECB, FDIC, WEO database, and Pilloff (2004).

1/ In full-time equivalents; raw numbers are likely to be higher.

2/ The data here have a slightly different coverage from those in Table 1.

Table VI.3. EU 15 and United States: Indicators of Bank Profitability and Efficiency, 2003  
(In percent of assets, unless otherwise noted)

	EU 15	US
Net interest income	1.4	3.3
Net non-interest income	1.0	2.5
Total income	2.4	5.8
Staff costs	0.9	1.4
Other costs	0.6	1.9
Total costs	1.4	3.3
Operating profits	0.9	2.5
Profits, pre-tax	0.6	2.1
Profits, after tax	0.4	1.4
Return on equity (In percent of Tier 1)	9.9	15.3
Equity-to-asset ratio	4.2	9.2
Risk-based Tier 1 ratio (In percent)	8.8	10.1
Overall solvency ratio (In percent)	12.4	12.7

Sources: ECB (EU Banking Sector Stability, 2004) and FDIC (Quarterly Banking Profile, 2003).



Table VI.4. EU 15 and US Banking Sector Indicators, 1997–2003  
(In percent, unless otherwise noted)

	EU banks			US banks		
	All	Small	Large	All	Small	Large
Return on average assets						
10th percentile	0.08	0.05	0.10	0.40	0.44	0.37
Median	0.46	0.42	0.47	1.22	1.26	1.18
Return on average equity						
10th percentile	2.64	1.94	3.74	7.10	7.86	6.82
Median	11.42	11.10	11.61	14.84	14.18	15.43
Tier 1 ratio						
10th percentile	5.60	5.68	5.52	7.30	7.70	6.90
Median	7.40	7.50	7.40	9.45	9.80	8.50
Equity ratio						
10th percentile	2.01	1.79	2.41	4.73	5.78	4.09
Median	3.87	4.10	3.80	8.14	8.51	7.66
Revenue 1/ 2/						
10th percentile	4.19	4.07	4.33	5.15	5.38	4.84
Median	5.92	5.67	6.08	8.07	8.17	7.92
Cost 1/ 3/						
90th percentile	7.57	7.34	7.65	10.40	10.49	9.94
Median	5.30	5.19	5.52	6.37	6.42	6.28
Operating profit 1/						
10th percentile	0.09	0.07	0.11	0.22	0.22	0.22
Median	0.56	0.51	0.60	1.25	1.46	1.06
Operating expenditure 1/						
90th percentile	3.03	3.34	2.86	5.30	5.82	4.41
Median	1.69	1.58	1.75	2.67	2.73	2.48
Personell expenditure 1/						
90th percentile	1.40	1.46	1.34	2.16	2.05	2.18
Median	0.78	0.69	0.84	1.31	1.31	1.32
Other revenue 1/						
Median	1.04	0.99	1.11	1.59	1.42	1.80

Source: Fitch IBCA database; and IMF staff calculations.

1/ In percent of assets.

2/ Operating revenue excluding interest expenses.

3/ Operating costs plus interest expenses.

4/ Sum of average return on assets and Tier 1 ratio divided by variance of average return on assets.

Table VI.5. Measures of Cost Efficiency of EU Banks (Relative to US banks), 1997–2003  
(Dependent variable is the log of operating expense plus interest expense)

Equation	Efficiency coefficient		Rbar2	Degrees of freedom
All banks				
No exogenous variable	-4.81	***	0.99	423
L/A, D/L, A/E ratios added	-4.66	***	0.99	414
L/A, D/L, A/E, C/A ratios added	-5.21	***	0.99	413
Large banks				
No exogenous variable	-4.01	***	0.99	182
L/A, D/L, A/E ratios added	-4.37	***	0.99	174
L/A, D/L, A/E, C/A ratios added	-3.99	**	0.99	173
Small banks				
No exogenous variable	-2.13		0.99	223
L/A, D/L, A/E ratios added	-2.61		0.99	219
L/A, D/L, A/E, C/A ratios added	-2.64		0.99	218

Sources: Fitch IBCA database; and IMF staff calculations. L stands for loans; A for assets; D for deposits; and C for capital.

1/ Confidence region is two standard errors wide on each side of point estimate.

\*\*\* denotes that the coefficient is significantly different from zero at the 1 percent level.

\*\* denotes that the coefficient is significantly different from zero at the 5 percent level.

\* denotes that the coefficient is significantly different from zero at the 10 percent level.

Table VI.6. Measures of Revenue Efficiency of EU Banks  
(Relative to US banks), 1997–2003  
(Dependent variable is the log of operating income plus interest expense)

Equation	Efficiency coefficient		Rbar2	Degrees of freedom
<b>All banks</b>				
No exogenous variable	-18.29	***	0.99	417
L/A, D/L, A/E ratios added	-18.02	***	0.99	408
L/A, D/L, A/E, C/A ratios added	-12.39	***	0.99	407
<b>Large banks</b>				
No exogenous variable	-15.13	***	0.99	176
L/A, D/L, A/E ratios added	-16.36	***	0.99	168
L/A, D/L, A/E, C/A ratios added	-7.70	***	0.99	167
<b>Small banks</b>				
No exogenous variable	-11.42	***	0.98	217
L/A, D/L, A/E ratios added	-11.19	***	0.98	213
L/A, D/L, A/E, C/A ratios added	-6.43	*	0.98	212

Sources: Fitch IBCA database; and IMF staff calculations. L stands for loans; A for assets; D for deposits; and C for capital.

1/ Confidence region is two standard errors wide on each side of point estimate.

\*\*\* denotes that the coefficient is significantly different from zero at the 1 percent level.

\*\* denotes that the coefficient is significantly different from zero at the 5 percent level.

\* denotes that the coefficient is significantly different from zero at the 10 percent level.

Table VI.7. Measures of Competition for EU Banks and US Banks, 1997–2003

Equation	H-Statistic	Confidence region 1/	
		lower bound	upper bound
<b>All banks</b>			
		<b>European Union</b>	
No exogenous variable	0.50	0.43	0.58
L/A, D/L, A/E ratios added	0.53	0.46	0.60
L/A, D/L, A/E, C/A ratios added	0.54	0.48	0.61
		<b>United States</b>	
No exogenous variable	0.73	0.64	0.82
L/A, D/L, A/E ratios added	0.71	0.60	0.82
L/A, D/L, A/E, C/A ratios added	0.68	0.58	0.79
Specification 4	0.48	0.36	0.60
<b>Large banks</b>			
		<b>European Union</b>	
No exogenous variable	0.64	0.52	0.76
L/A, D/L, A/E ratios added	0.65	0.52	0.77
L/A, D/L, A/E, C/A ratios added	0.68	0.57	0.80
		<b>United States</b>	
No exogenous variable	0.71	0.58	0.85
L/A, D/L, A/E ratios added	0.60	0.43	0.77
L/A, D/L, A/E, C/A ratios added	0.50	0.32	0.68
<b>Small banks</b>			
		<b>European Union</b>	
No exogenous variable	0.54	0.42	0.67
L/A, D/L, A/E ratios added	0.53	0.41	0.65
L/A, D/L, A/E, C/A ratios added	0.63	0.51	0.74
		<b>United States</b>	
No exogenous variable	0.84	0.69	0.98
L/A, D/L, A/E ratios added	0.83	0.68	0.99
L/A, D/L, A/E, C/A ratios added	0.83	0.68	0.98

Sources: Fitch IBCA database; and IMF staff calculations. L stands for loans; A for assets; D for deposits; and C for capital.

1/ Confidence region is two standard errors wide on each side of point estimate.

Table VI.8. Measures of Competition for EU Banks  
(Relative to US Banks), 1997–2003

Equation	EU banks' H-Statistic (Relative to US banks)		Confidence region 1/	
			lower bound	upper bound
<b>All banks</b>				
No exogenous variable	-0.23	***	-0.34	-0.13
L/A, D/L, A/E ratios added	-0.18	***	-0.31	-0.05
L/A, D/L, A/E, C/A ratios added	-0.14	**	-0.26	-0.02
<b>Large banks</b>				
No exogenous variable	-0.08		-0.27	0.10
L/A, D/L, A/E ratios added	0.04		-0.17	0.25
L/A, D/L, A/E, C/A ratios added	0.18	*	-0.03	0.39
<b>Small banks</b>				
No exogenous variable	-0.34	***	-0.53	-0.16
L/A, D/L, A/E ratios added	-0.34	***	-0.53	-0.15
L/A, D/L, A/E, C/A ratios added	-0.23	***	-0.42	-0.04

Sources: Fitch IBCA database; and IMF staff calculations. L stands for loans; A for assets; D for deposits; and C for capital.

1/ Confidence region is two standard errors wide on each side of point estimate.

Table VI.9. Measures of Competition for Small EU Banks  
(Relative to large EU Banks), 1997–2003

Equation	Small banks' H-Statistic (Relative to large banks)		Confidence region 1/	
			lower bound	upper bound
No exogenous variable	-0.12	*	-0.29	0.05
L/A, D/L, A/E ratios added	-0.13	*	-0.30	0.04
L/A, D/L, A/E, C/A ratios added	-0.07		-0.23	0.09

Sources: Fitch IBCA database; and IMF staff calculations. L stands for loans; A for assets; D for deposits; and C for capital.

1/ Confidence region is two standard errors wide on each side of point estimate.

\* denotes that the coefficient is significantly negative at the 10 percent level.

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