# The Fundamental Determinants of Financial Integration in the European Union

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**Abstract**

This paper focuses on the fundamental determinants of the degree of financial integration in the European Union over the period 1973-1993. Using closed interest differentials to measure the intensity of capital controls and applying a panel data approach, we find realized inflation rates, government deficits, current account deficits and credits to the domestic economy to be significantly positively correlated with the intensity of capital export restrictions. In addition, low productivity in the business sector and low availability of sophisticated deposit instruments are positively related to the intensity of capital export controls. Consequently, remaining differences in national economic and financial structures, should be of greater interest to policymakers.

**JEL Classification:** E43, F32, F36.

**Keywords:** Financial integration, capital controls, determinants, European Union.

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## 1 Introduction

This paper focuses on the fundamental determinants of degree of financial integration -- or more precisely of the intensity of capital controls -- in the European Union (EU) over the period 1973-1993.[1] Macroeconomic evidence seems to support the view that the integration between European financial markets has increased in recent years (see Lemmen and Eijffinger, 1993, Frankel, Phillips and Chinn, 1993 and Lemmen and Eijffinger, 1995a). It fosters the impression that remaining differences in national economic and financial structures are unimportant. Moreover, it may tend to overstate the pressure towards, and hence the speed of integration. An obvious question, then, is what are the main determinants of financial integration. A thorough understanding of the determinants of the intensity of capital controls may provide important insight into the process of financial and monetary integration in Europe and may help in policy formulation.

This paper improves analysis started by Epstein and Schor (1992) and Alesina, Grilli and Milesi-Ferretti (1994) in a number of aspects. First, previous investigations of the determinants of capital controls (Epstein and Schor, 1992, Alesina, Grilli and Milesi-Ferretti, 1994, Gruijters, 1994, Milesi-Ferretti, 1995 and Grilli and Milesi-Ferretti, 1995) typically constructed dummy variables or capital control indices to measure the degree of financial integration. As we will argue, these measures are problematic because they do not account for different intensities of capital controls. In our opinion, this aspects is of crucial importance for policy analysis. We compute deviations from closed interest parity to measure the intensity of capital controls. Resulting negative (positive) deviations from closed interest parity are associated with capital export (import) restrictions. Second, Alesina, Grilli and Milesi-Ferretti (1994) apply their analysis to the financial markets of 20 OECD countries. Grilli and Milesi-Ferretti (1995) apply their analysis to 61 developed and less-developed countries. In practice, integration attempts across the world are more of a geographical nature. The EU financial markets can be seen as an excellent sample to test for the fundamental determinants of financial integration because they are in the process of institutional integration. Most legal barriers have been either removed or are scheduled to be removed. Furthermore, the EU has adopted a stronger form of harmonization for its financial services -- a policy of mutual recognition whereby member states within the EU have agreed to allow financial intermediaries from other states to operate under home country rules and supervision. Third, Alesina, Grilli and Milesi-Ferretti (1994) apply Maximum Likelihood Estimation to estimate various logit/probit models. We innovatively apply a panel data approach to estimate various fixed-effects models. The panel data approach allows us to include those author's political variables (the country-specific effects) along with other explanatory variables. Furthermore, several new explanatory variables were included in our analysis: the realized depreciation of the exchange rate, the unemployment rate, the productivity in the business sector, the ratios of government deficit, domestic credit and broad money over gross domestic product and the ratio of broad money over narrow money. Contrary to Alesina, Grilli and Milesi-Ferretti (1994) and related papers who emphasize the importance of various political variables, we argue that various measures of national economic and financial structure have considerable explanatory power in the determination of capital controls. We find high realized inflation rates, high government deficits, high current account deficits, high credit expansion to the economy, low productivity in the business sector and low availability of sophisticated deposit instruments to be the main determinants of the intensity capital export restrictions. According to the evidence, remaining differences in national economic and financial structures, should be of greater interest to policymakers.[2]

The paper is organized as follows. Section 2 provides a meaningful measure of the degree of financial integration, which is the dependent variable in our empirical analysis. This paper focuses on the *price* aspect of financial integration. That is, financial integration is expected to lead to price convergence. As we will argue, the price measure -- i.e. the closed interest rate differential -- is particularly suited to measure the

[1] The concepts of "financial integration" and "intensity of capital controls" are used interchangeable.

[2] Our argument is also demonstrated by the events during the exchange crises in the European Monetary System.

intensity of capital controls (lack of offshore interest rates in a number of countries forces us to construct a synthetic approximation of closed interest differentials using forward exchange rates). Because capital controls are plausible sources introducing persistence in return differentials, section 2 therefore also formulates a partial adjustment model of the price measure of financial integration. Section 3 identifies the main determinants of capital controls. For the purpose of our empirical analysis, we link these determinants to several relevant analytical indicators. Section 4 analyses the effect of these indicators on the intensity of capital controls using a panel data approach. We estimate a fixed-effects model, principally attributing country risk to an country-specific effect which of course differs among countries. The analysis is carried out for 11 EU countries over the period 1973-1993 for which relevant annual data are available. The frequency of the data was dictated by the absence of higher frequency data on important macroeconomic determinants of financial integration and by the fact that we want to evaluate long-term trends in financial integration. Finally, section 5 concludes the paper.

## 2 Alternative measures of the degree of financial integration

This section addresses the definition and measurement of the dependent variable: the degree of financial integration. First, we argue that the price measure is to be preferred to concentrating on the *volume* of capital flows themselves. As markets become more integrated, asset prices often adjust in anticipation of capital flows that would otherwise occur. Consequently, the volume of capital flows is less suited to measure the degree of financial integration.[3] In addition, the price measure is also to be preferred to more legal oriented approaches of capital controls that construct dummy variables or indices of capital controls intensity. Since financial integration is essentially a legal concept, previous research on the determinants of the degree of financial integration (Epstein and Schor, 1992, Alesina, Grilli and Milesi-Ferretti, 1994, Gruijters, 1994, Milesi-Ferretti, 1995 and Grilli and Milesi-Ferretti, 1995) typically constructed dummy variables or capital control indices to measure the degree of financial integration. Alesina, Grilli and Milesi-Ferretti (1994) use dummy variables -- taking the value 1 when capital controls are in place and 0 otherwise -- to measure capital controls. Unfortunately, dummy variables cannot explain different degrees of intensity of capital controls over time (Epstein and Schor, 1992, p. 143). Epstein and Schor (1992) construct an annual capital control index compiled from the summary table at the end of the International Monetary Fund (IMF) 's Annual Reports on Exchange Arrangements and Exchange Restrictions. This index is composed of restrictions on payments for capital transactions (i.e. capital controls) and the use of separate exchange rate(s) for some or all capital transactions and/or some or all invisibles (i.e. dual exchange markets). Both types of restrictions are given equal weight. If both restrictions are in place, the index takes the value of 2, if one restriction is in place the index takes the value of 1, and 0 otherwise. Appendix A at the end of the paper gives an idea of what this means for our EU countries. As follows from Appendix A, capital control indices are more capable of explaining different degrees of intensity of capital controls than dummy variables. Epstein and Schor (1992, p. 141), however, argue that the IMF definitions do no include some indirect measures against capital flows which might reasonably be considered capital controls (e.g. the interest equalisation tax). Furthermore, the IMF does not distinguish between restrictions to limit capital outflows and restrictions to limit capital inflows (i.e. the direction of capital flows), and between restrictions on short-term and restrictions on long-term capital flows (i.e. the maturity of capital flows). Gruijters (1994, pp. 198-213) tries to overcome these weaknesses and constructs two capital control indices to explain the intensity of capital import restrictions and the intensity of capital export restrictions, respectively. The indices are based upon a historical survey of direct and indirect capital controls in 11 OECD countries. The measure implicitly embodies numerous types of restrictions, with some being more important than others across different countries. However, the major shortcoming endemic to all legal measures is the subjective element needed to construct them. Ample historical evidence suggests that there have been significant discrepancies between

[3] Besides, long time-series data of gross capital flows are not available (see Kouri and Porter, 1974).

the legal and actual intensity of controls. Restrictions are not always binding (i.e. effective) or some indirect restrictions are simply not taken into account. As a result it may be a mistake to conclude that the market is segmented. The private sector is extremely creative in finding ways to move capital internationally. In countries with restrictions on capital mobility, the private sector has typically resorted to leads and lags in average payments terms for exports and imports to evade legal controls on capital flows.[4] Moreover, the Eurocurrency market has played an important role in evading capital controls. So, one needs to go beyond legal restrictions in assessing the extent of capital mobility.

The measure we use takes account of *short-term* financial integration because forward exchange rates exist only for short horizons generally not exceeding one year.[5] In the investigation design, the underlying financial assets differ only with respect to currency of denomination and country-specific regulation (e.g. capital controls and tax treatment), rather than with respect to asset-specific types of risk (e.g. default risk and liquidity risk) or other risk characteristics.[6]

We argue that closed nominal interest rate differentials are most suited to capture differences in the intensity of capital controls. This follows from the decomposition of *onshore* covered nominal interest rate parity in Table 1. This may be demonstrated by distinguishing between covered nominal interest parity in *onshore* markets (for comparable assets in different political jurisdictions and restrictions on cross-border capital flows) and covered nominal interest parity in *offshore* markets (for comparable assets in the same political jurisdiction and no restrictions on cross-border capital flows). Each of the components $\phi_{Domestic}$, $\phi_{Foreign}$ and $\phi_{Euro}$ provides information on the source of the onshore covered nominal interest rate differential. $\phi_{Domestic}$ measures the extent to which *domestic* controls are the cause of a non-zero onshore covered nominal interest rate differential. Similarly, $\phi_{Foreign}$ measures the extent to which *foreign* controls contribute to a non-zero onshore covered nominal interest rate differential. $\phi_{Euro}$ measures deviations from covered interest arbitrage in offshore markets. We assume that interest arbitrage ensures that differences from covered interest rate parity in offshore markets ($\phi_{Euro}$) are negligible. Since banks in Euromarkets set Euro-interest rates of the domestic country (say the Euro-Sterling rate) equal to foreign Euro-interest rates (say the Euro-Deutsche Mark rate) adjusted for the forward premium (discount) on the domestic currency, *offshore* covered nominal interest parity will always hold in Euromarkets. Deviations in the Euromarket are largely due to technical factors and/or transactions costs. Under this assumption, the domestic onshore-offshore interest rate differential may be approximated by the adjusted domestic covered nominal interest rate differential (see Giavazzi and Giovannini, 1989, p. 172).

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[4] Therefore, Milesi-Ferretti (1995) and Grilli and Milesi-Ferretti (1995) use a current account restrictions dummy variable to proxy for the intensity of capital controls.

[5] Although currency swaps allow us to calculate deviations from covered interest rate parity for longer horizons, they are not available over a sufficiently long time horizon (see Popper, 1993).

[6] Preferably, one might also want to disentangle the effect of interest rate withholding taxation. Interest withholding taxes importantly affect the pre-tax gross return demanded by international investors. Huizinga (1994) adjusts the interest rate parity condition for the effect of nonresident interest withholding taxation. Since the effects of interest rate withholding taxation are difficult to grasp, we leave this aspect for further research.

**Table 1 − The decomposition of the onshore covered nominal interest rate differential**

**(1) Offshore covered nominal interest rate differential**

$$\phi_{Euro} = i^{Euro}_{t,t+k} - i^{*Euro}_{t,t+k} - (f^{t+k}_t - s_t)$$

**(2) Domestic onshore-offshore closed nominal interest rate differential**

$$\phi_{Domestic} = i_{t,t+k} - i^{Euro}_{t,t+k}$$

**(3) Foreign offshore-onshore closed nominal interest rate differential**

$$\phi_{Foreign} = i^{*Euro}_{t,t+k} - i^{*}_{t,t+k}$$

**(4)=(1)+(2)+(3) Onshore covered nominal interest rate differential**

$$\phi = \phi_{Domestic} + \phi_{Foreign} + \phi_{Euro} =$$

$$i_{t,t+k} - i^{*}_{t,t+k} - (f^{t+k}_t - s_t) =$$

$$[\, i_{t,t+k} - i^{Euro}_{t,t+k} \,] + [\, i^{*Euro}_{t,t+k} - i^{*}_{t,t+k} \,] + [\, i^{Euro}_{t,t+k} - i^{*Euro}_{t,t+k} - (f^{t+k}_t - s_t) \,]$$

**Now, we may derive our measure for the intensity of capital controls. The domestic intensity of capital controls may be approximated by the adjusted domestic covered nominal interest rate differential**

$$\xi_{Domestic} = \phi - \phi_{Foreign} = \phi_{Domestic} + \phi_{Euro} = i_{t,t+k} - i^{*Euro}_{t,t+k} - (f^{t-k}_t - s_t)$$

**while the foreign intensity of capital controls may be approximated by the adjusted foreign covered nominal interest rate differential**

$$\xi_{Foreign} = \phi - \phi_{Domestic} = \phi_{Foreign} + \phi_{Euro} = i^{Euro}_{t,t+k} - i^{*}_{t,t+k} - (f^{t-k}_t - s_t)$$

**where banks ensure that offshore covered nominal interest rate parity holds continuously. That is, we may write**

$$i^{Euro}_{t,t+k} = i^{*Euro}_{t,t+k} + (f^{t+k}_t - s_t)$$

**and**

$$i^{*Euro}_{t,t+k} = i^{Euro}_{t,t+k} - (f^{t+k}_t - s_t)$$

**Symbols:**

| | | |
|---|---|---|
| $i_{t,t+k}$ | = | domestic onshore nominal rate of interest at time t on a k-period bond held between time t and t+k |
| $i^{Euro}_{t,t+k}$ | = | domestic offshore nominal rate of interest at time t on a k-period bond held between time t and t+k |
| $f^{t+k}_t$ | = | forward exchange rate at time t for the delivery of foreign currency at time t+k |
| $s_t$ | = | spot exchange rate at time t (defined as units of domestic currency per unit of foreign currency) |
| $k$ | = | holding period of the underlying debt instrument |
| $*$ | = | denotes a foreign variable |

Source: Goldsbrough and Teja (1991) and authors' own summary of the literature.

Consequently, the domestic intensity of capital controls may either be measured by the domestic onshore-offshore closed nominal interest rate differential

$$\phi_{Domestic} = i_{t,t+k} - i^{Euro}_{t,t+k} \tag{1}$$

or by the adjusted domestic covered nominal interest rate differential

$$\xi_{Domestic} = i_{t,t+k} - i^{*Euro}_{t,t+k} - (f^{t+k}_t - s_t) \tag{2}$$

Capital controls will be an important reason for significant deviations from onshore covered nominal interest parity.[7] Since offshore covered nominal interest rate parity is zero by assumption, it follows that any differential between the Euro-rate and the domestic rate on a comparable asset is likely to reflect domestic capital controls. Closed and adjusted covered nominal interest rate differentials have been widely used to

[7] More precisely, capital controls that are economically significant -- thus lying outside a small band of differentials created by transaction costs.

measure the intensity c.q. effectiveness of capital controls. The closed and adjusted covered nominal interest differentials -- we will refer to as country risk premia -- primarily reflect the joint influence of existing and expected capital controls (i.e. political risks) (Aliber 1973, p. 1453). They indicate agents' ability to move financial assets across national borders.

Capital controls play two major roles. First, where capital controls are effective, they produce a bias against either capital inflows or capital outflows.[8] In general, a *negative* domestic onshore-offshore interest differential or a *negative* adjusted domestic covered nominal interest rate differential is indicative of capital *export* restrictions in the domestic country (c.q. capital *import* restrictions in the foreign country). Second, they tend to slow down the process of convergence of closed c.q. adjusted covered nominal interest differentials. Therefore, we formulate a partial adjustment model for the closed c.q. adjusted covered nominal interest rate differential. The partial adjustment model for the closed nominal interest rate differential may be derived as follows (suppressing the time and country subscripts) (see Harvey, 1990, p. 230-231):

$$i - i^{Euro} = (i - i^{Euro})_{-1} + \psi\left(\overline{(i - i^{Euro})} - (i - i^{Euro})_{-1}\right) + \epsilon \qquad (3)$$

Equation (3) shows that the *actual* interest rate differential in period t equals the actual interest rate differential in the previous period t-1 and the proportion ($\psi$) in which the difference between the *desired* interest rate differential in period t (bar) and the actual interest rate differential in the previous period t-1 (no bar) is erased. Finally, $\varepsilon$ denotes an error term. Rewriting equation (3) leads to equation (4):

$$i - i^{Euro} = (1 - \psi)(i - i^{Euro})_{-1} + \psi\,\overline{(i - i^{Euro})} + \epsilon \qquad (4)$$

Assuming the desired domestic interest rate differential is determined by a constant ($\delta_1$) and other determinants (x)[9]

$$\overline{i - i^{Euro}} = \delta_1 + \delta_2 x \qquad (5)$$

and combining (4) and (5) leads to

$$i - i^{Euro} = \psi\,\delta_1 + (1 - \psi)(i - i^{Euro})_{-1} + \psi\,\delta_2 x + \epsilon \qquad (6)$$

Similarly, the partial adjustment model for the adjusted domestic covered nominal interest rate differential may be formulated as follows:

$$(i - (i^{*Euro} + f - s)) = \psi\,\delta_1 + (1 - \psi)(i - (i^{*Euro} + f - s))_{-1} + \psi\,\delta_2 x + \epsilon \qquad (7)$$

Annual series for closed nominal interest rate parity may be derived as follows (see Appendix B):

$$\phi^{Year}_{Domestic} = \sum_{j=1}^{j=12} \frac{[\,i_{t,t+3} - i^{Euro}_{t,t+3}\,]_j}{12} \qquad (8)$$

for Germany, France, Netherlands and the United Kingdom.[10] Unfortunately, Euro-interest rates are not available for Austria, Belgium, Denmark, Finland, Italy, Spain and Sweden. Therefore, for these countries

[8] This reasoning applies to both direct or quantitative measures (consisting of outright restrictions or prohibitions of certain capital transactions) and indirect or cost measures (effecting the operations of the banking and nonbanking sector). Numerous qualitative studies exist that describe the introduction and workings of capital control measures.

[9] In section 3, we identify relevant determinants.

[10] Data for Germany refer to the Federal Republic of Germany before the unification of Germany.

we calculate annual series of adjusted covered nominal interest rate differentials (see Appendix B):

$$\xi_{Domestic}^{Year} = \frac{\sum_{j=1}^{j=12} [\, i_{t,t+3} - i_{t,t+3}^{*\,Euro} - (f_t^{t+3} - s_t)\,]_j}{12} \qquad (9)$$

which is equivalent to the closed nominal interest rate differential under the assumption of covered interest rate parity in offshore markets. Henceforth, when we speak about closed interest differentials we also mean adjusted covered interest rate differentials.

Appendix C plots the year-by-year average deviations from the price measure over the period 1973-1993. Unfortunately, we had to take a shorter sample period for Italy (1977-1993) due to the lack of forward exchange rate data. Clearly, Appendix C shows a declining pattern of closed interest differentials, with alternating periods of relatively high and low capital control intensity. Finally, note that care must be exercised in taking the closed interest rate differentials as an indication of the intensity of capital controls, since differences in asset-specific types of risk cannot be completely excluded.[11] The next section identifies the main determinants of capital controls. Why do governments regulate financial markets?

## 3 The rationales for capital controls

This section focuses on the rationales for capital controls. Several authors have dealt with the issue of the rationales for capital controls (see e.g. Cairncross, 1973, OECD, 1980, OECD, 1990a, Mathieson and Rojas-Suarez, 1993, 1994 and the sections on capital flows of IMF's Annual Report on Exchange Arrangements and Exchange Restrictions). We take an eclectic approach to identify the main determinants of financial integration in the EU. Thus, we investigate whether certain economic, institutional and political features of individual countries may explain the intensity of capital controls.[12] In addition, we offer some analytical indicators for the determinants of capital controls. Some determinants of capital controls may actually apply more to long-term capital flows. So, in the empirical analysis we should find them to be less significant.

According to Mathieson and Rojas-Suarez (1994) the main three arguments for capital controls in industrial countries are: (1) Limiting volatile short-term capital flows, (2) Retaining domestic savings and (3) Maintaining the domestic tax structure (tax rates and tax base). Cairncross (1973) comes up with a fourth rationale for capital controls: (4) Applying the "second-best" principle of welfare economics.

*(1) Limiting volatile short-term capital flows*

(1a) Capital controls support the sustainability of fixed but adjustable c.q. unilateral pegged exchange rates: i.e. capital controls limit the scope for speculative attacks[13]

The recent turbulence in the European Monetary System (EMS) of pegged but adjustable exchange rates and of countries unilateral pegging their exchange rates to the ECU or DM (Sweden and Finland), highlights the importance of the choice of the exchange rate arrangement. An important feature of the functioning of the EMS was the maintenance of many capital controls to support monetary policy. Controls took a variety of forms, ranging from taxes on holdings of foreign-currency assets to restrictions on the ability

[11] The price measure may be more informative about country-specific regulation using treasury bill rates with the same default risks. Unfortunately, treasury bill rates are unavailable for all EU countries considered, or the depth of the treasury bill market is low (see Cumby and Obstfeld, 1984, p. 132 and Appendix B).

[12] The rationales for capital controls are often intimately related. So, they may be encompassed under more headings.

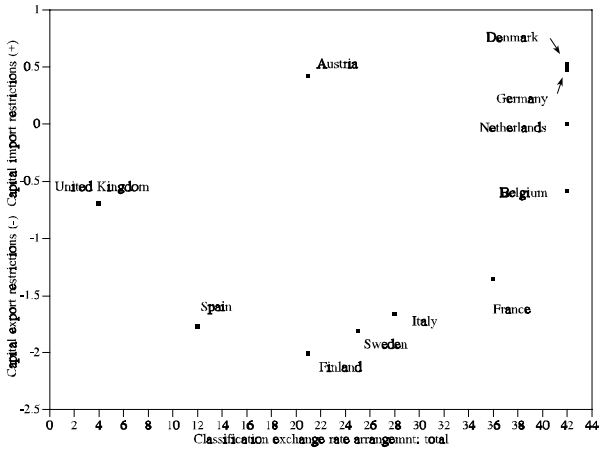
[13] This subdivision partially follows Alesina, Grilli and Milesi-Ferretti (1994).

of banks to lend abroad (see Giavazzi and Giovannini, 1989). Capital controls should (temporarily) prevent c.q. discourage speculative capital flows (see Wyplosz, 1988, p. 95). For example, when the markets expect a realignment, the holding of weak currencies becomes more risky (i.e. the degree of substitutability between weak and strong currencies diminishes). If the authorities of weak currency countries wish to avoid or delay the realignment they will be obliged to raise domestic interest rates to make investors indifferent to the choice between holding domestic and foreign assets. This interest rate variability is particularly damaging in countries where the government has a large proportion of short-term debt, or when longer-term debt instruments are indexed to short-term interest rates, as is the case in Italy (Alesina, Grilli and Milesi-Ferretti, 1994, p. 294). Similarly, currency pegging with concomitant high short-term domestic interest rates also harm households and firms with large proportions of short-term debt. On the other hand, restrictions on capital export may (temporarily) sustain the pressure for the domestic interest rate to rise. Foreigners engaged in speculative transactions move to the offshore markets causing large offshore-onshore interest rate differentials. For example, during the EMS exchange crisis of September 1992 Ireland, Portugal and Spain defended their exchange rate by creating large offshore-onshore interest rate differentials through the reintroduction of measures penalizing speculative transactions by non-residents.

We hypothesise that countries participating in less flexible exchange rate arrangements are more inclined to use capital import and export controls. To that end, we construct an index variable (EXR) of exchange rate flexibility taking the value of 2 during periods of minimal flexibility (i.e. the exchange rate flexibility is limited in terms of a cooperative arrangement under mutual intervention arrangements (the "snake" or EMS), 1 during period of intermediate flexibility (i.e. the exchange rate is maintained within relatively narrow margins in terms of a single currency (DM or US dollar) or a composite of currencies (ECU)) and the value of 0 during periods of maximum flexibility (i.e. more flexible arrangements) (see Appendix B for data sources). Our index variable EXR differs from the dummy variable EXR constructed by Alesina, Grilli and Milesi-Ferretti (1994) where periods of minimal *and* intermediate flexibility take the value 1 and periods with maximum flexibility take the value 0. Figure 1 plots the classification of the exchange rate arrangement (EXR) against the average deviation of the price measure representing the intensity of capital controls (CC) over the period 1973-1993. In addition, we report a bivariate cross-section regression with variables averaged over the period 1973-1993 to investigate the relationship between exchange rate flexibility and the intensity of capital controls. One asterisk indicates that the coefficient is significantly different from zero at the 95 % confidence interval, while two asterisks indicate that the coefficient is significantly different from zero at the 99 % confidence interval. Standard errors are indicated between parentheses. Furthermore, we report the adjusted coefficient of determination ($\bar{R}^2$).

**Figure 1 - The intensity of capital controls: The classification of the exchange rate arrangement**

$$CC = -1.67 + 0.05\ EXR \qquad \bar{R}^2 = 0.01$$
$$(0.91)\quad (0.05)$$



(1b) Capital controls preserve monetary autonomy

Monetary autonomy refers to the extent to which the central bank is in a position to control domestic interest rates, that is, to conduct monetary policy independently of the rest of the world.[14] The degree of monetary autonomy is determined by three factors: (1) exchange rate variability, (2) the substitutability of domestic and foreign assets and (3) the effectiveness of capital controls. The substitutability of domestic and foreign assets is partly dependent on exchange rate uncertainty, and the first factor can, therefore, be seen as an important aspect of the second. Capital controls that entirely preclude interest-sensitive capital movements result in complete autonomy -- irrespective of the exchange rate regime. Effective capital controls impose further restrictions on the substitutability of domestic and foreign assets. Capital controls or the threat of capital controls may result in significant country premia as described by Aliber (1973). This country premium is exploitable to achieve monetary independence. With no restrictions on capital movements, on the other hand, the substitutability of domestic and foreign assets needs to be imperfect, for some monetary autonomy to exist. The OECD (1990a, p. 25) argues: "In integrated financial markets monetary policy cannot control interest rates and exchange rates simultaneously, without the use of another instrument -- capital controls, for example.[15] The imposition of capital controls allows the government to pursue "inconsistent" monetary policies for a while.[16] The OECD (1990a, p. 23) argues: "Thus, exchange controls have been often viewed as a means whereby the authorities may seek to insulate, at least temporarily, domestic credit expansion from monetary developments abroad and increase the autonomy with which the supply of money can be steered to influence domestic objectives. With fixed exchange rates, the freedom of capital movements opens greater possibilities for low-risk interest arbitrage when interest rates differ across countries. In the limiting case -- with perfect capital mobility -- movements of capital should theoretically induce interest rates to be maintained at complete parity across countries. This means that, for example, a reduction of domestic interest rates resulting from an expansionary monetary policy stance would induce capital to flow out of the country, thereby offsetting the monetary expansion and provoking a rise in domestic interest rates back to the parity level. Indeed, any significant deviation of domestic interest rates from parity levels across countries would result in capital flows leading eventually to restoration of interest rate parity."

The incentive of the government to impose capital controls should, then, depend on the degree of control the government has over monetary policy. The control the government acquires over monetary policy by imposing capital controls depends (among other things) on the degree of independence of the central bank. We hypothesise this control to be tighter, the less independent the central bank (see also Alesina, Grilli and Milesi-Ferretti, 1994 and Milesi-Ferretti, 1995). We employ the Eijffinger-Schaling index (ES) of central bank independence, since it is available for all EU countries considered (see Appendix B).[17] For the Eijffinger-Schaling index, the following rule applies: the higher the score ranging from 1 to 5, the more independent the central bank. Figure 2 plots the Eijffinger-Schaling index of central bank independence against the intensity of capital controls. Clearly, countries with less independent central banks maintain capital export restrictions, while countries with highly independent central banks maintain capital import restrictions. It may be argued that the Eijffinger-Schaling index of central bank independence points at long run monetary policy independence, which means that countries may opt for different rates of steady-state inflation. Consequently, high levels of inflation (INF) may also indicate the increased presence of capital export controls. The plot for the relationship between INF and CC is contained in Appendix D. Only plots

[14] Policymakers attempt to insulate the economy from external disturbances.

[15] See also the discussion in articles of Eichengreen, Tobin and Wyplosz (1995, pp. 162-172), Garber and Taylor (1995, pp. 173-180) and Kenen (1995, pp. 181-192) of the January 1995 Economic Journal Policy Forum on Sand in the Wheels of International Finance. Other policy instruments are the imposition of a transaction tax (Tobin Tax) on purchases and sales of foreign currency or a non-interest-bearing deposit requirement on loans in domestic currency to non-residents.

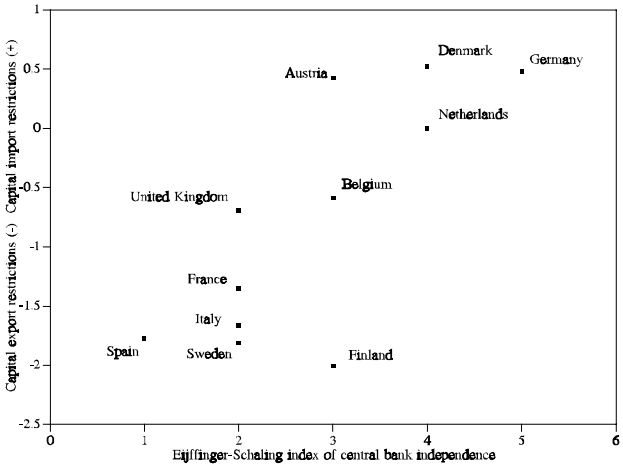
[16] The argument for capital controls to pursue "inconsistent" fiscal policies follows later.

[17] Cukierman's legal index (LVAU) of central bank independence which is also available for all EU countries in our sample gives similar results. The Grilli, Masciandaro and Tabellini (1991) total (economic and political) index of central bank independence also gives similar results. However, this index is not available for all EU countries. The same holds for the Alesina (1988, 1989) and the Bade-Parkin (1988) legal indices of central bank independence.

which represent the institutional and political variables are contained in the main text.

**Figure 2 - The intensity of capital controls: The Eijffinger-Schaling index of central bank independence**

$$CC = -2.63^{**} + 0.66^{**}\ ES \qquad \bar{R}^2 = 0.55$$
$$(0.55) \quad (0.18)$$




Capital controls may also follow from the need to prevent the loss of foreign exchange reserves of the central bank in case of a speculative attack or inconsistent monetary policies. The OECD (1990a, p. 27) argues: "Countries pursuing exchange rate targets may feel concern with the adequacy of their currency reserves in relation to real or potential flows of capital at the given exchange rate." In the EMS -- characterized by periodic realignments -- anticipation of a realignment may give rise to speculative attacks against the reserves of the central banks. The central bank may try to offset the impact of undesirable capital movements on domestic monetary aggregates through sterilisation. In addition, a country that expands its rate of money growth to reduce its interest rate, capital controls will prevent the outflow of capital seeking yields abroad. Consequently, a useful indicator of the inconsistencies in monetary policy is the ratio of broad money over GDP (M2). With a monetary expansion, capital export restrictions are needed, while a monetary contraction dictates capital import restrictions. The variable M2 was not included in previous research of Alesina, Grilli and Milesi-Ferretti (1994) and related papers.

(1c) Capital controls limit exchange rate volatility under flexible exchange rates

Although flexible exchange rates free the national monetary authorities from balance of payments constraints[18] and thus from the need to impose capital controls, capital controls still are frequently defended as a stabilization policy instrument under flexible exchange rates. The case for limiting capital mobility under flexible exchange rates relies on the differential speed of adjustment between the financial and the real sector (Dornbusch, 1976). This differential speed of adjustment, together with "excess volatility" in financial markets, may induce excess exchange rate volatility with negative effects on trade (Bini-Smaghi, 1991, Alesina, Grilli and Milesi-Ferretti, 1994, p. 294). The argument is closely related to the previous argument, since it may also hold during periods with exchange rate realignments, and for exchange rate movements within a band. Controls on capital inflows are intended to keep a strong currency from becoming stronger. Controls on capital outflows are intended to support a weak currency. We expect exchange rate depreciation (appreciation) to be a major driving force for capital outflows (inflows). Therefore, we construct a proxy for the expected exchange rate depreciation (DEP). We apply the assumption of rational expectations to proxy exchange rate expectations by their realized values. The proxy for Germany is based on the bilateral exchange rate expressed in DM per US $, for the other European countries the proxy is expressed in national

[18] Exchange rate depreciation is regularly defended to restore the loss of competitiveness (see also argument 2b).

currency per DM.[19] The variable DEP was not included in previous research.

*(2) Retaining domestic savings*

(2a) Capital controls limit differences between private and social returns

Another argument for capital controls is derived from possible differences between private and social returns. This argument has been used particularly in relation to direct foreign investment.[20] The OECD (1990a, p. 26) assert: "Whereas a private investor will invest abroad if the after-tax return from foreign assets is higher than the domestic return, the social return to the home country of the investment may be less than that of a domestic investment since the employment, production and tax-revenue benefits accrue to the host country." Capital controls can be used to retain domestic savings at home by reducing the return on foreign assets (e.g. through the introduction of an interest equalisation tax) and by limiting access to foreign assets. Thus, capital controls may raise investment in the domestic economy and, hence, economic growth. Furthermore, capital controls can be used to influence the distribution of ownership of domestic and foreign productive assets. With capital export restrictions a larger fraction of domestic assets will be owned by domestic residents and a smaller fraction of foreign assets will be owned by domestic residents.[21] A relevant indicator for the private return is the productivity in the business sector (PROD). The variable was not included in previous research. The productivity in the business sector reflects the attractiveness of domestic financial markets as the potential location of foreign capital. Countries with relatively high productivity in the business sector are expected to have restrictions on capital import. The unemployment rate (UN) may be a relevant indicator of social costs. With relatively high unemployment rates more capital export restrictions are expected to be in place. Again, this variable was not included in previous research.

(2b) Capital controls to maintain internal and external balance

With respect to this argument, the OECD (1990a, p. 27) remarks: "With substantial problems with both internal and external imbalances, policy concerns may increasingly be expressed in relation to the financing of government debt accumulation and balance of payments deficits and the size and the composition of external debt." Capital controls might keep interest rates down so as to reduce the cost of servicing its debt (Wyplosz, 1988, p. 88). Thus, capital controls may help to smooth and/or delay necessary internal adjustments to outside pressures. We conjecture that the ratio of general government financial balance to GDP (also referred to as net lending of the government) (DEF) may be a relevant indicator for the intensity of capital controls. Governments with large budget deficits relative to GDP are expected to impose more capital export restrictions to preserve the tax base. This variable was also not included in previous research. Similarly, governments with large proportions of gross debt relative to GDP (DEBT) are expected to impose capital export controls.

Others countries have implemented capital controls measures to facilitate the financing of current account deficits and to influence the structure of such financing. The OECD (1990a, p. 27) argues: "It may also be felt that exchange controls can support the management of future current account flows resulting from interest and debt payments. In this connection, restrictive regulations may be advocated with a view to influencing the sectoral composition and term-structure of foreign debt." The subsequent empirical analysis will introduce the ratio of current account balance to GDP (CA) as a relevant indicator. We expect countries with large current account deficits to impose capital export restrictions and countries with large current account surpluses to impose capital import restrictions. Note however, that countries generally show asymmetric behaviour with respect to targeting the current account: capital export restrictions with current

[19] Evidently, the proxy for Germany is less comparable with the proxy for the other EU countries. Of course, an alternative proxy expressed in ECU also has its drawbacks. It will be dominated by Germany and it may be difficult to construct due to data availability.

[20] Note that this argument is more related to *long-term* capital movements.

[21] Capital controls may be designed to limit foreign ownership of certain sectors of the economy.

account deficits, no capital import restrictions with current account surpluses.

*(3) Maintaining the domestic tax structure (tax base and tax rates)*

3(a) Capital controls prevent tax arbitrage

Taxation affects the pattern of international capital flows -- by directing savings and financial transactions to countries with a favourable fiscal regime. Differences in the taxation of the returns on capital (withholding taxes on interests, profits and dividends) across countries may lead to capital flight from high to low tax countries to such an extent that nations may be deprived of their tax bases and, as a consequence, of their welfare systems. Differences in the tax structure are created by different tax rates, differences in the bases that are taxed and by different possibilities of avoidance and evasion. The importance of differences in tax structure in explaining closed nominal interest rate differentials is likely to increase with more integrated financial markets.

In addition, countries with inefficient tax systems may be more likely to impose capital controls. Because they erode the tax base, capital outflows may greatly reduce the efficacy of the inflation tax on domestic money holdings. The use of inflation tax is more attractive in the presence of a large tax base, i.e. when the demand for base money is high. This is more likely in countries where a large amount of transactions take place with the use of cash, and where banks have large amounts of reserves (Alesina, Grilli and Milesi-Ferretti, 1994, p. 304). Capital controls, by isolating domestic financial intermediaries from foreign competition, allow the imposition of high bank reserve requirements. This maintains a high demand for monetary base and thus assures a large tax base for the inflation tax. The inflation tax provides the government an alternative source of revenue as opposed to conventional forms of distorting taxation such as income taxation (Phelps, 1973, Cukierman, Edwards and Tabellini, 1992)).[22]

Of course, this argument is closely related to the previous argument on the maintenance of internal balance. Relevant indicators are the inflation tax (INF TAX, the inflation rate times base money as percentage of GDP, active instrument i.e.the growth of seigniorage as a consequence of inflation) and seigniorage (SEIGN, the growth rate of nominal GDP times base money as percentage of GDP, active and passive instrument i.e. the growth of seigniorage as a consequence of inflation and real income). We conjecture that with higher inflation tax and seigniorage revenue, the intensity of capital export controls will be higher.

(3b) Capital controls redistribute income

Left-wing governments are hypothesized to favour the taxation of capital income over that of labour income, and to be tempted to introduce capital controls to prevent capital export and thus maintain a large domestic tax base for capital levies (Alesina, Masciandaro and Tabellini, 1994).[23] We introduce the dummy variable LEFT, taking the value 1 when a left-wing government is in place and the value 0 otherwise (see Appendix B). Furthermore, we expect political unstable countries to have more capital export restrictions. We proxy the political instability of countries with the frequency of significant government changes (SIGGOV) constructed by De Haan and Van 'tHag (1994).[24] This brings us to the final argument for capital controls.

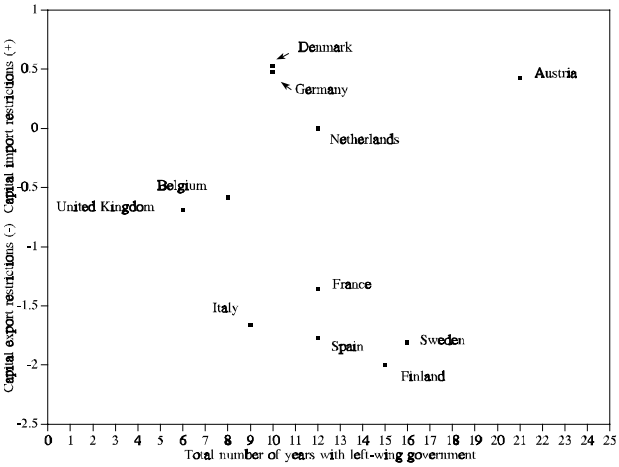
[22] Note, however, the inflation tax may not be a choice variable for the government if monetary policy conduct is delegated to an independent central bank.

[23] Underlying the capital levy explanation of capital controls is the assumption that the government has sufficiently wide support to introduce capital controls.

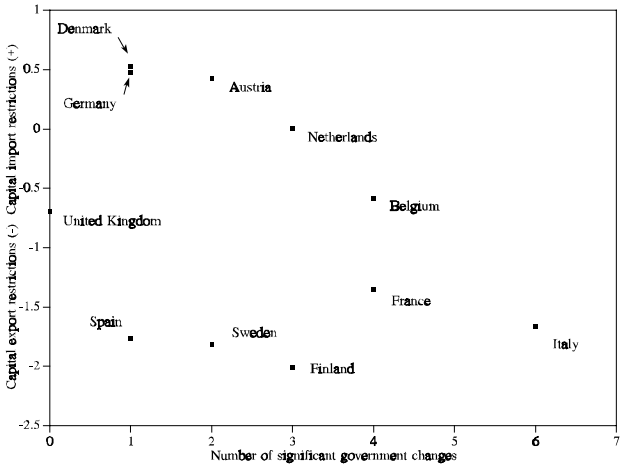
[24] The Grilli, Masciandaro and Tabellini (1991) index of significant government changes gives similar results. However, this index is not available for Finland and Sweden.

**Figure 3 - The intensity of capital controls: The total number of left-wing governments and the total number of significant government changes**

CC = − 0.72 − 0.004 LEFT $\bar{R}^2$ = −0.11
(1.00) (0.08)




CC = − 0.25 − 0.21 SIGGOV $\bar{R}^2$ = 0.04
(0.53) (0.18)




*(4) Applying the "second-best" principle of welfare economics*

(4a) Capital controls correct distortions in labour and goods markets

Capital controls have also been defended with reference to the "second-best" principle of welfare economics. Second-best theory suggests that government intervention can enhance welfare in the presence of multiple distortions. If some unavoidable rigidities exist in goods and labour markets, it has been argued, then some "optimal" degree of distortions in the operation of financial markets might lead to an overall improvement of welfare.[25] Unavoidable rigidities in goods and labour markets are best matched by some institutionally created rigidities in foreign exchange and financial markets (Cairncross, 1973). Capital flows exacerbate economic distortions in the short run and long run. Relevant indicators of economic structure are the productivity in the business sector (PROD) and the openness of the economy (OPEN). With high openness capital controls are less effective, so they are less likely imposed. On the other hand, one may argue, with high openness capital controls may shield the economy from foreign competition, so they are more likely imposed. Moreover, the productivity in the business sector and the openness of the economy may also control for omitted variables in the regression specification -- i.e. variables which are strongly correlated with these control variables.

(4b) Capital controls correct distortions in financial markets and financial systems

We hold that the explanation of European differences in the degree of financial integration cannot abstract from the analysis of country-specific differences in financial market structure (the financial system inclusive). The structure and regulation of the domestic financial system is at the heart of the use of capital controls. With financial markets becoming increasingly integrated, the role of country-specific differences in financial market structure in explaining closed interest differentials is likely to increase. The OECD (1990a, p. 27) argues: "The authorities may also wish to regulate capital flows because of concerns with the degree of foreign exchange exposure of domestic financial institutions and its implications for the soundness of the financial system as a whole.[26] One set of reasons advanced for limiting the size and mobility of capital flows relates to the associated foreign exchange risks as well as the potential for undermining national prudential standards by allowing domestic investors to acquire assets that the authorities consider unsound or by encouraging the emergence of instruments and practices the authorities do not wish to see developed in local markets." The financial market structure of EU countries can be seen as the outcome of the behaviour of the various sectors in the economy (Lemmen and Eijffinger, 1995b). According to Hubbard (1994, p.

[25] Or, to keep trade free of tariffs and subsidies, it may be necessary to regulate capital movements.

[26] The rationale for capital controls and regulation of domestic financial markets results from the desire to avoid systemic risk.

246), financial market structure refers to "[...] the mix of finance between equity and debt and to the source of funds -- through financial markets or through financial intermediaries." The term "financial structure" may be defined fairly broadly to include such features as the degree of development of money and financial markets; the degree of competition within the banking system, and between banks and other intermediaries, the existence of constraints on capital movements; the ownership structure of the financial intermediaries (Cottarelli and Kourelis, 1994, p. 590). Among the facts that interfere with the relationships between financial integration and financial market structure are the persistent difference in bank-based and market-based systems, the uneven development and structure of financial balances and the unequal responsiveness of interest rates to monetary policy (Bank for International Settlements, 1994, pp. 136-140). In many of the national financial markets bank deposit and loan rates were subject to regulation and other distortions (see Marston, 1995, Chapter 2). Policies that seek to maintain nonmarket interest rates on loans or deposits are undermined by international arbitrage unless backed up by controls. Taxes on financial intermediation can cause financial activity to move offshore unless backed up by controls.

Unfortunately, it is rather difficult to find relevant indicators of financial market structure. Due to data availability we had to employ rather crude measures of financial market structure.[27] We conjecture that the intensity of capital controls is negatively related to the development of the financial system. We hypothesise that less-developed financial markets are characterized by relatively low intermediation by financial institutions to the domestic economy (CREDIT); that is, domestic credit expansion is relatively low, and relatively low ratios of broad money (M2) over narrow money (M1) (M2M1); that is, the development of more sophisticated deposit instruments is relatively low.[28] Both variableds were not included in previous research. On the other hand, CREDIT may also indicate inconsistent monetary policies and the presence of capital export restrictions. So, we will let the data decide which of the two arguments holds.

## 4 The fundamental determinants of financial integration in the European Union: Empirical results and interpretation

This section determines empirically the fundamental determinants of financial integration in the EU. Because we would like to infer conclusions about a country-specific effect which cannot be observed directly, we resort to the use of panel data. With the use of panel data the partial adjustment model specified in equation (6) of section 2 takes the following form:[29]

$$(i - i^{Euro})_{i,t} = \beta_0 + \beta_1 (i - i^{Euro})_{i,t-1} + \beta_2 x_{i,t} + \gamma_i + \epsilon_{i,t} \qquad (10)$$

where $\beta_0=\psi\delta_1$ is the common intercept term, $\beta_1=(1-\psi)$ is the partial adjustment coefficient, $\beta_2=\psi\delta_2$ is coefficient for the determinants of the intensity of capital controls, $(i-i^{Euro})_{i,t}$ is the closed nominal interest rate differential of country i in period t, $(i-i^{Euro})_{i,t-1}$ is the closed nominal interest rate differential of country i in period t-1, $x_{i,t}$ are the determinants of the intensity of capital controls excluding EXR, ES, LEFT and SIGGOV of country i in period t, $\gamma_i$ is the country-specific effect and $\varepsilon_{i,t}$ is the error term for country i

[27] To our knowledge, only the OECD has comparable data available to examine sectoral financial balances (OECD, Financial Statistics, Part II, Financial Accounts of OECD countries). See also Mooslechner (1994) and Lemmen and Eijffinger (1995b).

[28] Of course, there are more relevant indicators such as the market share of the five largest banks, or the number of bank branches per 100,000 inhabitants etc. (see e.g. King and Levine, 1993 and Cottarelli and Kourelis, 1994). Since data are difficult to obtain, we leave this for further research.

[29] Actually, we should write $\beta_3\gamma_i$, but this term can only be estimated in a composite form. We are not able to disentangle the constant coefficient $\beta_3$ and the country-specific effect $\gamma_i$. So, without loss of generality $\beta_3$ can be normalized at one.

in period t.[30] The subscript i represents the countries in our sample (i=1,..,N) and subscript t is the time subscript (t=1,..,T).

Before turning to the estimation results, we will briefly describe the estimation technique for the above fixed-effects model (see Hsiao 1986, pp. 29-32 and Eijffinger, Van Rooij and Schaling, 1994). For convenience, we introduce the following notation:

$$\beta = (\beta_1, \beta_1, \beta_3, \ldots)'$$

$$X_{i,t} = \left( (i - i^{Euro})_{i,t-1}, x'_{i,t} \right)' \quad i = 1,..,N \quad t = 1,..,T$$

$$\zeta_i = \beta_0 + \gamma_i \qquad i = 1,..,N$$

Now, we are able to rewrite equation (10) as

$$(i - i^{Euro})_{i,t} = \zeta_i + \beta' x_{i,t} + \epsilon_{i,t} \qquad i = 1,..,N \quad t = 1,..,T \tag{11}$$

Note that we have comprised the common intercept $\beta_0$ and the country-specific effect $\gamma_i$ together to $\zeta_i$. The reason for this is that because both terms are fixed constants we cannot identify or estimate them separately. We will refer to $\zeta_i$ as the generalized country-specific effect to distinguish it from the country-specific effect $\gamma_i$. Ensuing, we need the following notation:

$$(i - i^{Euro})_i = \left( (i - i^{Euro})_{i,t}, \ldots, (i - i^{Euro})_{i,T} \right)' \quad i = 1,..,N$$

$$e = (1, \ldots, 1)'$$

$$X_i = \left( x'_{i,1}, \ldots, x'_{i,T} \right)' \qquad i = 1,..,N$$

$$\epsilon_i = \left( \epsilon_{i,1}, \ldots, \epsilon_{i,T} \right)' \qquad i = 1,..,N$$

Now equation (11) can be written as[31]

$$(i - i^{Euro})_i = \zeta_i e + X_i \beta + \epsilon_i \qquad i = 1,..,N \tag{12}$$

Define matrix Q as $Q=I_T - ee'/T$ where $I_T$ denotes the identity matrix with dimensions T by T. Premultiplying equation (12) with Q has the effect of transforming all observations into deviations of their individual means. Performing this transformation on equation (12) gives:

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[30] We assume the error term $\varepsilon_{i,t}$ to be an independently, identically distributed random variable with mean zero and variance $\sigma_\epsilon^2$. Furthermore, we assume that the error term is independent of the regressors. Moreover, when we use F- and t-statistics, we implicitly make the assumption that the error term is normally distributed.

[31] The conditions for $\varepsilon_{i,t}$ imply for $\varepsilon_i$:

$$(1) \quad E(\epsilon_i) = 0 \qquad i = 1,..,N$$
$$(2) \quad E(\epsilon_i \epsilon_i') = \sigma_\epsilon^2 I_T \qquad i = 1,..,N$$
$$(3) \quad E(\epsilon_i \epsilon_j') = 0 \qquad i, j = 1,..,N \wedge i \neq j$$

with $I_T$ denoting the T by T identity matrix.

$$Q\,(\,i - i^{Euro}\,)_i = Q\,X_i\,\beta + Q\,\epsilon_i \qquad i = 1,..,N \tag{13}$$

Since transforming a constant into a deviation of its individual mean gives zero, the term $\zeta_i e$ drops out. Applying Ordinary Least Squares (OLS) to (13) gives the following within-group estimator (Hsiao, 1986, p. 31):[32]

$$\hat{\beta}_{WG} = \left[\sum_{i=1}^{N} X_i'\,Q\,X_i\right]^{-1}\left[\sum_{i=1}^{N} X_i'\,Q\,(\,i - i^{Euro}\,)_i\right] \tag{14}$$

Now we can estimate $\zeta_i$ by:

$$\hat{\zeta}_{i,WG} = \overline{(\,i - i^{Euro}\,)_i} - \overline{X_i'}\,\hat{\beta}_{WG} \tag{15}$$

with

$$\overline{(\,i - i^{Euro}\,)_i} = \frac{1}{T}\sum_{t=1}^{T}(\,i - i^{Euro}\,)_{i,t}$$

and

$$\overline{X_i'} = \frac{1}{T}\sum_{t=1}^{T} X_{i,t}$$

The variance-covariance matrix of the within-group estimator is

$$\hat{VAR}\,(\,\hat{\beta}_{WG}\,) = \hat{\sigma}_{\epsilon}^{2}\left[\sum_{i=1}^{N} X_i'\,Q\,X_i\right]^{-1} \tag{16}$$

with

$$\hat{\sigma}_{\epsilon}^{2} = \frac{1}{NT-(N+k)}\sum_{i=1}^{N}\left[\,(i - i^{Euro})_i - \hat{\zeta}_{i,WG}e - X_i\hat{\beta}_{WG}\,\right]'\left[\,(i - i^{Euro})_i - \hat{\zeta}_{i,WG}e - X_i\hat{\beta}_{WG}\,\right]$$

and

$$\hat{VAR}\,(\,\hat{\zeta}_{i,WG}\,) = \overline{X_i'}\,\hat{VAR}\,(\,\hat{\beta}_{WG}\,)\,\overline{X_i} + \frac{\hat{\sigma}_{\epsilon}^{2}}{T} \tag{17}$$

The parameter k denotes the number of regressors. Basically, the fixed-effects model implies that all countries have the same coefficients in front of the exogenous variables but that the intercepts are different among the 11 EU countries. We are referring to the generalized country-specific effects ($\zeta_i$) because we are only able to estimate these in a composite form. This is no problem because our main interest is not in the exact value of these effects but their ranking. Furthermore, under proper conditions for the error term we can

[32] The estimator is called this way because only the variation within each group (country) is used.

apply OLS to equation (13) and the within-group estimator is BLUE (Best Linear Unbiased Estimator) (Hsiao, 1986, p. 32).

Next, we turn to the estimation results. The sample consists of 11 EU countries for which data are available: Austria, Belgium, Denmark, Finland, France, Germany, Italy, Netherlands, Spain, Sweden and the United Kingdom. The intention was to use publicly available data sources (OECD and IMF) (see Appendix B). The sample contains 216 observations (231 less 11 due to the lagged dependent variable less 4 due to the lack of forward exchange rate data for Italy). The results are reported in Table 2.

Regressions A and B explain closed interest differentials by their fundamental determinants $x_{i,t}$, not including the lagged dependent variable:

$$(i - i^{Euro})_{i,t} = \zeta_i + \beta_2 x_{i,t} + \epsilon_{i,t} \qquad (18)$$

In regression A all determinants except the lagged dependent variable are included. In regression B we apply the general-to-specific approach (see Charemza and Deadman, 1992). The specification started with the inclusion of all determinants except the lagged dependent variable, finally arriving at the significant regressors only.[33]

We attribute remaining differences from closed interest parity to country risk premia imposed by the international financial community on particular countries. The generalized country-specific effect $\gamma_i$ reflects the effects of *expectations* that controls might be tightened or eased in the future, or the effect of controls not currently binding might become a constraint in the future, or the effect of expectations of new controls. The generalized country-specific effect may also include the risk as assessed by the market that the policy will not maintained (peso problems) and country-specific risk that cannot be explained by its fundamental determinants (news). In addition, these country premia also capture the other determinants which cannot be included in the right-hand side of the regression because they are time-invariant such as the index of exchange rate flexibility (EXR), the Eijffinger-Schaling index of central bank independence (ES), the proxy for the political leaning of the government (LEFT) and the measure for political instability (SIGGOV). Because these variables are (more or less) constant over time, the coefficients of these variables cannot be identified in a panel data approach. Moreover, since both EXR and ES are indirectly measured by the depreciation of the exchange rate (DEP) and the rate of inflation (INF) respectively, the country-specific effect is mainly attributed to political risk variables such as LEFT and SIGGOV. Furthermore, possible other sources of political conflict such as high general government gross debt ratios (DEBT) and current account imbalances (CA) are already included in the right-hand side of the regression.

The first question, then, is to address whether the signs of the individual coefficients conform to theoretical expectations (see discussion in section 3). By now, considerable agreement exists across studies (Alesina, Grilli and Milesi-Ferretti, 1994 and Milesi-Ferretti, 1995) that the realized inflation rate (INF) and related attributes such as the inflation tax (INF TAX) and seigniorage revenue (SEIGN) account for an important part of closed nominal interest rate differentials (compare the magnitude of the estimated coefficients in regression A). Generally, high inflation rates are associated with more capital export restrictions. Realized depreciations of the exchange rate (DEP) are positively associated with the intensity of capital export controls. Both INF and DEP encourage capital outflows, so more capital export restrictions are expected to be in place. Strong evidence is found for the intensity capital controls to depend negatively on the size of general government deficit (DEF).

[33] We apply a joint F-test of zero restrictions on the coefficient of the deleted variables. We omit the insignificant variables.

## Table 2 - The fundamental determinants of the intensity of capital controls in the EU

| | $\zeta_i$ | $(i-i^{Euro})_{i,t-1}$ | $DEP_i$ | $INF_i$ | $M2_i$ | $DEF_i$ | $DEBT_i$ | $UN_i$ | $CA_i$ | $INF\ TAX_i$ | $SEIGN_i$ | $M2M1_i$ | $CREDIT_i$ | $OPEN_i$ | $PROD_i$ | $\sigma_\varepsilon^2$ | F | $\bar{R}^2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | See below. | | -0.022 (0.017) | -0.205 (0.082) | 0.003 (0.023) | -0.114* (0.060) | 0.008 (0.013) | -0.001 (0.072) | 0.168* (0.073) | 0.708 (0.554) | -0.210 (0.414) | 0.584** (0.226) | -0.036 (0.021) | -0.033 (0.025) | 0.092** (0.031) | 2.58 | 9.93 | 0.35 |
| B | See below. | | | -0.151** (0.050) | | -0.098* (0.048) | | | 0.150* (0.065) | | | 0.487* (0.211) | -0.035** (0.011) | | 0.097** (0.024) | 2.57 | 20.42 | 0.35 |
| C | See below. | 0.548** (0.055) | | | | | | | | | | | | | | 2.66 | 105.25 | 0.33 |
| D | See below. | 0.324** (0.063) | -0.019 (0.016) | -0.124 (0.079) | 0.0008 (0.022) | -0.130* (0.048) | 0.005 (0.056) | -0.0005 (0.068) | 0.086 (0.070) | 0.400 (0.525) | -0.096 (0.390) | 0.465* (0.214) | -0.020 (0.020) | -0.033 (0.024) | 0.059* (0.030) | 2.28 | 12.41 | 0.43 |
| E | See below. | 0.397** (0.059) | | -0.153** (0.032) | | -0.103* (0.043) | | | | | | | | | | 2.31 | 52.04 | 0.41 |

| | A: $\zeta_i$ | | B: $\zeta_i$ | | C: $\zeta_i$ | | D: $\zeta_i$ | | E: $\zeta_i$ | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Netherlands | -4.533 (3.427) | Germany | -6.482 (2.042)** | Denmark | 0.483 (0.366) | Netherlands | -2.396 (3.249) | Denmark | 1.399 (0.429)** |
| 2 | Germany | -4.931 (2.566) | Spain | -7.192 (2.249)** | Austria | 0.147 (0.366) | Belgium | -2.505 (3.497) | UK | 0.776 (0.469) |
| 3 | Denmark | -5.030 (3.245) | Denmark | -7.205 (2.327)** | Netherlands | 0.004 (0.365) | Denmark | -2.689 (3.085) | Spain | 0.686 (0.507) |
| 4 | Belgium | -5.121 (3.679) | UK | -7.254 (2.233)** | Germany | -0.080 (0.366) | Germany | -3.292 (2.434) | Austria | 0.628 (0.398) |
| 5 | Austria | -6.045 (3.203) | Netherlands | -7.470 (2.140)** | UK | -0.157 (0.367) | UK | -3.791 (2.757) | Germany | 0.272 (0.385) |
| 6 | UK | -6.192 (2.890)* | Austria | -7.861 (2.276)** | Spain | -0.336 (0.381) | Austria | -3.824 (3.043) | Finland | 0.240 (0.407) |
| 7 | Spain | -6.370 (2.987)* | France | -7.873 (2.174)** | Belgium | -0.349 (0.366) | Spain | -4.103 (2.843) | Netherlands | 0.239 (0.408) |
| 8 | France | -6.455 (2.817)* | Italy | -8.645 (2.345)** | France | -0.610 (0.373) | France | -4.149 (2.686) | Sweden | 0.100 (0.416) |
| 9 | Sweden | -7.738 (3.081)* | Belgium | -8.714 (2.203)** | Italy | -0.659 (0.418) | Sweden | -4.778 (2.954) | France | 0.051 (0.414) |
| 10 | Italy | -7.968 (3.042)* | Sweden | -9.560 (2.346)** | Sweden | -0.684 (0.380) | Finland | -5.208 (3.088) | Belgium | -0.422 (0.524) |
| 11 | Finland | -8.456 (3.214)** | Finland | -10.388 (2.456)** | Finland | -0.871 (0.382)* | Italy | -5.503 (2.900) | Italy | -0.543 (0.690) |

[a] $\sigma_\varepsilon^2$ is the variance of the error terms in the model, F is the F-test of the explanatory power of the regression and $\bar{R}^2$ is the coefficient of determination adjusted for degrees of freedom, denoting the explanatory power of the regression. For critical values of the t- and the F-distribution, see Dougherty (1992, pp. 364-371).

* Significantly different from zero at the 95 % level of confidence (two-tailed test).

** Significantly different from zero at the 99 % level of confidence (two-tailed test).

Source: see Appendix B.

The government debt ratio (DEBT) enters insignificantly positive in the regression. Resulting, higher debt ratios are positively related to capital import controls -- contrary to our prior expectation. Apparently, foreign investors demand compensation in the form of higher domestic returns to compensate for the increased probability of loan default. Current account surpluses (CA) are associated with capital import restrictions. With relatively high domestic credit expansion (CREDIT) more capital export restrictions are in place. Little evidence was found for justifying an important role of broad money (M2) and the unemployment rate (UN) in explaining the intensity of capital controls. Monetary policies that accommodate high rates of domestic credit expansion should lead to lower domestic interest rates relative to offshore interest rates and a negative coefficient for M2 arises. However, if such accommodating monetary policies are perceived to eventually lead to higher future inflation or current account deficits a positive coefficient for M2 arises. The openness of the economy (OPEN) and the productivity of the business sector (PROD) are effective control variables. The productivity in the business sector provides an important (significant) indication of the direction of capital flows and, hence, for the objective of capital controls. Low productivity of the business sector may be an influential argument for restricting capital exports. Apparently, even with capital export restrictions, capital find their way to the most productive investment opportunities. The openness of the economy is positively related to the presence of capital export restrictions. New evidence is found to support the hypothesis of the increasing relevance of financial market structure for the intensity of capital controls. With less-developed financial markets (M2M1) relatively higher capital outflows are expected. Accordingly, capital export restrictions are more feasible with low ratios of M2 over M1.

Regression B finds the variables INF, DEF, CA, M2M1, CREDIT and PROD to be the most important explanations of capital control intensity. Regression B indicates the existence of significant country risk premia (see country-specific effects $\zeta_i$ in Table 2).[34] The countries are listed in ascending order of estimated country risk premia ($\zeta_i$). Consequently, it may be important to include the lagged dependent variable as an explanatory variable in the regression.

In regression C we explain closed interest differentials by the persistence in the intensity of capital controls as measured by coefficient $\beta_1$ in equation (19).

$$(i - i^{Euro})_{i,t} = \zeta_i + \beta_1 (i - i^{Euro})_{i,t-1} + \epsilon_{i,t} \qquad (19)$$

Coefficient $\beta_1$ reflects the direct effect of capital controls in place. The country-specific effects capture all other determinants of closed interest differentials. The within-group estimator for $\beta_1$ is 0.548 with standard error of 0.055 and a coefficient of determination adjusted for degrees of freedom ($\bar{R}^2$) of 0.33. Again, the countries are listed in ascending order of estimated country risk premia ($\zeta_i$). This regression may be seen as the reference point for regressions D and E identifying the fundamental determinants of the financial integration in the EU.

We now arrive at our principal models of the fundamental determinants of capital controls. The estimation results of the partial adjustment model in equation (20) are summarized in regressions D and E of Table 2.

$$(i - i^{Euro})_{i,t} = \zeta_i + \beta_1 (i - i^{Euro})_{i,t-1} + \beta_2 x_{i,t} + \epsilon_{i,t} \qquad (20)$$

In regression D all determinants are included. Regression E is equivalent to D but now only reports the most significant variables applying general-to-specific modelling including only the significant variables. Regressions D and E tests for the relative importance of the persistence in capital controls (i.e. lack of

[34] The significance may also be caused by the common constant ($\beta_0$) to be significantly different from zero.

financial integration caused by capital controls) vis-à-vis domestic factors in explaining closed interest differentials. If financial integration is strong (coefficient $\beta_1$ is small) domestic factors will be a more important explanation for closed interest differentials. The regressions also allow for the presence of country-specific risk unexplained by the right-hand side of the regression. Including the lagged dependent variable together with the domestic determinants $x_i$ makes it possible to explain a substantial part of the intensity of capital controls. The generalized country-specific effect in regressions D and E is interpreted slightly differently than in regressions A and B. The domestic determinants $x_i$ affect the magnitude of the coefficient $\beta_1$ of the lagged dependent variable. Coefficient $\beta_1$ arguably captures existing capital controls. If we compare regression C with regressions D and E, the magnitude of coefficient $\beta_1$ declines with the country risk premium that is explained by the other determinants $x_i$ in the regression such as the perceived probability of debt default (DEF) and the risk of loss of purchasing power (INF). The generalized country-specific effect is assumed to pick up the other political risks. We expect countries with high political risk to show lower country-specific effects $\zeta_i$ and, consequently, a lower generalized country-specific effect. A negative country-specific effect may indicate that more capital export restrictions are expected. The existence of political risk (unrelated to the economic fundamentals) puts a limit on the extent to which international investors are willing to hold a particular asset. The results for Regression D are broadly in line with those of regression A, B and C.

Regression E advances that closed interest differentials in EU countries have been largely determined by realized inflation and government deficits together with the persistence in capital controls. So domestic monetary and fiscal policy are dominant determinants of closed interest differentials. Remaining insignificant country risk premia (see the country-specific effects of regression E) depend on a small number of "fundamentals" indicating confidence in the country's policies.

For ease of comparison, we have ranked the generalized country-specific effects in Table 2. The estimates for $\zeta_i$ recurrently coincide with a priori ranking of EXR, ES, LEFT and SIGGOV in Appendix B. In Table 3 we report formal statistical tests for positive c.q. negative correlations between the generalized country-specific effects from regressions B and E and the variables EXR, ES, LEFT and SIGGOV.

**Table 3 - Test for positive c.q.negative correlation between the generalized country-specific effect and EXR, ES, LEFT and SIGGOV (absolute t-statistics are indicated between brackets)**[a]

| Sample correlation coefficient of generalized country-specific effect with: | B | E |
|---|---|---|
| EXR | 0.136 (0.412) | -0.227 (0.698) |
| ES | 0.292 (0.916) | 0.163 (0.496) |
| LEFT | -0.340 (1.085) | 0.104 (0.315) |
| SIGGOV | -0.481 (1.645)* | -0.826 (4.399)** |

[a] We calculate the following t-statistic for the correlation coefficient r; $t = r\sqrt{\frac{n-2}{1-r^2}}$ where n-2 are the degrees of freedom (Dougherty, 1992, p. 112).

* Significantly different from zero at the 95 % level of confidence (one-tailed test).
** Significantly different from zero at the 99 % level of confidence (one-tailed test).

The results for EXR and LEFT are ambiguous. An increase in EXR leads to both an increase in the generalized country-specific effect (B) and a decline in the generalized country-specific effect (E). An increase in LEFT leads to a decline in the generalized country-specific effect (B) and a decline in the generalized country-specific effect. Both EXR and LEFT are insignificantly related to the country-specific effect. This result of EXR contrasts with that of Alesina, Grilli and Milesi-Ferretti (1994), while the result for LEFT corresponds with Alesina, Grilli and Milesi-Ferretti (1994). Apparently, other explanations at the righthand-side of the regression dominate. An increase in ES leads to an increase in the country-specific effect (both B and E), but again ES is insignificantly related to the generalized country-specific effect. This may be due to the variable INF which is already included in the right-hand side of the regression equation. Finally,

an increase in SIGGOV leads to a *significant* decline of the generalized country-specific effect (B and E). So, we agree with the prediction of Alesina, Grilli and Milesi-Ferretti (1994) that capital export controls are more likely imposed in countries with less independent central banks and in countries with significant government changes.

The generalized county-specific effects in regression E indicate that Belgium and Italy have potentially greater risks for investors as follows from the negative country risk premia with respect to regression E. Judging the negative sign of the generalized country-specific effect, capital export restrictions are more likely. Nevertheless, the political risks are insignificant. From regression B it follows that also Finland and Sweden probably have very low generalized country-specific effects. Investments in Finland and Sweden apparently involve relatively high (but insignificant) political risks.

Finally, we should mention some critical measurement issues. First, the relationship between the intensity of capital controls and its explanatory variables is often subject to uncertainty. The finding of no significant association with the intensity of capital controls may simply reflect the crudeness of the measured dependent and independent variables. Second, controls on capital outflows may also reduce capital inflows, as foreign investors worry about their ability to transfer income outside the country. Or a country imposes both capital import as well as capital export restrictions. These aspects of capital controls are difficult to grasp. Third, multicollinearity problems may exist in regressions A and D. For example, the inflation variable is of course closely related to the seigniorage revenue and the inflation tax variable. The same may hold for the inflation rate and the expansion of broad money. Therefore, regressions B and E apply general-to-specific modelling to find the main (significant) determinants. Lastly, future research may want to consider covered interest parity for long-term bonds (calculated with the help of currency swaps) as it is unclear if the results go through in financial assets with maturities of say more than 1 year.

## 5 Conclusions

The process of financial integration has received considerable attention in recent years. The paper has provided renewed evidence on the fundamental determinants of the intensity of capital controls. Using closed interest differentials to measure the intensity of capital controls and applying a panel data approach, we have identified the fundamental determinants of the intensity of capital controls in the EU. The main empirical results can be summarized as follows. The most important implication of increased financial integration is that it forces a greater degree of interest rate parity across countries, and that it reduces the scope for independent monetary (the interest rate instrument) and fiscal policy in the EU. Although, we emphasize different factors contributing to deviations from closed interest rate parity, broad common ground exist for the intensity of capital export controls to depend positively on realized inflation (INF) and government deficits (DEF) (see regressions B and D). Particularly, this adverse effect of inconsistent national monetary and fiscal policies has been of crucial importance in explaining the intensity of capital controls after allowing for the persistence in capital control intensity (see regression E). Furthermore, regarding almost all other arguments considered in this study, the basic purpose of controls on capital flows has been to provide a certain degree of autonomy from external economic circumstances. We find credit to the domestic economy (CREDIT) to be significantly positively correlated with the intensity of capital export restrictions (see regression B). Furthermore, also low productivity in the business sector (PROD) and low availability of sophisticated deposit instruments (M2M1) belong to the main determinants of the intensity of capital export restrictions (see regression B). These explanatory variables were not taken into account by previous studies. Similar to Alesina, Grilli and Milesi-Ferretti (1994), we find capital export restrictions to be less likely in countries with current account surpluses (CA) (see regression B).

Remaining differentials from closed interest parity are the consequence of country risk premia imposed

by the international financial community on particular countries. The paper finds relatively high but *insignificant* political risks in Belgium, Finland, Italy and Sweden (see regression E). This is in contrast with Alesina, Grilli and Milesi-Ferretti (1994) who find significant political risks for a sample of 20 OECD countries. These insignificant political risks are basically attributed to political instability approximated by significant government changes. This is in accordance with Alesina, Grilli and Milesi-Ferretti (1994) who find that capital export controls are more likely imposed in countries with significant government changes.

In contrast with previous research, this paper highlights the impact of (differences in) national economic and financial structures on financial integration. With capital controls increasingly being eliminated, we expect the underlying characteristics of economic and especially financial market structure to be major determinants of remaining closed nominal interest rate differentials in the future. Monetary and fiscal policy in the EU are expected to become increasingly dependent on varying economic and financial structures, rather than on financial integration.

# Appendix A

**Dummy variable of separate restrictions on payments for capital transactions: if these restrictions are in place, the variable takes the value of 1, and 0 otherwise.**

| CONTROL 1 | AUS | BEL | DEN | FIN | FRA | GER | ITA | NET | SPA | SWE | UK | **TOTAL** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1973 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | **9** |
| 1974 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | **9** |
| 1975 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | **9** |
| 1976 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | **9** |
| 1977 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | **9** |
| 1978 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | **8** |
| 1979 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | **8** |
| 1980 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | **7** |
| 1981 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | **7** |
| 1982 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | **7** |
| 1983 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | **7** |
| 1984 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | **6** |
| 1985 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | **6** |
| 1986 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | **6** |
| 1987 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | **7** |
| 1988 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | **7** |
| 1989 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | **6** |
| 1990 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | **6** |
| 1991 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | **6** |
| 1992 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | **4** |
| 1993 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | **5** |
| **TOTAL** | **19** | **0** | **16** | **20** | **21** | **0** | **18** | **6** | **21** | **21** | **7** | |

Source: International Monetary Fund, Exchange Restrictions, 1973-1978 and International Monetary Fund, Exchange Arrangements and Exchange Restrictions, Annual Reports, 1979-1993.

**Dummy variable of separate exchange rate(s) for some or all capital transactions and/or some or all invisibles: if these restrictions are in place, the variable takes the value of 1, and 0 otherwise.**

| CONTROL 2 | AUS | BEL | DEN | FIN | FRA | GER | ITA | NET | SPA | SWE | UK | **TOTAL** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1973 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | **5** |
| 1974 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | **5** |
| 1975 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | **3** |
| 1976 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | **3** |
| 1977 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | **3** |
| 1978 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | **3** |
| 1979 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | **2** |
| 1980 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | **2** |
| 1981 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | **2** |
| 1982 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | **2** |
| 1983 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| 1984 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| 1985 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| 1986 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| 1987 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| 1988 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| 1989 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| 1990 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| 1991 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| 1992 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| 1993 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **TOTAL** | **0** | **18** | **0** | **0** | **2** | **0** | **10** | **2** | **0** | **0** | **6** | |

Source: International Monetary Fund, Exchange Restrictions, 1973-1978 and International Monetary Fund, Exchange Arrangements and Exchange Restrictions, Annual Reports, 1979-1993.

**Index of restrictions on payments for capital transactions and separate exchange rate(s)for some or all capital transactions and/or some or all invisibles: If both restrictions are in place, the index takes the value 2, if one restriction is in place the index takes the value of 1, and 0 otherwise.**

| CONTROL 3 | AUS | BEL | DEN | FIN | FRA | GER | ITA | NET | SPA | SWE | UK | **TOTAL** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1973 | 1 | 1 | 1 | 1 | 2 | 0 | 2 | 2 | 1 | 1 | 2 | **14** |
| 1974 | 1 | 1 | 1 | 1 | 2 | 0 | 2 | 2 | 1 | 1 | 2 | **14** |
| 1975 | 1 | 1 | 1 | 1 | 1 | 0 | 2 | 1 | 1 | 1 | 2 | **12** |
| 1976 | 1 | 1 | 1 | 1 | 1 | 0 | 2 | 1 | 1 | 1 | 2 | **12** |
| 1977 | 1 | 1 | 1 | 1 | 1 | 0 | 2 | 1 | 1 | 1 | 2 | **12** |
| 1978 | 1 | 1 | 1 | 1 | 1 | 0 | 2 | 1 | 1 | 1 | 2 | **11** |
| 1979 | 1 | 1 | 1 | 1 | 1 | 0 | 2 | 0 | 1 | 1 | 1 | **10** |
| 1980 | 1 | 1 | 1 | 1 | 1 | 0 | 2 | 0 | 1 | 1 | 0 | **9** |
| 1981 | 1 | 1 | 1 | 1 | 1 | 0 | 2 | 0 | 1 | 1 | 0 | **9** |
| 1982 | 1 | 1 | 1 | 1 | 1 | 0 | 2 | 0 | 1 | 1 | 0 | **9** |
| 1983 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | **8** |
| 1984 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | **7** |
| 1985 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | **7** |
| 1986 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | **7** |
| 1987 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | **8** |
| 1988 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | **8** |
| 1989 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | **7** |
| 1990 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | **7** |
| 1991 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | **6** |
| 1992 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | **4** |
| 1993 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | **5** |
| **TOTAL** | **19** | **18** | **16** | **20** | **23** | **0** | **28** | **8** | **21** | **21** | **13** | |

Source: authors' own calculation.

Intensity of capital controls = $\underset{(0.50)}{0.12} - \underset{(0.03)}{0.06}$ Control 1 $\quad \bar{R}^2 = 0.23$

Intensity of capital controls = $\underset{(0.37)}{-0.71} - \underset{(0.06)}{0.008}$ Control 2 $\quad \bar{R}^2 = -0.11$

Intensity of capital controls = $\underset{(0.59)}{0.67} - \underset{(0.03)}{0.08^{*}}$ Control 3 $\quad \bar{R}^2 = 0.36$

# Appendix B

*The dependent variable*

| Variable | Countries |
|---|---|
| $\phi^{Year}_{Domestic} = \frac{\sum_{j=1}^{j=12} [\, i_{t,t+3} - i^{Euro}_{t,t+3} \,]_j}{12}$ | Germany, France, Netherlands, United Kingdom. |
| $\xi^{Year}_{Domestic} = \frac{\sum_{j=1}^{j=12} [\, i_{t,t+3} - i^{*\,Euro}_{t,t+3} - (f_t^{t+3} - s_t) \,]_j}{12}$ | Austria, Belgium, Denmark, Finland, Italy, Spain, Sweden. |

**Representative three-month domestic money-market interest rates**

Finding consistent comparable interest rate data for the EU countries under consideration is far from easy. To the extent possible, given data availability over long sample periods, we tried to use publicly available representative three-month money-market interest rates (monthly series). The integration of one segment of the money-market, that is taking one asset among many, may give a misleading impression of the overall short-term mobility of capital. This problem may partly be overcome by the use of representative short-term interest rates. Quoting the OECD (1990b, p. 45): "[...] the aim has not necessarily been to take the same rate for all countries, but to choose the rates which are the most typical or the most revealing, or again, those which may be described as the 'reference' rates. In drawing up the following norms, while attention has, of course, been given to ensuring as much international comparability as possible, it has nevertheless been necessary to have regard for the fact that the methods of calculation used by countries to some extent reflect the institutional features of their financial markets."

| Country | Period | Description | Source |
|---|---|---|---|
| Austria | January 1973-December 1993 | 3-month vibor | OECD, Financial Statistics Monthly, Part I |
| Belgium | January 1973-December 1993 | 3-month treasury bills | OECD, Financial Statistics Monthly, Part I |
| Denmark | January 1973-December 1975 | Central bank deposit certificates | OECD, Financial Statistics Monthly, Part I |
| | January 1976-December 1993 | 3-month interbank rate | OECD, Main Economic Indicators |
| Finland | January 1973-April 1987 | Average cost of central bank financing | OECD, Financial Statistics Monthly, Part I |
| | May 1987-December 1993 | 3-month helibor | OECD, Financial Statistics Monthly, Part I |
| France | January 1973-December 1993 | 3-month pibor | OECD, Financial Statistics Monthly, Part I |
| Germany | January 1973-December 1993 | 3-month fibor | OECD, Financial Statistics Monthly, Part I |
| Italy | January 1973-December 1993 | 3-month treasury bills | OECD, Financial Statistics Monthly, Part I |
| Netherlands | January 1973-December 1985 | 3-month loans to local authorities | OECD, Financial Statistics Monthly, Part I |
| | January 1986-December 1993 | 3-month aibor | OECD, Financial Statistics Monthly, Part I |
| Spain | January 1973-December 1976 | Rates charged: Short-term credits up to 3 months | OECD, Financial Statistics Monthly, Part I |
| | January 1977-December 1993 | 3-month interbank loans | OECD, Financial Statistics Monthly, Part I |
| Sweden | January 1973-December 1981 | 3-month treasury bills | OECD, Financial Statistics Monthly, Part I |
| | January 1982-December 1993 | 3-month discount notes | OECD, Financial Statistics Monthly, Part I |
| United Kingdom | January 1973-December 1993 | 3-month interbank rate | OECD, Financial Statistics Monthly, Part I |

**Representative three-month Euro money-market interest rates**

Representative three-month Euro money-market interest rates are available for the following EU countries: Germany, France, Netherlands and the United Kingdom (monthly series).

Source: OECD, Financial Statistics Monthly, Part I.

**Three-month forward exchange rates vis-à-vis the DM**

The following are our own cross-rate calculations of forward exchange rates of EU currencies vis-à-vis the DM based upon end-of-period three-month forward exchange rates vis-à-vis the US dollar (monthly series). The forward exchange rates are expressed as premiums (+) and discounts (−) on the forward value of the currency relative to its spot price. Defining the spot rate as currency units per US dollar, the formula for the forward premium on the currency in percent per annum is:

$$\frac{(S_t - F_t^{t-3}) \times 4 \times 100}{S_t}$$

The annualized forward premium or discount is based on a 360-day year, and the three-month forward rate is the rate for 90 days, yielding the factor 4 that is employed in the formula. Since direct DM forward (and spot) exchange rates are not available for all EU countries considered and/or over a sufficiently long period, we used cross-rate calculations of forward and spot exchange rates of EU currencies vis-à-vis the DM based upon forward exchange rates vis-à-vis the US dollar. Concerning these cross-rate calculations, we already *presume* in the investigation design perfect capital mobility. However, this is only possible on the basis of the assumption of perfect arbitrage between markets of foreign exchange. Due to transactions costs in triangular arbitrage, cross-rate calculations do not exactly correspond to direct quotations. In constructing DM forward and spot exchange rates, dollar cross-rate calculations are preferred because of the reserve currency status of the dollar, the role of the dollar as the world's major intervention currency and the scale and efficiency of the US financial markets. Forward exchange rates for Italy are only available from January 1977 onwards.

Source: IMF (1985), International Financial Statistics Supplement on Exchange Rates and IMF, International Financial Statistics, line 60f.

**Spot exchange rates vis-à-vis the DM**

Own cross-rate calculations of spot exchange rates of EU countries vis-à-vis the DM based upon end-of-period spot exchange rates vis-à-vis the US dollar (monthly series).

Source: IMF, International Financial Statistics, line ae.

*The independent variables*

| Indicator | Description | Source |
|---|---|---|
| CA | Current account balance as percentage of GDP | OECD, National Accounts, Main Aggregates, Volume I, 1960-1993 |
| CREDIT | Total domestic credit to the economy as percentage of GDP | IMF, IFS Yearbook 1994, line 32 |
| DEBT | General government gross debt as percentage of GDP | OECD Economic Outlook |
| DEP | Proxy for three-month exchange rate expectation, Realized three-month exchange rate depreciation vis-à-vis the DM, Own cross-rate calculation. Germany, realized three-month exchange rate depreciation vis-à-vis the US dollar | IMF, International Financial Statistics, line ae |
| EXR | Variable indicating exchange rate flexibility, 2 minimal flexibility, 1 intermediate flexibility and 0 maximal flexibility | IMF, Exchange Restrictions, Annual Report, 1973-1978. IMF, Exchange Arrangements and Exchange Restrictions, Annual Report, 1979-1993 |
| ES | Eijffinger-Schaling index of central bank independence (ranges from 1 minimal independence to 5 maximum independence) | Eijffinger and Schaling (1993), Eijffinger and Van Keulen (1995) |
| DEF | General government financial balance (government net lending) as percentage of GDP | OECD Economic Outlook |
| GDP | Gross domestic product | OECD, National Accounts, Main Aggregates, Volume I, 1960-1993 |
| M0 | Base money (reserve money) | IMF, IFS Yearbook 1994, line 14 |
| M1 | Money as percentage of GDP | IMF, IFS Yearbook 1994, line 34 |
| M2 | Money plus quasi-money as percentage of GDP | IMF, IFS Yearbook 1994, lines 34 (Money) and 35 (Quasi-money) |
| M2M1 | Money plus quasi-money over money | IMF, IFS Yearbook 1994, lines 34 and 35 |
| INF | Rate of change in the consumer price index (1990=100) | IMF, International Financial Statistics, line 64 |
| INF TAX | Inflation rate times M0 as percentage of GDP | IMF, International Financial Statistics, line 64 (CPI), IMF, International Financial Statistics, line 14 (Reserve Money) |
| LEFT | Dummy variable, taking the value 1 when a left-wing government is in place and the value 0 otherwise | Banks (1993), Political Handbook of the World: 1993, CSA Publications, State University of New York, Binghamton, New York |
| OPEN | Openness = (Export of goods and services+Imports of goods and services)/GDP | OECD, National Accounts, Main Aggregates, Volume I, 1960-1993 |
| PROD | Productivity in the business sector, index (1987=100) | OECD Economic Outlook |
| SIGGOV | The total number of significant government changes, measure for political instability | De Haan and Van 'tHag (1994) |
| SEIGN | Growth rate of nominal GDP times base money (M0) as percentage of GDP | IMF, International Financial Statistics, line 64 (CPI), line 14 (Reserve Money) |
| UN | Unemployment rate | OECD Economic Outlook |

**Exchange Rate Arrangements: minimal flexibility (2), intermediate flexibility (1) and maximum flexibility (0).**

| | AUS | BEL | DEN | FIN | FRA | GER | ITA | NET | SPA | SWE | UK | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1973 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 2 | 2 | 2 | 0 | 18 |
| 1974 | 1 | 2 | 2 | 1 | 0 | 2 | 0 | 2 | 2 | 2 | 0 | 14 |
| 1975 | 1 | 2 | 2 | 1 | 0 | 2 | 0 | 2 | 1 | 2 | 0 | 13 |
| 1976 | 1 | 2 | 2 | 1 | 2 | 2 | 0 | 2 | 1 | 2 | 0 | 15 |
| 1977 | 1 | 2 | 2 | 1 | 0 | 2 | 0 | 2 | 1 | 2 | 0 | 13 |
| 1978 | 1 | 2 | 2 | 1 | 2 | 2 | 0 | 2 | 1 | 1 | 0 | 14 |
| 1979 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 0 | 1 | 0 | 15 |
| 1980 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 0 | 1 | 0 | 15 |
| 1981 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 0 | 1 | 0 | 15 |
| 1982 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 0 | 1 | 0 | 15 |
| 1983 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 0 | 1 | 0 | 15 |
| 1984 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 0 | 1 | 0 | 15 |
| 1985 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 0 | 1 | 0 | 15 |
| 1986 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 0 | 1 | 0 | 15 |
| 1987 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 0 | 1 | 0 | 15 |
| 1988 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 0 | 1 | 0 | 15 |
| 1989 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 0 | 1 | 0 | 15 |
| 1990 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 0 | 16 |
| 1991 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 18 |
| 1992 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 18 |
| 1993 | 1 | 2 | 2 | 0 | 2 | 2 | 0 | 2 | 1 | 0 | 0 | 12 |
| TOTAL | 22 | 42 | 42 | 21 | 36 | 42 | 28 | 42 | 12 | 25 | 4 | |

Source: Index constructed with the help of IMF, Exchange Restrictions, Annual Report, 1973-1978 and IMF, Exchange Arrangements and Exchange Restrictions, Annual Report, 1979-1993.

**Eijffinger-Schaling index of central bank independence**

| | Austria | Belgium | Denmark | Finland | France | Germany | Italy | Netherlands | Spain | Sweden | United Kingdom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ES | 3 | 3 | 4 | 3 | 2 | 5 | 2 | 4 | 1 | 2 | 2 |

Source: Eijffinger and Schaling (1993) and Eijffinger and Van Keulen (1995).

**De Haan-Van 'tHag index of significant government changes**

| | Austria | Belgium | Denmark | Finland | France | Germany | Italy | Netherlands | Spain | Sweden | United Kingdom |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SIGGOV | 2 | 4 | 1 | 3 | 4 | 1 | 6 | 3 | 1 | 2 | 0 |

Source: De Haan and Van 'tHag (1994).

**Incumbent government: left-wing government (1), right-wing government (0).**

| LEFT | AUS | BEL | DEN | FIN | FRA | GER | ITA | NET | SPA | SWE | UK | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1973 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 7 |
| 1974 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 8 |
| 1975 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 7 |
| 1976 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 7 |
| 1977 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 6 |
| 1978 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 5 |
| 1979 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 6 |
| 1980 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 6 |
| 1981 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 7 |
| 1982 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 8 |
| 1983 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 6 |
| 1984 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 6 |
| 1985 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 6 |
| 1986 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 6 |
| 1987 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 5 |
| 1988 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 5 |
| 1989 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 6 |
| 1990 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 6 |
| 1991 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 6 |
| 1992 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 6 |
| 1993 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 6 |
| TOTAL | 21 | 8 | 10 | 15 | 12 | 10 | 9 | 12 | 12 | 16 | 6 | |

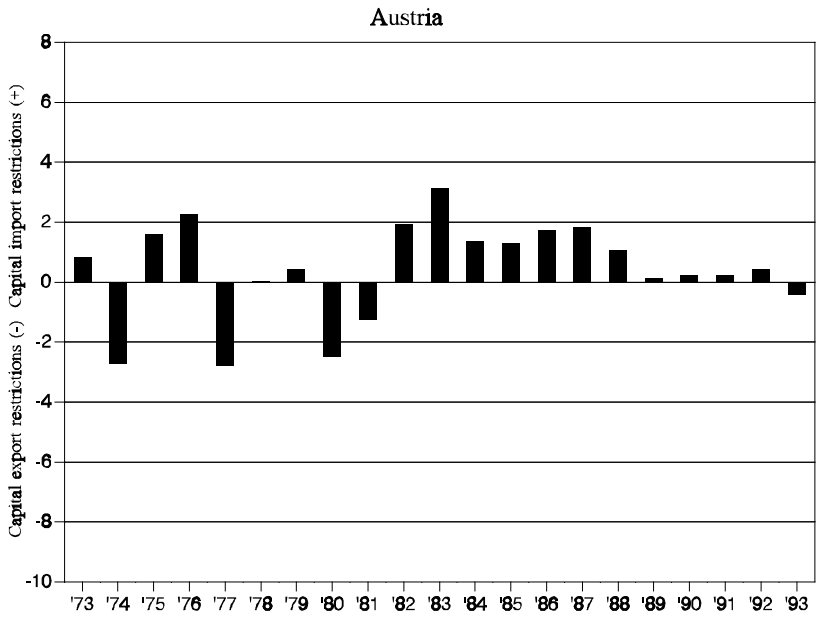
Source: Dummy variable constructed with the help of Banks (ed.) (1993), Political Handbook of the World: 1993, CSA Publications, State University of New York, Binghamton, New York.

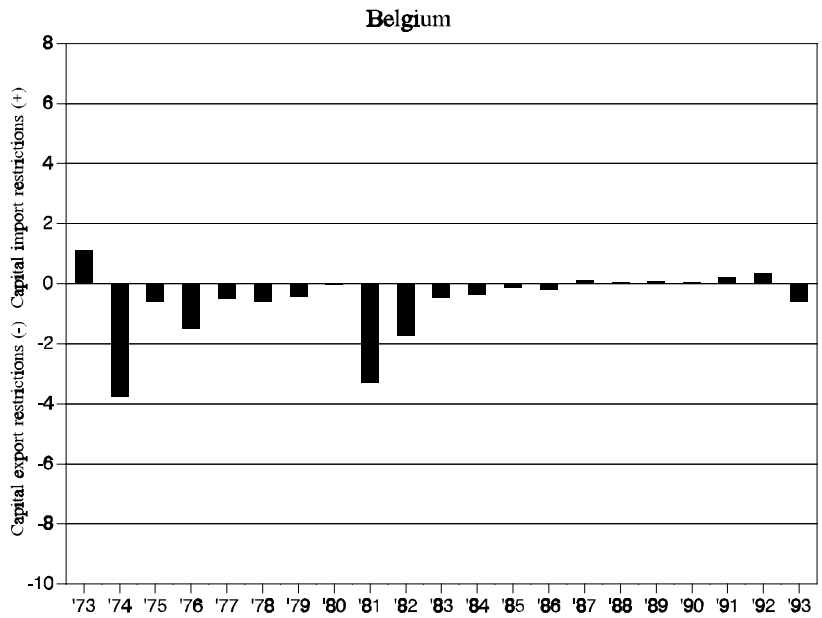
**Ranking of countries' EXR, ES, LEFT and SIGGOV variables: a priori assumption, Rank 1: few capital controls - Rank 11: many capital controls**

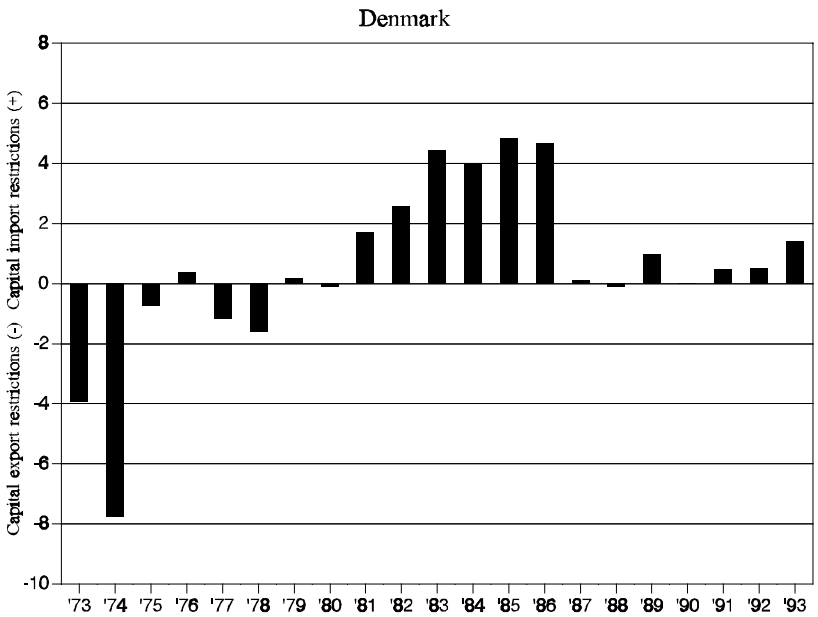
| | EXR | | ES | | LEFT | | SIGGOV | |
|---|---|---|---|---|---|---|---|---|
| 1 | UK | 4 | Germany | 5 | UK | 6 | UK | 1 |
| 2 | Spain | 12 | Denmark | 4 | Belgium | 8 | Denmark | 1 |
| 3 | Finland | 21 | Netherlands | 4 | Italy | 9 | Germany | 1 |
| 4 | Austria | 22 | Austria | 3 | Denmark | 10 | Spain | 1 |
| 5 | Sweden | 25 | Belgium | 3 | Germany | 10 | Austria | 2 |
| 6 | Italy | 28 | Finland | 3 | Netherlands | 12 | Sweden | 2 |
| 7 | France | 36 | France | 2 | Spain | 12 | Finland | 3 |
| 8 | Belgium | 42 | Italy | 2 | France | 12 | Netherlands | 3 |
| 9 | Denmark | 42 | Sweden | 2 | Finland | 15 | Belgium | 4 |
| 10 | Germany | 42 | United Kingdom | 2 | Sweden | 16 | France | 4 |
| 11 | Netherlands | 42 | Spain | 1 | Austria | 21 | Italy | 6 |

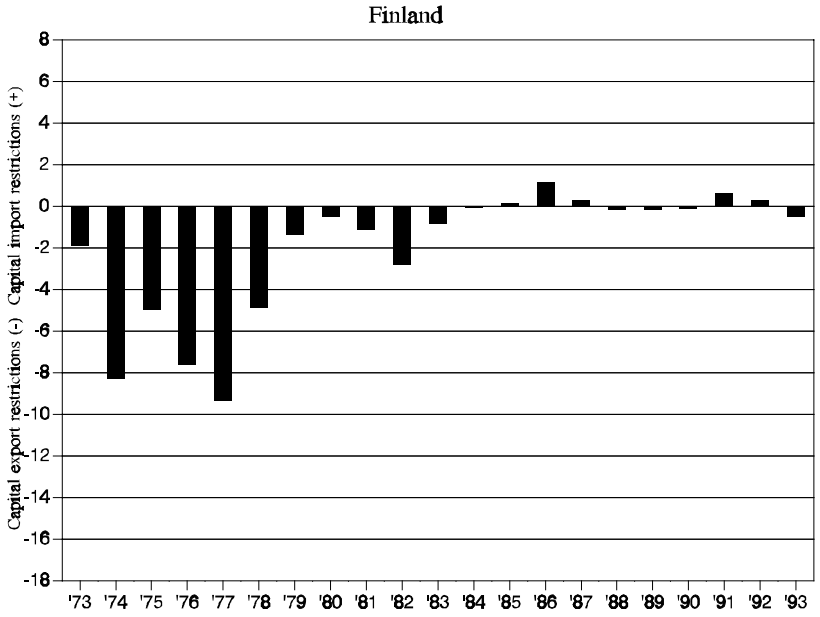
## Appendix C

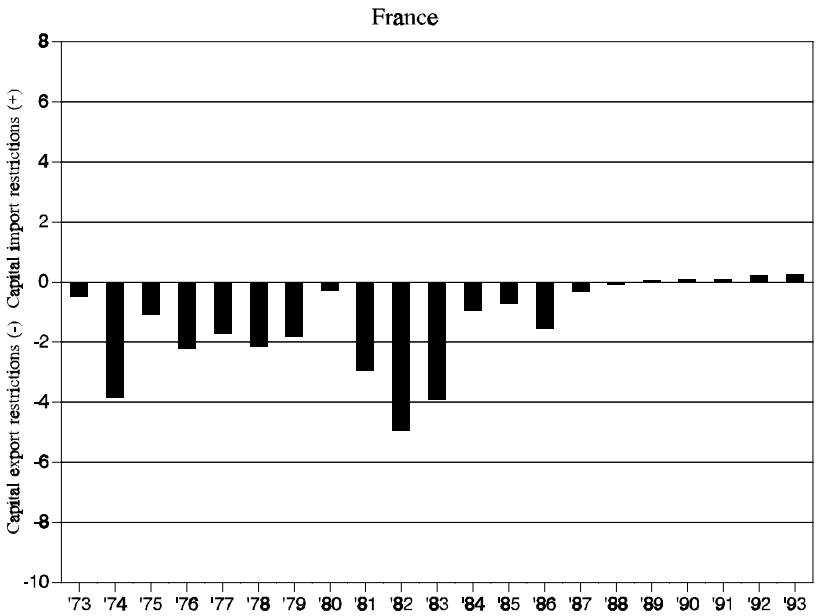
*Year-by-year average deviations from the price measure (in percentages per year)*

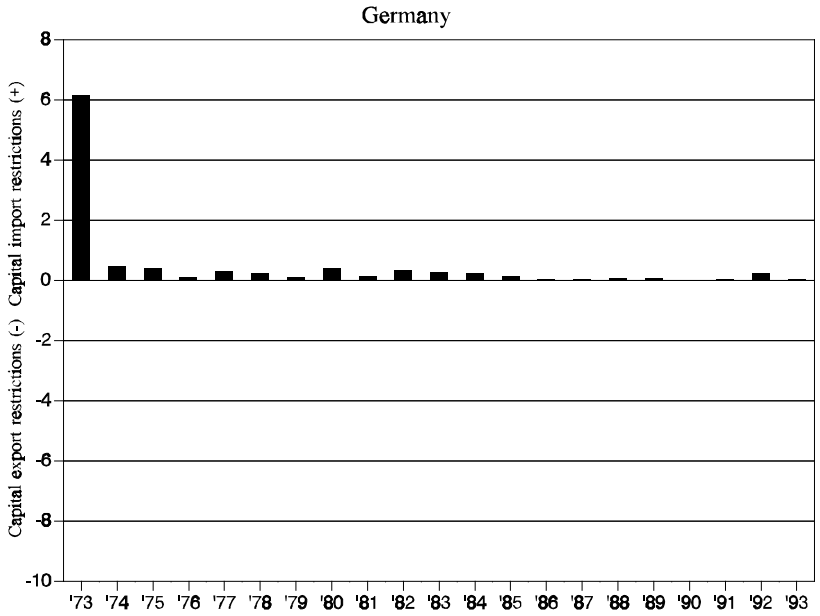


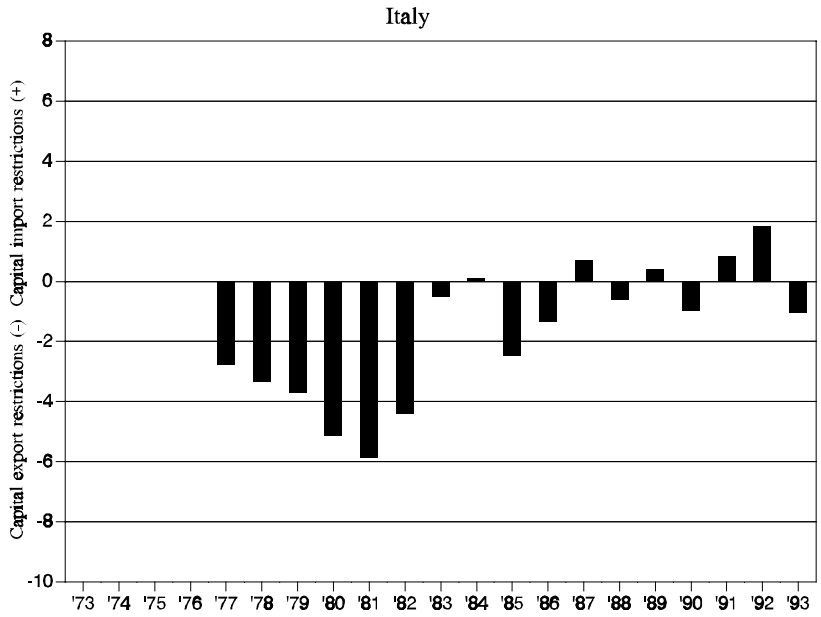



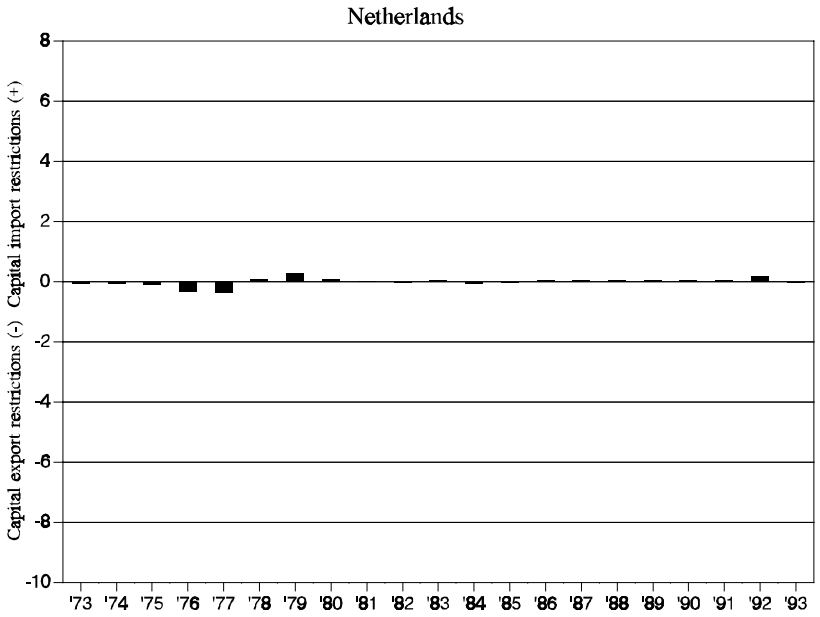



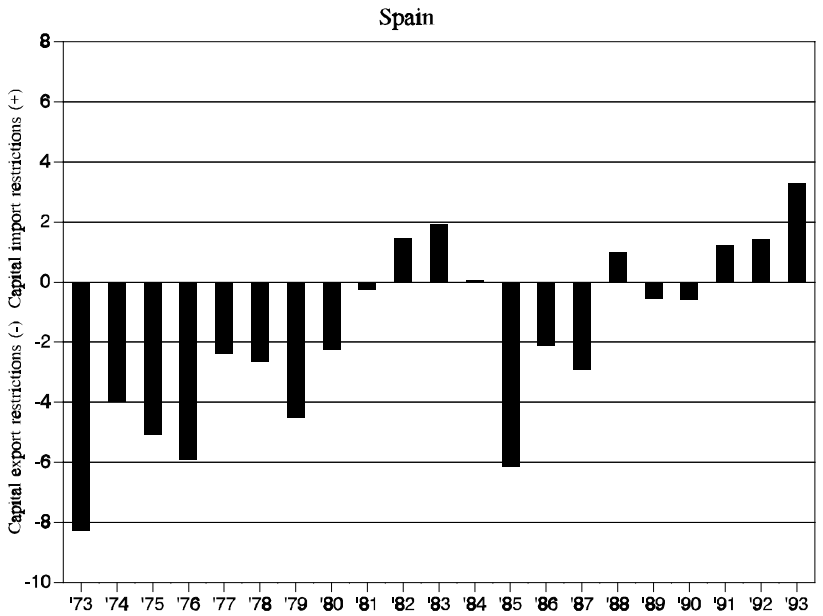



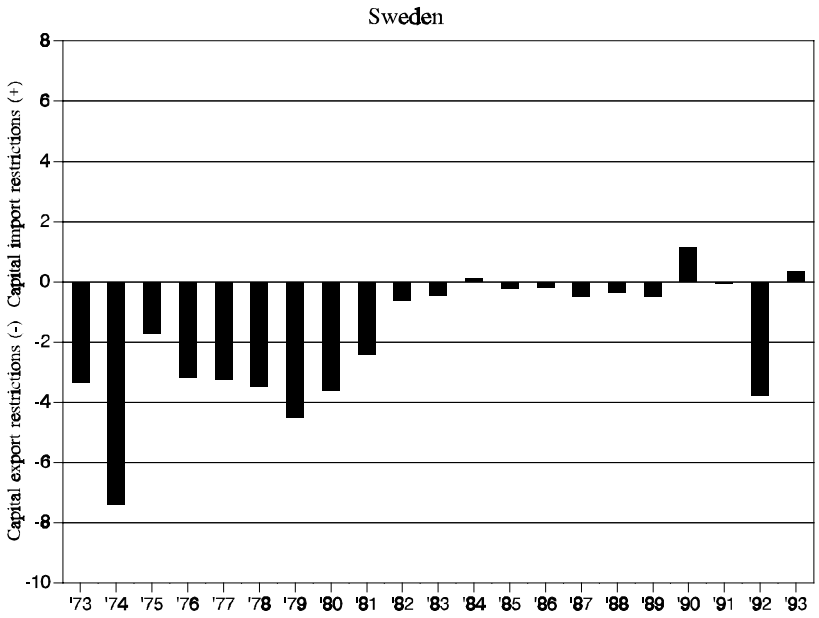

France
Capital export restrictions (-) Capital import restrictions (+)
8
6
4
2
0
-2
-4
-6
-8
-10
'73 '74 '75 '76 '77 '78 '79 '80 '81 '82 '83 '84 '85 '86 '87 '88 '89 '90 '91 '92 '93

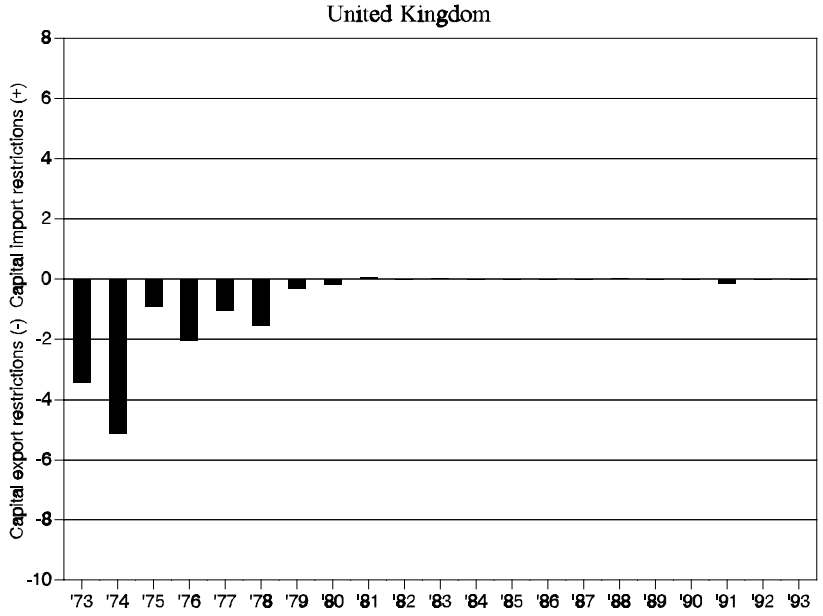

Germany
Capital export restrictions (-) Capital import restrictions (+)
8
6
4
2
0
-2
-4
-6
-8
-10
'73 '74 '75 '76 '77 '78 '79 '80 '81 '82 '83 '84 '85 '86 '87 '88 '89 '90 '91 '92 '93


Italy
Capital export restrictions (-) Capital import restrictions (+)
8
6
4
2
0
-2
-4
-6
-8
-10
'73 '74 '75 '76 '77 '78 '79 '80 '81 '82 '83 '84 '85 '86 '87 '88 '89 '90 '91 '92 '93


Netherlands
Capital export restrictions (-) Capital import restrictions (+)
8
6
4
2
0
-2
-4
-6
-8
-10
'73 '74 '75 '76 '77 '78 '79 '80 '81 '82 '83 '84 '85 '86 '87 '88 '89 '90 '91 '92 '93

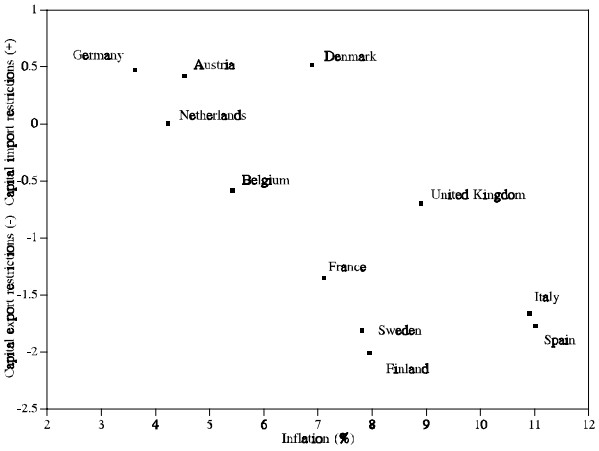

Spain
Capital export restrictions (-) Capital import restrictions (+)
8
6
4
2
0
-2
-4
-6
-8
-10
'73 '74 '75 '76 '77 '78 '79 '80 '81 '82 '83 '84 '85 '86 '87 '88 '89 '90 '91 '92 '93


Sweden
Capital export restrictions (-) Capital import restrictions (+)
8
6
4
2
0
-2
-4
-6
-8
-10
'73 '74 '75 '76 '77 '78 '79 '80 '81 '82 '83 '84 '85 '86 '87 '88 '89 '90 '91 '92 '93

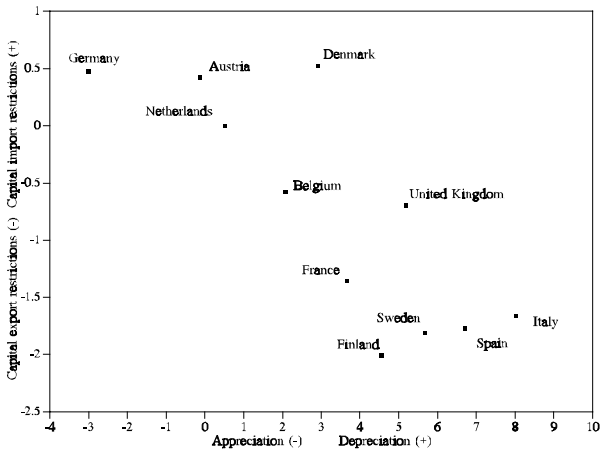

United Kingdom
Capital export restrictions (-) Capital import restrictions (+)
8
6
4
2
0
-2
-4
-6
-8
-10
'73 '74 '75 '76 '77 '78 '79 '80 '81 '82 '83 '84 '85 '86 '87 '88 '89 '90 '91 '92 '93

# Appendix D

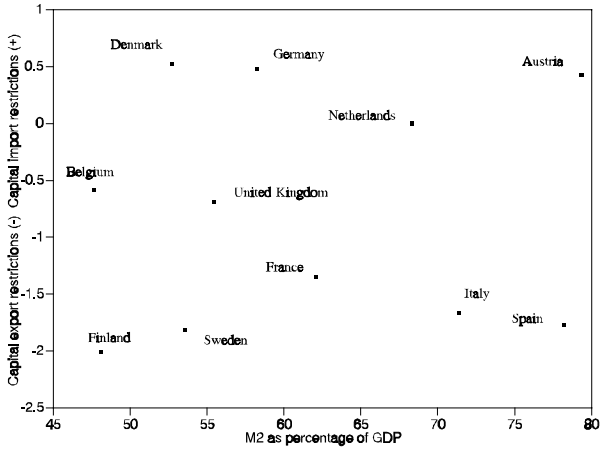
CC = −1.37 − 0.30** INF  $\bar{R}^2$ = 0.53
(0.65) (0.09)



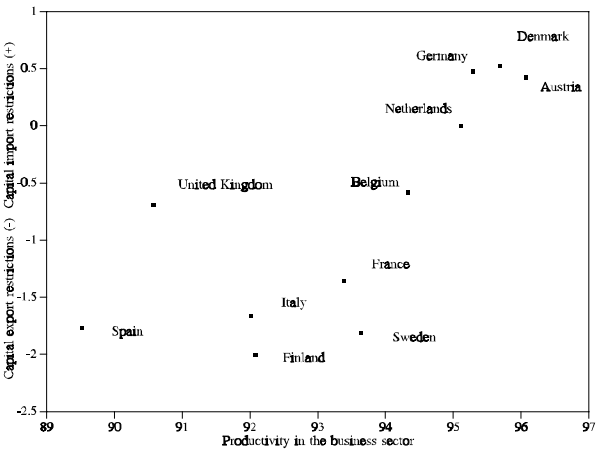

CC = 0.04 − 0.25** DEP  $\bar{R}^2$ = 0.63
(0.27) (0.06)



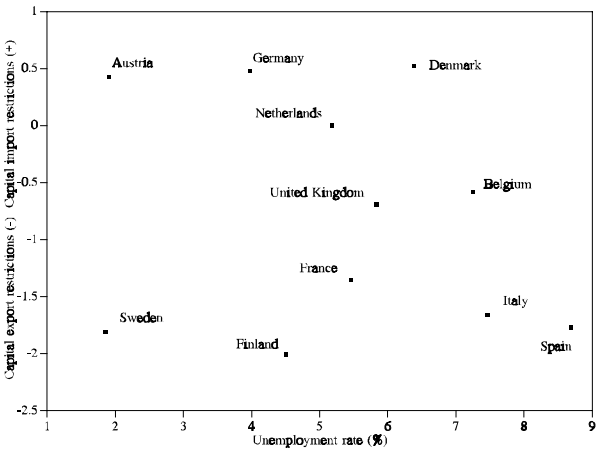

CC = −1.02 + 0.004 M2  $\bar{R}^2$ = −0.11
(1.83) (0.03)



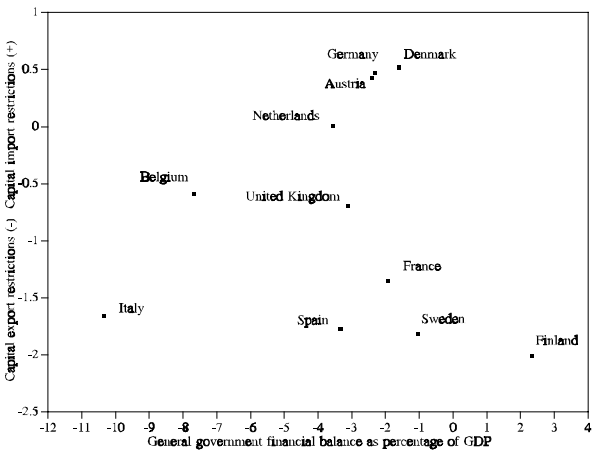

CC = −33.51** + 0.35** PROD  $\bar{R}^2$ = 0.52
(9.51) (0.10)



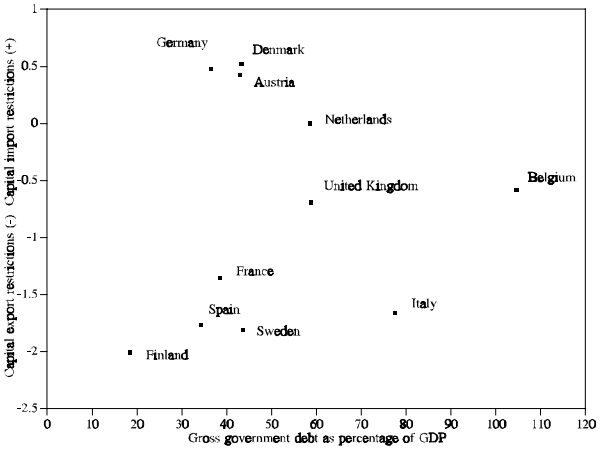

CC = −0.22 − 0.10 UN  $\bar{R}^2$ = −0.06
(0.86) (0.15)



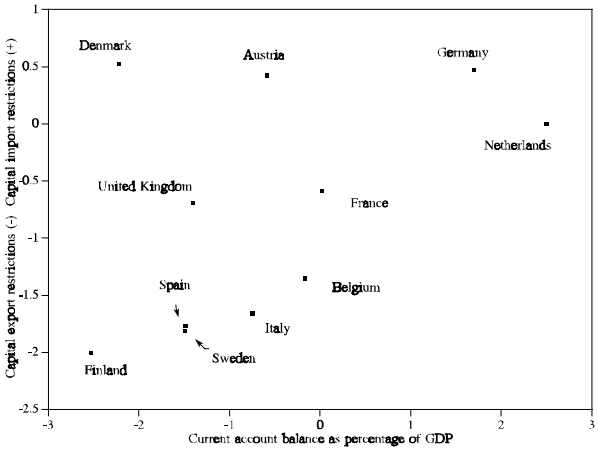

CC = −0.78 − 0.003 DEF  $\bar{R}^2$= −0.11
(0.45) (0.10)



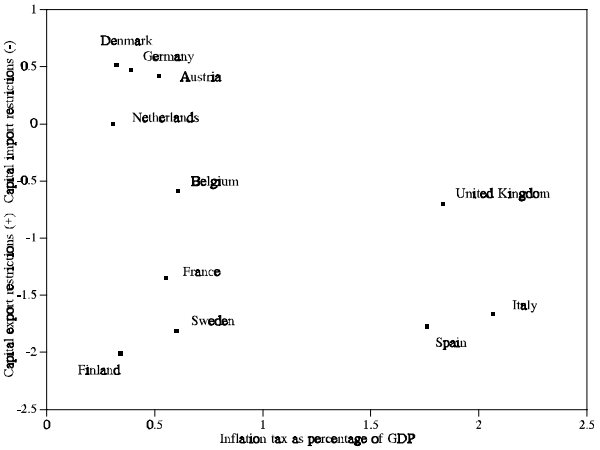
CC = −1.01 + 0.005 DEBT $\bar{R}^2$ = −0.10
(0.78) (0.01)



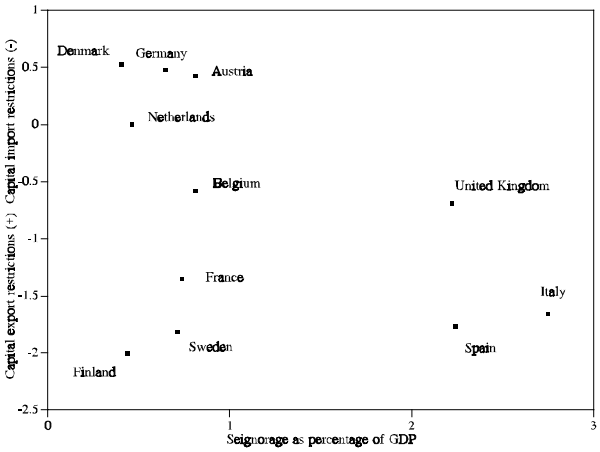

CC = −0.59 − 0.30 CA $\bar{R}^2$ = 0.14
(0.30) (0.19)



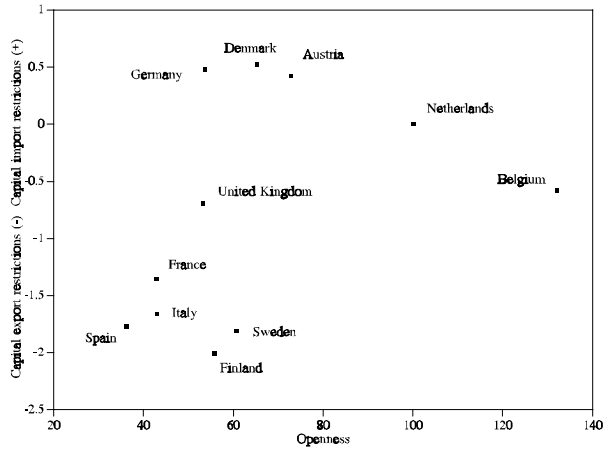

CC = −0.23 − 0.64 INF TAX $\bar{R}^2$ = 0.10
(0.49) (0.36)



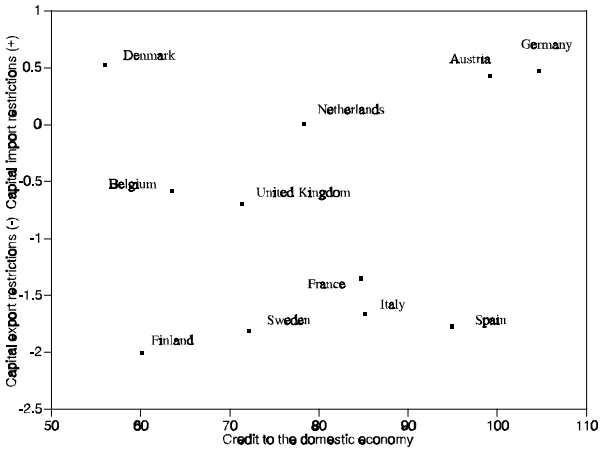

CC = −0.24 − 0.48 SEIGN $\bar{R}^2$ = 0.07
(0.49) (0.36)



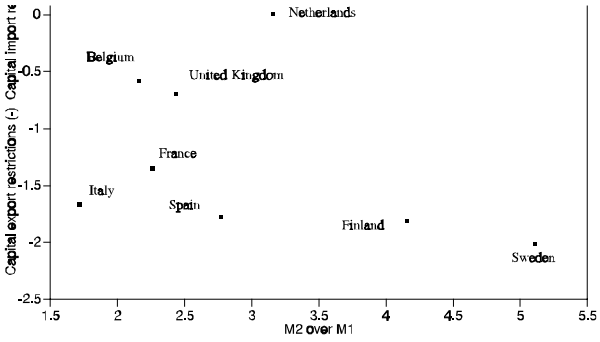

CC = −1.68* − 0.01 OPEN $\bar{R}^2$ = 0.06
(0.77) (0.01)




CC = −1.63 + 0.01 CREDIT $\bar{R}^2$ = − 0.07
(1.64) (0.02)




CC = −0.75 − 0.005 M2M1 $\bar{R}^2$ = −0.11
(0.93) (0.27)



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