Kiel Institute for World Economics
Duesternbrooker Weg 120
24105 Kiel (Germany)

Kiel Working Paper No. 1260

Consumption Volatility and Financial Openness

by

Claudia M. Buch and Serkan Yener

November 2005

Consumption Volatility and Financial Openness

Claudia M. Buch (University of Tübingen)*

Serkan Yener (Kiel Institute for World Economics)

November 2005

Abstract

Economic theory predicts that the integration of financial markets lowers the volatility of consumption. In this paper, we study long-term trends in the consumption volatility of the G7 countries. Using different measures of financial openness, we find some evidence that greater financial openness has been associated with lower consumption volatility. However, volatility of consumption relative to output has not declined.

Key words: Consumption volatility, financial integration, G7 countries

JEL classification: F36, F41

---

* Corresponding author: Claudia M. Buch, Eberhard-Karls-University Tuebingen, Economics Department, Mohlstrasse 36, D - 72 074 Tuebingen, Phone +49 (0)7071 2972962, Fax +49 (0)7071 295071, E-Mail: claudia.buch@uni-tuebingen.de

This paper has been written in the context of the research project 'Volatility in the Global Economy: The Role of Financial Markets'. Financial support from the Fritz Thyssen Foundation is gratefully acknowledged. We would like to thank Christian Pierdzioch for helpful comments on an earlier draft as well as Dennis Quinn for sharing his data on capital controls.

1 Motivation

The integration of international financial markets should help consumers to smoothen consumption over time. By borrowing and lending on international financial markets, consumers can cushion against domestic shocks and, thus, achieve a more stable consumption path. Hence, the volatility of consumption should decline as countries open up for foreign capital. Moreover, the decoupling of consumption from domestic production implies that correlations of consumption across countries should exceed correlations of output in financially integrated markets.

In the empirical literature, international consumption and output correlations have been widely documented. In contrast to predictions of economic theory, consumption correlations do not typically exceed output correlations. This 'consumption-correlation puzzle' has become a stylized fact in international finance (Backus et al. 1992 and 1995, Lewis 1999, Obstfeld and Rogoff 2000).

Empirical literature on the volatility of consumption and on the link between volatility and financial openness is more scarce. Recently, Prasad et al. (2003) and Basu and Taylor (1999) have started to document stylized facts which show some common patterns in the data. Comparing consumption volatility for recent decades, they find evidence for a decline of consumption volatility in developed economies over time. Moreover, the level of consumption volatility in developed countries is below that of developing countries.

While these findings indicate that consumption volatility and financial openness might be correlated, Bekaert et al. (2004) directly analyze the link between consumption volatility and financial liberalization. Their results show that financial liberalization tends to be associated with lower consumption volatility.

In this paper, we use time series evidence to test whether the integration into international financial markets has helped developed countries to reduce the volatility of domestic consumption. In contrast to earlier work focusing on cross-country or panel evidence, we use long-run time series data for the G7 countries. We cover the post-war period for two reasons. On the one hand, we want to capture a time period during which the capital account regime of the countries under study has changed significantly. The end of the Bretton Woods system of fixed exchange rates in the early 1970s has been associated with a gradual phasing out of capital controls in many countries. Hence, the past 30 years provide us with a sufficiently long time frame to cover both the pre- and the post-capital-controls period. Second, although we may go back even further in history, combining data for the pre- and the post-war period would imply that we have to deal with significant structural breaks in the data.

In contrast to Bekaert et al. (2004), we control for macroeconomic shocks, we focus on a narrower set of G7 countries, and we use a larger time window covering the past 40 years. The reason for this is that we want to capture the time-series dimension of the liberalization episodes. Hence, our identification of a possible liberalization effect comes from the time-series (pre- versus post-liberalization) dimension only.

We find that capital account liberalization has lowered consumption volatility only in Canada, Italy, Japan, and the United Kingdom. In all countries except France, more liberalized capital markets have been associated with lower consumption volatility. These results are fairly robust against modifications of the model such as including proxies for macroeconomic shocks and interaction terms between openness and macroeconomic shocks. However, volatility of consumption relative to output has not declined.

Methodologically, there are two main questions to be addressed when studying the link between consumption volatility and financial openness. The first is the measure of volatility. We use the volatility of consumption growth, computed as the standard deviation of a rolling

window over two years of quarterly data. To check the robustness of our results, we also use the volatility of consumption growth computed as the median absolute deviation of the same rolling window.

The second issue is the measurement of financial openness. We use the regulatory measure developed by Quinn (1997), which combines information on the imposition of capital controls with qualitative information on the intensity of controls. The second measure we use has been proposed by Kaminsky and Schmukler (2003), and it additionally includes information on the development and integration of equity markets.

In Part Two, we briefly present the theoretical background on the link between consumption volatility and financial openness. In Part Three, we present and discuss our measures of financial openness and consumption volatility. In Part Four, we present our empirical results for the link between consumption volatility and financial openness. We also analyze whether the link between consumption volatility and financial openness depends on the type of shock that hits an economy. Part Five concludes.

2 Theoretical Background

To set the stage for our empirical analysis and to show how consumption volatility and financial openness are linked, we use a standard complete markets model.[1] The representative household has a known income Y_1 in period $t = 1$ but faces uncertainty over future income, Y_2. Consumption plans (C_1, C_2) are contingency plans conditional on aggregated uncertainty over output in period $t = 2$. Utility is given by:

$$(1) \qquad U_1 = U_1(C_1, C_2) = u(C_1) + \beta\{\pi(1)u[C_2(1)] + \pi(2)u[C_2(2)]\}$$

[1] For a more detailed presentation see Obstfeld and Rogoff (1996, Chapter 5).

where the numbers 1 and 2 denote either the time period (the lower case indices) or the state of nature (the numbers in brackets), β is the subjective discount factor, and $\pi(1)+\pi(2)=1$ are the probabilities of reaching the two states of nature. The intertemporal budget constraint is given by

$$(2) \qquad C_1+\frac{C_2(1)p(1)+C_2(2)p(2)}{1+r}=Y_1+\frac{Y_2(1)p(1)+Y_2(2)p(2)}{1+r}$$

where $p(s)/(1+r)$ is the world-market price for Arrow-Debreu-securities $B_2(1), B_2(2)$ in terms of current consumption. Substituting the period budget constraints into the utility function (1) and optimizing with respect to *C* gives the standard Euler equation for consumption:

$$(3) \qquad \beta\pi(s)u'(C_2(s))=\frac{p(1)}{1+r}u'(C_1) \quad s=1,2\,.$$

A similar condition applies to the foreign country. Foreign variables are denoted by an asterix. In a two-country model, market clearing requires:

$$(4) \qquad \begin{aligned} &C_1+C_1{*}=Y_1+Y_1{*}=Y_1^W \\ &C_2(s)+C_2(s){*}=Y_2(s)+Y_2(s){*}=Y_2^W(s), \qquad s=1,2 \end{aligned}$$

Resources will be optimally allocated across time and across countries if all marginal rates of substitution are equal. With CRRA utility, we have $u(C)=\frac{C^{1-\rho}}{1-\rho}$ and $u'(C)=C^{-\rho}=C^{\frac{1}{\rho}}$. The last condition, together with state-contingent prices, implies that second period consumption is given by

$$(5) \qquad C_2(s)=\frac{Y_2^w(s)}{Y_1^w}C_1\,.$$

In financially integrated markets, the change of consumption over time is thus determined by the change in world output:

$$\Delta^I C = \frac{C_2(s) - C_1}{C_1} = \frac{Y_2^w(s) - Y_1^w}{Y_1^w}$$

Under autarky, in contrast, the change of consumption is determined by domestic output. The change in consumption volatility moving from autarky to financial integration is then given by

$$\Delta^A C - \Delta^I C = \frac{Y_2(s) - Y_1}{Y_1} - \frac{Y_2^w(s) - Y_1^w}{Y_1^w}$$

Hence, consumption becomes less volatile if world output is less volatile than domestic output, i.e. if domestic and foreign output are imperfectly correlated. A similar consumption smoothing pattern would be predicted by models assuming that bonds are the only financial asset that can be traded internationally (Baxter and Crucini 1995). Using more richly specified models allowing for the possibility that different types of shocks (monetary, fiscal, or productivity shocks) hit an economy, one can show that the impact of financial openness on the volatility of consumption does not depend on the type of shock considered (see, e.g., Sutherland 1996).

However, empirical literature testing the predictions of standard macroeconomic models of open economies tends to find that consumption correlations across countries are relatively small and are, in particular, smaller than the corresponding output correlations (see Lewis 1999 for a survey of the literature). Moreover, consumption tends to be more closely correlated with domestic output than with foreign consumption.

At least one explanation for the consumption *correlation* puzzle might also help to explain why consumption *volatility* does not respond to financial openness. One reason for the

consumption correlation puzzle could be that the welfare gains from a reduction in consumption volatility might be small. Providing estimates for the US, Lucas (2003) has argued that a relatively small level of consumption volatility may not justify taking measures aimed at the reduction in volatility.[2] This holds, in particular, if international financial transactions are costly. In fact, Prasad et al. (2003) find the welfare gains from a reduction of volatility to be relatively modest for developed market economies such as the one we study here. Potential gains are larger for developing countries.

Yet, developing countries do not seem to benefit from increased financial integration through greater stability in consumption (Prasad et al. 2003). One explanation could be that developing countries have integrated into international capital flows more recently and less rapidly than the developed market economies. In addition, these countries have weaker institutional structures and, in particular, less developed domestic financial systems. This might have prevented them from reaping the benefits of financial integration. Although we cannot test this hypothesis directly studying the G7 countries, our data do yet cover a sufficiently long time span to analyze whether the benefits of financial integration with regard to changes in the volatility of consumption appear gradually over time and whether there is evidence for non-linearity in the data.

3 Data and Empirical Methods

The above theoretical framework has shown that consumption volatility should decline as financial markets become more integrated. This hypothesis will form the basis for our empirical tests below. Before going into the details of these tests, we discuss the measurement

---

[2] Reis (2005) surveys the literature and argues instead that the welfare effects of consumption volatility cannot be assessed without taking the persistence of consumption into account.

problems that arise with regard to volatility and financial openness. Because one goal of our analysis is to study the link between openness and volatility conditional on the shocks hitting an economy, we also describe the methodology that we use to identify shocks.

3.1 Measures of Volatility

The aim of this paper is to trace out the impact of financial openness on consumption volatility for a time period that spans different capital account regimes. Because, even for the full set of OECD countries, consumption data are not available for a sufficiently long time period and at a sufficiently high periodicity, we restrict our analysis to the G7 countries, i.e., Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States. For these countries, we have quarterly consumption data starting in 1957 (Canada, Japan, United Kingdom, United States), 1960 (Germany), 1965 (France), and 1970 (Italy). Our data set ends in 2000. Hence, for the majority of the countries, we can cover a time period of over 40 years.

We follow Bekaert et al. (2004) and compute the volatility of consumption growth over a rolling window of five years (i.e. we have 20 observations using quarterly data).[3] Constructing a time series of consumption volatilities by rolling a window with fixed size and computing the standard deviation for every window generates serial correlation in the resulting time series. Moreover, using this time series as the dependent variables in OLS estimations will feed the serial correlation patterns into the residuals. This invalidates inferences based on conventional standard errors. Fortunately, OLS estimates are still consistent, and the residuals can be used to correct standard errors according to the method of Hansen and Hodrick (1980).

---

[3] We also experimented with other approaches such as GARCH measures or the methods proposed by Schwert (1989) and Baxter and King (1999), but these failed to deliver reasonable volatility estimates.

Another problem implied by the rolling window approach is that shocks and noise, which appear as outliers in the original consumption data, have level effects in the time-series for volatility. Once an outlier of the original series enters the rolling window, it affects the volatility estimate for 19 consecutive time periods. We account for this effect by including dummy variables in the regression equation and by using the median absolute deviation instead of the standard deviation.

Table 1 shows summary statistics for consumption and output volatility starting from the 1960s to the end of the 1990s. We also report the ratio of consumption to output volatility as well as consumption volatility relative to the mean of consumption. The latter gives us an idea about the possible welfare gains from a reduction in consumption volatility. We report these measures for all four decades under study separately.

If increased financial integration opens up possibilities for consumption smoothing, we would expect that the volatility of consumption declines relative to the volatility of output. However, we fail to find this pattern in the data. In all countries except for France, relative consumption volatility was higher in the 1990s than at the start of the respective sample. In France, relative consumption volatility followed a ∪-shaped pattern but did not return to its level of the 1970s. Moreover, a similar ∪-shaped pattern can be detected for the United Kingdom, whereas Italy, Japan, and the United States witnessed a *reversed* ∪-shaped pattern of relative consumption volatility.

Behind these changes in the ratios are quite heterogeneous changes in consumption and output volatility. This holds in particular for consumption volatility. For France and Germany, the data resemble a ∪-shaped pattern, while Italy, Japan, the United Kingdom, and the United States show an inverse ∪-shaped pattern. Regarding output volatility, the data indicate a ∪-shaped pattern for France, Germany, and Italy, and an inverse ∪-shaped pattern for the United Kingdom and the United States. For Japan, we find a monotonic decline in output volatility.

Our results partly confirm findings of earlier studies, but partly they differ. Differences in the underlying samples and in the computation of volatility could be responsible for this. For example, Basu and Taylor (1999) consider a sample of 15 countries, which also includes our set of countries. However, their methodology differs from ours in two respects. First, they aggregate the data over different cross-sections before computing volatility. Second, Basu and Taylor look at the changing pattern of macroeconomic volatility over different historical periods instead of decades as we do. They find a decline in consumption and output volatility for their pooled data. For the sake of comparability, we aggregate in the time domain, by computing an average of our consumption and output volatility over the period 1970s-90s for each country. Hence, we can compare their results from the Bretton Woods and Post-Bretton Woods era.

A direct comparison of our Bretton Woods and Post-Bretton Woods data confirms a declining output volatility during these phases which is in line with the results obtained by Basu and Taylor. In contrast to this unambiguous decline of output volatilities, our result is mixed when looking at changes of consumption volatilities during the Bretton Woods and the Post-Bretton Woods phases. For Canada and France, we note a decrease, whereas for Germany, Japan, the United Kingdom, and the United States, there was an increase in the volatility of consumption. Hence, aggregation over different sub-groups of countries clouds differences in the patterns of consumption volatility.

Another related study is the one by Kose et al. (2003) who find an increase in consumption and output volatility moving from the 1960s to the 1970s and a decline in subsequent periods. Their sample covers 21 industrialized countries, and thus a much larger set of countries. Our more mixed results for individual G7 countries show that there is a significant amount of heterogeneity behind these aggregated figures.

In sum, our data show a somewhat mixed picture with regard to changes in consumption volatility over time. In the following sections, we will explore whether changes in consumption volatility across time have been linked to the degree of financial openness of countries.

3.2 Measures of Financial Openness

The theoretical model used in Part 2 has been based on the assumption that trade in a full set of contingent claims is possible. Such a complete markets setting does, of course, not exist in reality. Countries rather differ with regard to the degree of openness to foreign capital, the state of development of their financial systems, and the types of financial assets that are traded. Therefore, we choose different proxies for the degree of financial openness.

Literature has used different ways to measure the degree of restrictions on capital account transactions. Edison et al. (2002) provide a useful survey. They classify capital account restrictions into qualitative, rule-based restrictions and those that measure the intensity with which controls are being imposed. We follow a similar approach in this paper.

Most qualitative, rule-based measures of capital account openness are based on the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). We use a measure which has been compiled by Quinn (1997). His measure is based on the AREAER, and he uses information on the *intensity* of capital controls from the narrative parts of this report. One additional advantage of his measure is that it is available already since the 1950s. Other measures of regulations have been used in the literature that capture, for instance, the degree of regulation of stock markets, are typically not available for a sufficiently long time period (see Edison et al. 2002, Table 1 for an Overview).

Figure 1 plots the openness measures developed by Quinn (1997). There are two countries which have been fairly open for financial capital during most of the period under study:

Germany and the US. With the exception of two short periods during the late 1960s and early 1970s, these countries have been essentially open for foreign capital at least since the 1960, i.e., since the start of our sample period for the consumption data.

[Insert Figure 1 about here.]

Canada has had a similar capital account regime as the US but has introduced restrictions during the 1970s. Out of the non-European countries under study, Japan has clearly had the least open regime, not having fully abolished capital account restrictions up until the 1990s. The remaining three European G7 countries maintained capital account restrictions longer than Germany, establishing a free capital account regime in 1980 (UK), 1989 (Italy), and 1998 (France).

An alternative, rule-based measure of financial openness has been constructed by Kaminsky and Schmukler (2003) (Figure 2). Rather than looking at the openness of financial markets for capital flows in general, we use an average over three sub-indices capturing the degree of domestic financial sector's liberalization, capital account liberalization, and stock market liberalization. The index runs from 1 to 3, and a lower index implies that countries have more liberalized markets. By the year 1991, all countries in the sample had fully liberalized their markets. Yet, the timing of liberalization differed across countries. While the United States, the United Kingdom, Canada, and Germany liberalized their capital markets until the early 1980s, Japan, France, and Italy followed only in the early 1990s.

[Insert Figure 2 about here.]

As an alternative to rule-based, qualitative measures of capital mobility and capital account openness, measures of actual capital flows could be used. The advantage of such quantitative measures would be that they classify countries as financially open if de facto capital flows are large. Rule-based measures might come to different results if capital controls do not bind. However, the disadvantage of using quantitative measures of capital account

openness in our context would be that these measures are highly endogeneous. Endogeneity is less of a concern for our rule-based measures of capital account openness or the degree of capital market liberalization since the deregulation of markets has often been initiated in the context of international agreement under OECD or EU membership.

3.3 Measures of Structural Shocks

Estimating the relationship between consumption volatility and financial integration necessitates to control for structural shocks. In order to extract structural shocks, we estimate the two-country open-economy model proposed by Clarida and Gali (1994). As this is a two-country model, all variable are normalized with respect to a benchmark economy. Following Clarida and Gali, we take the US as a benchmark, and we set the lag length of all SVAR specifications equal to four. The variables comprise the first difference of the real output differential, the first difference of the bilateral real exchange rate, and the CPI differential, which corresponds to the bilateral inflation differential. This trivariate model essentially features a flexible price equilibrium in the long-run and sticky-prices in the short run due to the imposed restrictions adopted from Blanchard and Quah (1989). According to this specification, it is possible to identify three (relative) structural shocks: a supply shock, a demand shock, and a nominal shock.

4 Regression Results

Based on the descriptive statistics presented above, it is hard to argue that there has been a clear link between the openness of countries for financial capital and the volatility of consumption. While, generally, the G7 countries have become more open for financial capital

in legal terms over the past decades and while capital flows have increased rapidly, there has been no consistent pattern for consumption volatility to increase or decrease.

In this section, we study the link between consumption volatility and the openness of countries for capital in a regression framework. In a first set of regressions, we regress our rolling-window measure of consumption volatility on different measures of financial openness. Next, a series of robustness checks will be conducted. We use the median absolute deviation to construct an alternative measure of volatility, we include shocks and interaction terms of shocks and openness, we include non-linear terms to capture liberalization effects, and we analyze the impact of financial integration on relative consumption volatility.

4.1 Baseline Regression Results

Using our measure of consumption volatility based on the rolling-window approach, we first check whether consumption volatility and financial openness are significantly related. For our baseline case, we regress the volatility of consumption growth, σ_t , on a constant and a measure of financial openness $FINOP_t$:

$$(6) \qquad \sigma_t = \beta_0 + \beta_1 FINOP_t + \sum_j \alpha_j DUMMY_{j,t} + e_t \ .$$

Equation (6) is estimated separately for each country in our sample, i.e., Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States. We also include dummy variables, $DUMMY_{j,t}$ which capture country-specific structural breaks and the effects of outliers in the original consumption data. Results using the Quinn measure of financial openness are reported in Panel (a) of Table 2.

[Insert Table 2 about here.]

For Canada, Italy, Japan, and the United Kingdom, we find a significant decline in consumption volatility accompanying the process of financial market integration. Although the estimated coefficients look small at first sight, the impact of financial openness is quite important. Beta-coefficients[4] show that about 30-70% of the variation in consumption volatility can be explained through the degree of capital account openness for these countries. For the rest of the countries in our sample, the coefficients on the Quinn measure are insignificant or have the wrong sign. In general, there is no clear-cut answer to the question of whether capital account liberalization has helped consumers to smoothen shocks to domestic income.

The Kaminsky-Schmukler measure of financial openness provides more evidence for a link between consumption volatility and openness. The results for the baseline regression are reported in Panel (a) of Table 3.

[Insert Table 3 about here.]

Except for France, we obtain highly significant coefficients on the Kaminsky-Schmukler measure for all countries in our sample, implying that greater development of financial markets has been associated with a decline in volatility. (Note that the Kaminsky-Schmukler measure is constructed such that a *higher* value indicates a *less* developed financial market.)

Differences in results reported in Table 2 and 3 could be due to differences in the sample size or differences in the measure for financial openness. To test whether changes in sample size affect our results, we re-run regressions using the Quinn measure of capital account openness also for the smaller sample for which we have information on the degree of capital market liberalization. Results (not reported) show that all results are robust in the sense that they carry over to a shortened estimation period.

---

[4] The beta-coefficients have been computed as the coefficient estimates times the standard deviation of the explanatory variable divided by the standard deviation of the dependent

4.2 Alternative Measure of Volatility

The standard deviation may be a bad measure of scale (or volatility) in data sets with small sample sizes. In these cases, a robust measure of scale is the median absolute deviation (Huber 1981 and Sachs 1984). As the sample size of our rolling window is 20, this seems to be a reasonable alternative. Indeed, comparing the time series of the standard-deviation-based measure of consumption volatility to the median-absolute-deviation based measure of consumption volatility shows that the level effects of outliers are scaled down.

We substitute this robust measure of consumption volatility as our new dependent variable in (6) and run this regression for the Quinn measure (cf. Panel (b) of Table 2) and for the Kaminsky-Schmukler measure (cf. Panel (b) of Table3).

The major insight of this exercise is that, except for the United Kingdom and the United States in the regressions involving the Quinn measure, all results qualitatively carry over. Thus, the results from our baseline regressions seem to be quite robust with respect to the measure of consumption volatility, and we continue to use the standard deviation as a measure of consumption volatility in what follows.

4.3 Controlling for the Underlying Shocks

The stylized model that we have introduced above to show the link between financial openness and consumption volatility did not take into account the various shocks that can hit an economy. Consumption volatility in this model is the result of stochastic fluctuations in output. In reality, we need to control for other potential sources of output (and thus consumption) volatility such as monetary and fiscal shocks. In order to control for these shocks, we estimate the structural vector auto-regression (SVAR) as described in Section 3.3,

---

variable.

and we include the shocks in equation (6). Hence, our consumption volatility regression now reads:

$$\sigma_t = \beta_0 + \beta_1 FINOP_t + \beta_2 SUPPLY_t + \beta_3 DEMAND_1 + \beta_4 NOMINAL_t + \sum_j \alpha_j DUMMY_{j,t} + e_t \,, \tag{7}$$

where $SUPPLY$, $DEMAND$, and $NOMINAL$ denote the supply, demand, and nominal shock, respectively. We again control for structural breaks by including dummy variables. The regression results for the Quinn measure of capital account openness are summarized in Panel (c) of Table 2, results for the Kaminsky-Schmukler measure are given in Panel (c) of Table 3.

The first thing to note is that the impact of our macroeconomic shocks is insignificant for most of the countries. Most results for the link between capital account openness and consumption volatility remain unchanged as well. The estimated coefficients on the measure of capital account openness are similar to those obtained from the baseline regression.

As an additional test for the robustness of our results, we interact our measures of financial openness with our macroeconomic shocks. The reason for including these interaction terms is that Sutherland (1996) shows in his dynamic general equilibrium model that the impact of financial liberalization on consumption volatility depends on the nature of shocks. In this model, financial openness alone does not affect consumption volatility. Rather, consumption volatility is lower in more open financial systems following macroeconomic shocks. In order to test this hypothesis, we extend our regressions to include interaction terms:

$$\sigma_t = \beta_0 + \beta_1 FINOP_t + \beta_2 SUPPLY_t^* + \beta_3 DEMAND_t^* + \beta_4 NOMINAL_{i,t}^* + \sum_j \alpha_j DUMMY_{j,t} + e_t \,, \tag{8}$$

where $SUPPLY_t^* = SUPPLY_{t-1} \times FINOP_t$, $DEMAND_t^* = DEMAND_{t-1} \times FINOP_t$, and $NOMINAL_t^* = NOMINAL_{t-1} \times FINOP_t$. The interaction terms capture potential indirect effects of financial openness on volatility, conditional on the nature of shocks. The estimation results for the Quinn measure and the Kaminsky-Schmukler indicator are reported in Panel (d) of Tables 2 and 3, respectively. There are only minor changes in the coefficients or standard errors. Hence, estimations including proxies for macroeconomic shocks are not very different from those excluding shocks.

4.4 Testing for Non-Linearities

The effects of financial openness on consumption volatility might be non-linear. To test whether our data favor a non-linear specification over the linear specifications estimated so far, we include our proxies for financial openness and an additional quadratic term. This quadratic term captures potential threshold effects of financial openness.

Results are shown in Panels (e) of Table 2 and 3. For the Quinn measure of capital account openness, we now find an insignificant effect for France. The results for Canada, Italy, and the UK are overturned. The coefficient on the Quinn measure becomes significant for Germany. All countries, with the exception of the USA, feature non-linear effects of financial openness. In France and Japan, increasing openness has been associated with *more* volatility, increasing openness in the cases of Canada, Germany, Italy, and the UK has led to *less* volatility. For the Kaminsky-Schmukler measure, we confirm that increased financial openness has lower consumption volatility in all countries.

Generally, we also find evidence for non-linear effects of financial openness on consumption volatility. However, there is no consistent pattern of volatility to increase or decrease in a non-linear way. Generally, we hesitate to interpret these results further because

the introduction of a nonlinear term increases the degree of multicollinearity dramatically. This is shown by the conditioning number of the design matrix with and without the nonlinear term. Moreover, this is also the reason why we were forced to exclude the constant intercept in most regressions.

4.5 Financial Openness and Relative Consumption Volatility

Results reported so far inform us about the impact of financial openness on the volatility of consumption but not about the success of consumers to smoothen shocks to domestic output. Hence, we additionally run our baseline regression (6) using the ratio of consumption to output volatility as the dependent variable. Using this ratio can be thought of as an alternative way of controlling for macroeconomic shocks. We estimate the same regression as before, using the ratio of consumption to output volatility (σ_t^{RATIO}) as the dependent variable.

The results for the Quinn measure and the Kaminsky-Schmukler indicator are summarized in Table 4. Recall that we expect a negative coefficient for the Quinn measure and a positive coefficient for the Kaminsky-Schmukler measure if financial liberalization would be associated with lower *relative* volatility of consumption. Our results give a surprisingly clear picture that appears to be in line with the descriptive results on relative consumption volatility from Table 1. Both the Quinn measure and the Kaminsky-Schmukler measure convey the message that relative consumption volatility increased during the process of financial liberalization. The only exception to this finding is France where, for the Kaminsky-Schmukler measure of openness, increased financial openness lowered the relative volatility of consumption.

5 Summary

The aim of this paper has been to analyze the link between financial openness and consumption volatility. Consumers should benefit from financial integration by being able to smoothen consumption and by shielding themselves against shocks to national income. Using long-run time series for the G7 countries, we have tested whether more open financial markets have been associated with lower consumption volatility.

Our findings provide some support to the notion that greater financial openness lowers the volatility of consumption. This effect seems to be driven mostly by the liberalization of capital markets rather than liberalization of cross-border capital flows as such. Including proxies for macroeconomic shocks leaves the main result unaffected. At the same time, the decline in consumption volatility has been insufficient to compensate the increase in output volatility observed in some of the countries. For most countries, greater financial openness has been associated with higher consumption volatility relative to output volatility.

Our results partly differ from those of earlier studies such as Bekaert et al. (2004). While we confirm that greater financial market integration has been associated with lower consumption volatility, this does not hold necessarily for greater capital market development or for relative consumption volatility. One reason for this could be that we focus on the time series dimension. Differences between countries and thus cross-sectional variation in the data are not considered. However, cross-sectional variation might be important since one main liberalization effect in Bekaert et al. (2004) seems to come from the difference between emerging markets and developed market economies.

6 References

Backus, D.K., P.J. Kehoe, and F.E. Kydland (1992). International Real Business Cycles. *Journal of Political Economy* 100(4): 745-75.

Backus, D.K., P.J. Kehoe, and F.E. Kydland (1995). International Business Cycles: Theory and Evidence. In: T.F. Cooley (ed.). *Frontiers of Business Cycle Research*. Princeton University Press. New Jersey: 331-56.

Basu, S. and A. Taylor (1999). Business Cycles in International Historical Perspective. *Journal of Economic Perspective* 13(2): 45-68.

Baxter, M. and M. J. Crucini (1995). Business Cycles and the Asset Structure of Foreign Trade. *International Economic Review* 36(4): 821-54.

Baxter, M. and R. G. King (1999). Measuring Business Cycles: Approximate Band-Pass Filters for Economic Time Series. *Review of Economic and Statistics* 81(4): 575-93.

Bekaert, G., C.R. Harvey, and C. Lundblad (2004). Growth Volatility and Financial Liberalization. *NBER Working Paper* No. 10560. Cambridge, MA.

Blanchard, O.J. and D. Quah (1989). The Dynamic Effects of Aggregate Demand and Supply Disturbances. *American Economic Review* 79(4): 655-73.

Clarida, R. and J. Gali (1994). Sources of Real Exchange-Rate Fluctuations: How Important Are Nominal Shocks?. *Carnegie-Rochester Conference Series on Public Policy* 41: 1-51.

Edison, H.J., M.W. Klein, L. Ricci, and T. Sloek (2002). Capital Account Liberalization and Economic Performance: Survey and Synthesis. *NBER Working Paper* No. 9100, Cambridge, MA.

Hansen, L.P. and R.J. Hodrick (1980). Forward Exchange Rates as Optimal Predictors of Future Spot Rates: An Econometric Analysis. *Journal of Political Economy* 88(5): 829-53.

Huber, P.J. (1981). *Robust Statistics*. Wiley, New York NY.

International Monetary Fund (2004). International Financial Statistics on CD-Rom, Washington, DC.

Kaminsky, G. and S. Schmukler (2003). Short-Run Pain, Long-Run Gain: The Effects of Financial Liberalization. *IMF Working Paper* No. 03/34. Washington, DC.

Kose, M.A., E.S. Prasad, and M.E. Terrones (2003). Financial Integration and Macroeconomic Volatility. *IMF Staff Papers*, Volume 50, Special Issue. Washington, DC.: 119-42.

Lewis, K. (1999). Explaining Home Bias in Equities and Consumption. *Journal of Economic Literature* 37(2): 571-608.

Lucas, R.E. (2003). Macroeconomic Priorities. *American Economic Review* 93(1): 1-14.

Obstfeld, M. and K. Rogoff (1996). *Foundations of International Macroeconomics*. MIT Press, Cambridge, MA.

Obstfeld, M. and K. Rogoff (2000). The Six Major Puzzles in International Macroeconomics: Is There a Common Cause?. *NBER Working Paper* No. 7777, Cambridge MA.

Prasad, E. S., K. Rogoff, S.-J. Wei and M.A. Kose (2003). Effects of Financial Globalization on Developing Countries: Some Empirical Evidence. *IMF Occasional Paper* No. 220. Washington, DC.

Quinn, D. (1997). The Correlates of Change in International Financial Integration. *American Political Science Review* 91(3): 531-51.

Reis, R. (2005). The Time-Series Properties of Aggregate Consumption: Implications for the Costs of Fluctuations. National Bureau of Economic Research. NBER Working Paper 11297. Cambridge, MA.

Sachs, L. (1984). *Applied Statistics: A Handbook of Techniques*. 2.ed, Springer, New York NY.

Schwert, G.W. (1989). Why Does Stock Market Volatility Change over Time?, *Journal of Finance* XLIV(5): 1115-53.

Sutherland, A. (1996). Financial Market Integration and Macroeconomic Volatility. *Scandinavian Journal of Economics* 98: 129-39.

Table 1: Descriptive Statistics

Data in this Table are based on quarterly real consumption data starting in 1957 (Canada, Japan, United Kingdom, United States), 1960 (Germany), 1965 (France), and 1970 (Italy). Our dataset ends in 2000. σ_C is the standard deviation of real consumption growth (in %) within the corresponding time period, σ_Y is the standard deviation of real output growth (in %) within the corresponding time period, and $\overline{C}$ is the mean of real consumption growth (in %) within the corresponding time period.

		1960s	1970s	1980s	1990s
Canada	σ_C	1.0598	1.0856	0.8724	0.9858
	σ_Y	1.0602	0.9037	0.9661	0.7152
	σ_C / σ_Y	0.9996	1.2013	0.9031	1.3783
	$\sigma_C / \overline{C}$	0.9417	1.0391	1.2458	2.1277
France	σ_C	1.8400	1.2913	0.5924	1.7592
	σ_Y	...	0.7494	0.5909	1.3406
	σ_C / σ_Y	...	1.7230	1.0026	1.3123
	$\sigma_C / \overline{C}$	1.4174	1.4446	1.0180	5.1495
Germany	σ_C	1.2509	1.2147	1.1339	3.1592
	σ_Y	1.7919	1.3778	1.0751	1.5321
	σ_C / σ_Y	0.6981	0.8816	1.0547	2.0620
	$\sigma_C / \overline{C}$	0.9787	1.3234	2.7622	3.3359
Italy	σ_C	...	0.9826	1.5104	0.6685
	σ_Y	1.5116	1.1451	0.5564	0.6339
	σ_C / σ_Y	...	0.8581	2.7145	1.0545
	$\sigma_C / \overline{C}$	...	0.7953	2.7520	1.2309
Japan	σ_C	1.2310	1.8587	1.7073	1.2354
	σ_Y	2.1570	1.6543	0.8345	0.7776
	σ_C / σ_Y	0.5707	1.1236	2.0458	1.5887
	$\sigma_C / \overline{C}$	0.5490	1.5415	2.3650	3.7361
UK	σ_C	1.3353	1.8296	1.5248	1.1138
	σ_Y	1.0219	1.5229	0.8512	0.5555
	σ_C / σ_Y	1.3068	1.2014	1.7915	2.0049
	$\sigma_C / \overline{C}$	2.3659	3.2417	2.0775	1.5037
USA	σ_C	0.7112	0.9296	1.0748	0.5357
	σ_Y	0.8788	1.0938	0.9690	0.5311
	σ_C / σ_Y	0.8092	0.8499	1.1091	1.0087
	$\sigma_C / \overline{C}$	0.6913	1.3490	1.4851	0.7878

Source: IMF (2004), authors' calculations.

Table 2: Consumption Volatility and Capital Account Liberalization

The dependent variable is the volatility of consumption, computed using the rolling-window approach. The Quinn measure is an index ranging from 0 to 100, which assigns a large value to more open capital account regimes. In panel (b), the dependent variable is the volatility based on the median absolute deviation of consumption in conjunction with the rolling-window approach. The structural shocks in panel (c) have been obtained from a SVAR model as in Clarida and Gali (1994). In panel (d), these shocks have been interacted with the measure for financial openness. In panel (e), a non-linear term is included. Standard errors are corrected using the method suggested by Hansen and Hodrick (1980). Regressions for France and Germany include one dummy variable. Regressions for Canada, Italy, Japan, the UK, and the USA include two dummy variables. *** (**, *) = significant at the 1% (5%, 10%) level.

(a) Baseline regressions

	Canada	France	Germany	Italy	Japan	UK	USA
Constant	1.4862***	-0.7847***	1.2684***	3.7967***	2.4881***	2.0178***	0.1495
	(10.79)	(-3.23)	(2.95)	(25.67)	(11.84)	(22.37)	(0.56)
Quinn	-0.0066***	0.0226***	-0.0016	-0.0336***	-0.0153***	-0.0069***	0.0066**
measure	(-4.11)	(6.49)	(-0.36)	(-19.95)	(-4.63)	(-6.30)	(2.34)
β-coeff.	-0.3457	0.4037	-0.0055	-0.6842	-0.3259	-0.3980	0.1295
Period	62:02-99:04	75:02-99:04	65:02-99:04	75:02-99:04	62:02-99:04	62:02-99:04	62:02-99:04
N	151	99	139	99	151	151	151
R^2	0.8025	0.9760	0.9931	0.9672	0.9128	0.9256	0.9377

(b) Median-absolute-deviation-based volatility

	Canada	France	Germany	Italy	Japan	UK	USA
Constant	1.1559***	-0.0811	1.0276**	2.3234***	1.3302***	0.8301***	0.6652
	(11.62)	(-1.23)	(2.25)	(7.95)	(10.87)	(14.02)	(1.52)
Quinn	-0.0042***	0.0081***	-0.0015	-0.0206***	-0.0053***	0.0023***	-0.77e-3
measure	(-3.72)	(9.47)	(-0.33)	(-6.00)	(-2.65)	(2.80)	(-0.17)
β-coeff.	-0.2832	0.2936	-0.0161	-0.7439	-0.2316	0.1825	-0.0192
Period	62:02-99:04	75:02-99:04	65:02-99:04	75:02-99:04	62:02-99:04	62:02-99:04	62:02-99:04
N	151	99	139	99	151	151	151
R^2	0.8287	0.9734	0.9344	0.8499	0.8072	0.9252	0.7977

(c) Including structural shocks

	Canada	France	Germany	Italy	Japan	UK
Constant	1.4942***	-0.4543**	1.2581***	3.6625***	2.5021***	2.0126***
	(10.80)	(-2.44)	(2.99)	(24.91)	(12.35)	(23.63)
Quinn	-0.0067***	0.0166***	-0.0015	-0.0321***	-0.0155***	-0.0069***
measure	(-4.15)	(6.13)	(-0.34)	(-19.05)	(-4.87)	(-6.65)
Supply	0.0607	1.1574	0.1009	2.3826**	-0.5979	2.6104**
	(0.06)	(1.47)	(0.14)	(2.14)	(-1.21)	(2.49)
Demand	-0.2251	-0.0238	0.4140*	0.2127	0.241	-0.3271
	(-0.51)	(-0.15)	(1.66)	(0.95)	(1.15)	(-1.58)
Nominal	-1.1618	1.5451	10.72	11.7386**	3.4301**	3.0185**
	(-0.48)	(0.85)	(1.32)	(2.38)	(2.26)	(2.06)
Period	62:02-99:04	76:03-99:04	65:02-99:04	75:02-99:04	62:02-99:04	62:02-99:04
N	151	94	139	99	151	151
R^2	0.8032	0.9833	0.9933	0.9696	0.9168	0.9308

(d) Including interaction terms

	Canada	France	Germany	Italy	Japan	UK
Constant	1.4858***	-0.7875***	1.2931***	3.7691***	2.5149***	2.0174***
	(10.99)	(-3.22)	(3.04)	(23.96)	(12.29)	(22.39)
Quinn measure	-0.0066***	0.0226***	-0.0018	-0.0333***	-0.0157***	-0.0069***
	(-4.17)	(6.45)	(-0.43)	(-18.43)	(-4.89)	(-6.29)
$Supply_{\{-1\}}$*	-0.0013	-0.0096	-0.48e-3	0.0052	-0.0153*	-0.0075
Quinn	(-0.12)	(-0.78)	(-0.07)	(0.37)	(-1.83)	(-0.50)
$Demand_{\{-1\}}$*	-0.0074	-0.0011	0.0031	-0.0011	0.0039	-0.28e-3
Quinn	(-1.55)	(-0.53)	(1.19)	(-0.42)	(1.18)	(-0.12)
$Nominal_{\{-1\}}$*	0.0073	0.74e-3	0.0585	0.0684	0.0353	0.0013***
Quinn	(0.28)	(0.03)	(0.74)	(1.10)	(1.32)	(0.07)
Period	62:03-99:04	75:02-99:04	65:03-99:04	75:03-99:04	62:03-99:04	62:03-99:04
N	150	99	138	98	150	150
R^2	0.8033	0.9762	0.9933	0.9685	0.9160	0.9253

(e) Testing for non-linearities

	Canada	France	Germany	Italy	Japan	UK	USA
Constant	-	-	-	-	5.8124***	0.766**	-
					(6.27)	(2.02)	
Quinn	0.0272***	0.0047	0.0256***	0.0559***	-0.1274***	0.0302***	0.0098***
	(12.37)	(1.52)	(5.25)	(24.94)	(-4.07)	(2.72)	(3.42)
$Quinn^2$	-0.18e-3***	0.93e-6**	-0.14e-3***	-0.52e-3***	0.91e-3***	-0.25e-3***	-0.17e-6
	(-7.32)	(2.26)	(-2.95)	(-21.23)	(3.56)	(-3.35)	(-0.56)
Period	62:02-99:04	75:02-99:04	65:02-99:04	75:02-99:04	62:02-99:04	62:02-99:04	62:02-99:04
N	151	99	139	99	151	151	151
R^2	0.8381	0.9725	0.9931	0.9650	0.9313	0.9351	0.9377

Table 3: Consumption Volatility and Financial Market Liberalization

The dependent variable is the volatility of consumption, computed using the rolling-window approach. The Kaminsky-Schmukler (K-S) measure is an index ranging from 1 to 3, which assigns a lower value to more open capital account regimes. In panel (b), the dependent variable is the volatility based on the median absolute deviation of consumption in conjunction with the rolling-window approach. The structural shocks in panel (c) have been obtained from a SVAR model as in Clarida and Gali (1994). In panel (d), these shocks have been interacted with the measure for financial openness. In panel (e), a non-linear term is included. Standard errors are corrected using the method suggested by Hansen and Hodrick (1980). Regressions for France, Germany, and Japan include one dummy variable. Regressions for Canada, Italy, the UK, and the USA include two dummy variables. *** (**, *) = significant at the 1% (5%, 10%) level.

(a) Baseline regressions

	Canada	France	Germany	Italy	Japan	UK	USA
Constant	0.3636***	0.4759***	0.8530***	-0.2560***	0.9926***	0.9604***	-0.2406**
	(2.82)	(3.65)	(7.81)	(-3.65)	(38.09)	(14.31)	(-1.97)
K-S	0.5942***	0.1097	0.1962**	0.6222***	0.4255***	0.3517***	0.9117***
measure	(4.62)	(1.40)	(2.06)	(14.38)	(33.46)	(8.09)	(8.45)
β-coeff.	0.2334	0.1052	0.0236	0.5494	0.6493	0.3234	0.5711
Period	73:01-00:04	75:02-00:04	73:01-00:04	75:02-00:04	73:01-00:04	73:01-00:04	73:01-00:04
N	112	103	112	103	112	112	112
R^2	0.9268	0.9571	0.9958	0.9790	0.9801	0.9330	0.9300

(b) Median-absolute-deviation-based volatility

	Canada	France	Germany	Italy	Japan	UK	USA
Constant	-0.0355	0.7174***	0.4448***	-0.2360***	0.6168***	0.7623***	-0.2338**
	(-0.24)	(10.34)	(3.95)	(-3.22)	(16.07)	(18.16)	(-2.12)
K-S	0.7745***	0.0467	0.3481***	0.5058***	0.2687***	0.2888***	0.7628***
measure	(5.28)	(1.58)	(3.68)	(11.19)	(13.50)	(10.75)	(8.11)
β-coeff.	0.3766	0.0861	0.1237	0.7885	0.8309	0.3618	0.6109
Period	73:01-00:04	75:02-00:04	73:01-00:04	75:02-00:04	73:01-00:04	73:01-00:04	73:01-00:04
N	112	103	112	103	112	112	112
R^2	0.8624	0.9536	0.9639	0.9405	0.8856	0.9319	0.8715

(c) Including structural shocks

	Canada	France	Germany	Italy	Japan	UK
Constant	0.3765***	0.4710***	0.8556***	-0.2510***	0.9912***	0.9636***
	(2.92)	(3.58)	(7.87)	(-3.73)	(37.85)	(15.38)
K-S	0.5819***	0.1132	0.1951**	0.6181***	0.4263***	0.3471***
measure	(4.51)	(1.43)	(2.06)	(14.98)	(33.31)	(8.50)
Supply	0.3857	0.7977	-0.2102	0.4101	-0.0831	3.2419**
	(0.40)	(0.71)	(-0.28)	(0.54)	(-0.25)	(2.44)
Demand	0.4707	-0.0938	0.2531	0.3478**	0.1082	-0.0203
	(1.48)	(-0.40)	(1.16)	(2.06)	(0.78)	(-0.09)
Nominal	0.5522	-0.4369	4.9074	2.4185	0.7328	4.1227**
	(0.29)	(-0.16)	(0.57)	(0.66)	(0.73)	(2.35)
Period	73:01-00:04	75:02-00:04	73:01-00:04	75:02-00:04	73:01-00:04	73:01-00:04
N	112	103	112	103	112	112
R^2	0.9286	0.9573	0.9959	0.9800	0.9804	0.9385

(d) Including interaction terms

	Canada	France	Germany	Italy	Japan	UK
Constant	0.3222**	0.9551***	0.8663***	0.3179***	0.9909***	0.9471***
	(2.41)	(13.98)	(8.00)	(6.80)	(38.92)	(14.16)
K-S	0.6354***	0.0200	0.1838*	0.4527***	0.4264***	0.3650***
measure	(4.76)	(0.64)	(1.94)	(12.24)	(34.35)	(8.27)
$Supply_{\{-1\}}$*	-0.14662	0.3899	-0.2188	-0.0891	-0.0044	-0.4929
K-S	(-0.16)	(0.97)	(-0.33)	(-0.24)	(-0.03)	(-0.65)
$Demand_{\{-1\}}$*	0.29304	-0.0569	0.1898	-0.0861	0.0113	0.1447
K-S	(0.95)	(-0.66)	(0.96)	(-0.91)	(0.16)	(0.84)
$Nominal_{\{-1\}}$*	-1.9562	-0.3246	-2.6595	0.0501	0.1045	-1.1156
K-S	(-1.04)	(-0.28)	(-0.35)	(0.03)	(0.25)	(-0.86)
Period	73:02-00:04	75:02-00:04	73:02-00:04	75:03-00:04	73:02-00:04	73:02-00:04
N	111	103	111	102	111	111
R^2	0.9282	0.9873	0.9959	0.9853	0.9807	0.9343

(e) Testing for non-linearities

	Canada	France	Germany	Italy	Japan	UK	USA
Constant	-	-	-	-	1.155***	-	-
					(18.79)		
K-S	1.2335***	0.7382***	1.689***	0.4800***	0.2122***	1.8204***	0.8509***
	(12.74)	(6.45)	(17.02)	(7.32)	(2.88)	(24.34)	(7.85)
$K\text{-}S^2$	-0.2756***	-0.1829***	-0.6398***	0.0030	0.0531***	-0.4868***	-0.1464*
	(-2.85)	(-3.37)	(-7.78)	(0.10)	(2.86)	(-12.27)	(-1.84)
Period	73:01-00:04	75:02-00:04	73:01-00:04	75:02-00:04	73:01-00:04	73:01-00:04	73:01-00:04
N	112	103	112	103	112	112	112
R^2	0.9271	0.9547	0.9958	0.9758	0.9793	0.9093	0.8995

Table 4: Consumption Volatility Relative to Output Volatility and Financial Openness

The dependent variable is the volatility of consumption relative to the volatility of output. Volatilities are computed using the rolling-window approach. The Quinn measure of capital account liberalization is an index ranging from 0 to 100, which assigns a large value to more open capital account regimes. The Kaminsky-Schmukler (K-S) measure of financial market liberalization is an index ranging from 1 to 3, which assigns a lower value to more liberalized markets. OLS estimates with standard errors corrected using the method suggested by Hansen and Hodrick (1980). *** (**, *) = significant at the 1% (5%, 10%) level.

(a) Capital account liberalization

	Canada	France	Germany	Italy	Japan	UK	USA
Constant	0.5489***	-1.2811***	-1.6426***	3.0474***	-1.3963***	0.4522***	0.1815
	(2.98)	(-6.64)	(-3.95)	(7.48)	(-7.07)	(9.82)	(0.47)
Quinn	0.0065***	0.0332	0.0286	0.0193	0.0439***	0.0133***	0.0081**
measure	(3.24)	(12.46)	(6.64)	(-4.67)	(14.69)	(24.30)	(2.05)
β-coeff.	0.2391	0.4521	0.2266	-0.2583	0.7031	0.6712	0.2165
Period	62:02-99:04	75:02-99:04	65:02-99:04	75:02-99:04	62:02-99:04	62:02-99:04	62:02-99:04
N	151	99	139	99	151	151	151
R^2	0.8604	0.9728	0.9528	0.9817	0.9663	0.9450	0.7698

(b) Financial market liberalization

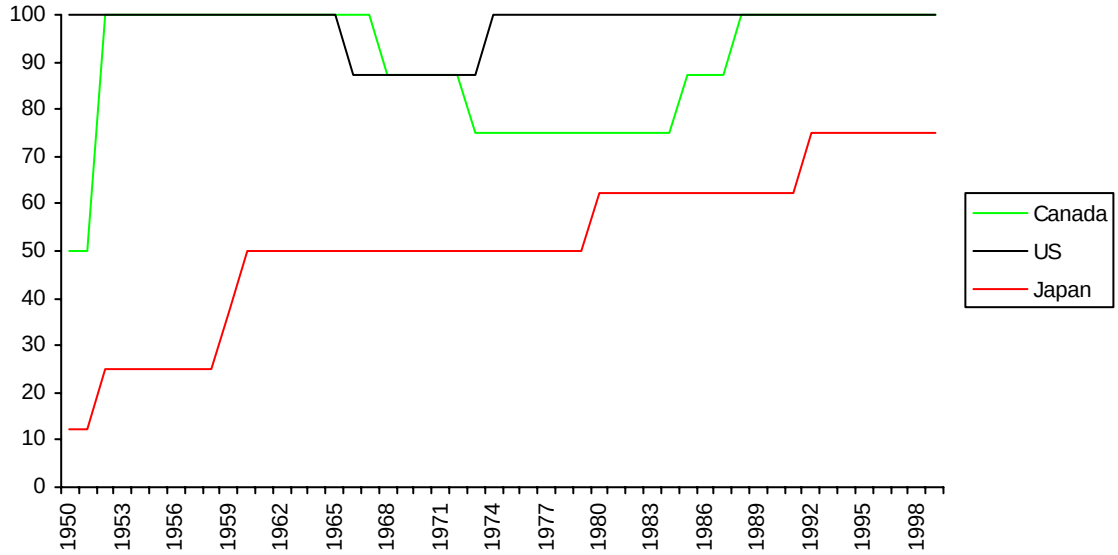
	Canada	France	Germany	Italy	Japan	UK	USA
Constant	1.9572***	1.7334***	3.0939***	1.0547***	1.6581***	2.5759***	1.3019***
	(13.47)	(15.54)	(29.37)	(7.60)	(44.87)	(10.62)	(10.22)
K-S	-0.6997	0.1922***	-1.7054***	0.1773	-0.1335***	-0.7151***	-0.2874
measure	(-5.14)	(-3.44)	(-18.89)	(1.47)	(-7.81)	(-3.94)	(-2.61)
β-coeff.	-0.1919	-0.1624	-0.5246	0.1043	-0.1977	-0.3652	-0.2987
Period	73:01-00:04	75:02-00:04	73:01-00:04	75:02-00:04	73:01-00:04	73:01-00:04	73:01-00:04
N	112	103	112	103	112	112	112
R^2	0.9108	0.9609	0.9713	0.9769	0.9514	0.8087	0.6286

Table 5: Data Definitions and Sources

Variable	Definition	Source
Consumption	Nominal household consumption expenditure, including nonprofit institutions serving households. Seasonally adjusted. Quarterly data starting in 1957 (Canada, Japan, United Kingdom, United States), 1960 (Germany), 1965 (France), and 1970 (Italy). Our dataset ends in 2000.	IMF (2004) 15696F.CZF... 13296F.CZF... 13496F.CZF... 13696F.CZF... 15896F.CZF... 11296F.CZF... 11196F.CZF...
CPI	Consumer prices. Quarterly data from 1957 to 2000.	IMF (2004) 15664...ZF... 13264...ZF... 13464...ZF... 13664...ZF... 15864...ZF... 11264...ZF... 11164...ZF...
Deflator	GDP deflator (2000=100). Quarterly data starting in 1957 (Canada, Japan, United Kingdom, United States), 1960 (Germany), 1970 (France), and 1960 (Italy). Our dataset ends in 2000.	IMF (2004) 15699BIRZF... 13299BIRZF... 13499BIRZF... 13699BIRZF... 15899BIRZF... 11299BIRZF... 11199BIRZF...
Kaminsky-Schmukler measure	Regulatory measure of financial market liberalization and development. We use an average over three sub-indices capturing the degree of domestic financial sector's liberalization, capital account liberalization, and stock market liberalization. The index runs from 1 to 3, and a lower index implies that countries have more open and more developed financial markets.	Kaminsky and Schmukler (2003)
Output	Nominal gross domestic product. Seasonally adjusted. Quarterly data starting in 1957 (Canada, Japan, United Kingdom, United States), 1960 (Germany), 1965 (France), and 1960 (Italy). Our dataset ends in 2000.	IMF (2004) 15699B.CZF... 13299B.CZF... 13499B.CZF... 13699B.CZF... 15899B.CZF... 11299B.CZF... 11199B.CZF...
Quinn measure	Regulatory measure of capital account openness with 0 = approval for capital transfer required, 0.5 = approval required and sometimes granted, 1.0 = no restriction but official approval required plus transaction is taxed, 1.5 = no official approval needed but transaction may be taxed, 2.0 = free capital account regime.	Quinn (1997)
Exchange rate	National currency vs US Dollars, end of period. Quarterly data from 1957 to 2000. Starting from 1999 EURO/US Dollar rate for France, Germany, and Italy.	IMF (2004) 156..DE.ZF... 132..AE.ZF... 134..AE.ZF... 136..AE.ZF... 158..AE.ZF... 112..AE.ZF... 163..AE.ZF...

Figure 1: Regulatory Measures of Capital Account Openness: The Quinn Measure

Data for these graphs have kindly been provided by Dennis Quinn. The measure used in Quinn (1997) is defined as follows: 0 = approval for capital transfer required, 0.5 = approval required and sometimes granted, 1.0 = no restriction but official approval required plus transaction is taxed, 1.5 = no official approval needed but transaction may be taxed, 2.0 = free capital account regime.



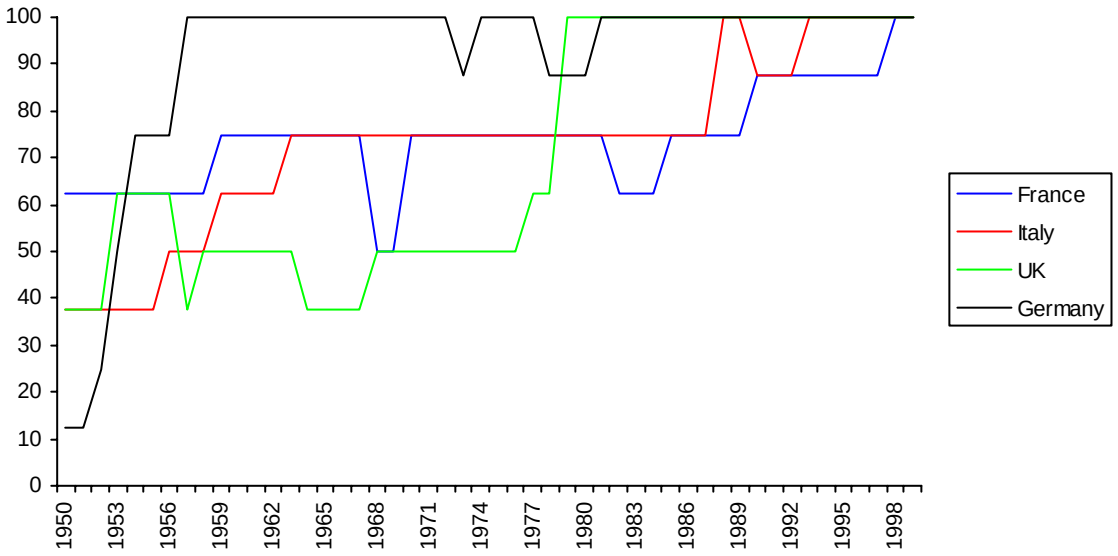


Figure 2: Regulatory Measures of Financial Development: The Kaminsky-Schmukler Measure

The measure used in Kaminsky and Schmukler (2003) runs from "less liberalization" (3) to "more liberalization" (1).