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Abstract: This paper considers the prediction of large depreciations (both nominal and real) in a panel of industrialized countries using a probit methodology. The current account balance/GDP ratio has a modest but statistically significant effect on the estimated probability of a large depreciation, and gives slight predictive power in an out-of-sample forecasting exercise. The CPI inflation rate also has a modest but statistically significant effect in predicting nominal depreciations and has slight predictive power, but this effect is not present for real exchange rates. The GDP growth rate occasionally has a significant effect. A higher current account balance (surplus) tends to reduce the probability of a sharp depreciation; a higher inflation rate tends to increase the probability of a sharp depreciation; and a higher GDP growth rate perhaps tends to reduce the probability of a sharp depreciation.

Keywords: current account, forecasting

JEL Classification: C22, F31.

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1. Introduction

Exchange rate prediction is very difficult. The flatline forecast associated with modeling the exchange rate as a driftless random walk is nearly impossible to improve upon. This result, first shown by Meese and Rogoff (1983), was surprising to economists at the time, but has since become recognized as perhaps the most basic empirical fact of international finance.

Large and sudden depreciations may, however, be different from ordinary currency movements, and they may be of special interest to policymakers because of their larger macroeconomic effects.[1] Large and sudden depreciations may even be more predictable than most exchange rate movements. A greater predictability of large depreciations could arise, for example, in a threshold model in which exchange rates behave as a random walk except when they are very far from their fundamental values, at which point they have a tendency to revert suddenly towards equilibrium. A large literature has considered early warning indicators of currency crises in the context of emerging markets, including Frankel and Rose (1996), Edison (2000), Kaminsky, Lizondo and Reinhart (1998), Collins (2003), and Kumar, Moorthy and Perraudin (2003) to name but a few.

Much less work has been done on predicting sharp depreciations in industrialized countries. Eichengreen, Rose and Wyplosz (1995) study the causes and consequences of realignments of fixed exchange rates and changes of exchange rate regime (fixed versus

[1] There is an asymmetry in that nominal exchange rates are more likely to depreciate sharply than to appreciate sharply, much as equity prices are known to be more likely to crash than to soar. We are referring here to the nominal exchange rate against a basket of foreign currencies, not to bilateral exchange rates, for which any depreciation of one currency must of course be matched by an appreciation of equal magnitude in the other currency. Interestingly, the asymmetry does not apply to real exchange rates, for which sharp depreciations and sharp appreciations are about equally likely. This may owe in part to the fact that the cross-country distribution of inflation rates is heavily skewed to the right.

floating) in a panel of twenty OECD countries over the years 1959-1993. They find that downward realignments of fixed exchange rates are preceded by political instability, current account and budget deficits and inflation, whereas regime transitions are hard to relate to any lagged macroeconomic or political variables. Freund (2005) analyzes current account reversals in industrialized economies. Although she is not explicitly concerned with the prediction of exchange rates, she finds that current account reversals typically occur when the current account/GDP ratio reaches about -5%, but that the reversals sometimes do not happen until this ratio exceeds -10%. She also finds that when reversals do occur, they are associated with substantial depreciation (both nominal and real), with slowing income growth, a fall in the investment/GDP ratio, and little change in the savings/GDP ratio.

In this paper we construct a panel of data from developed countries spanning 35 years. We adopt a specific definition of a large depreciation and estimate via probit models the probability of a given country having a large depreciation in a given year. The variables we use to predict large depreciations include the current account balance/GDP ratio, the budget balance/GDP ratio, the CPI inflation rate, the GDP growth rate, and the net international factor income/GDP ratio. The most consistent empirical result is that a decline in the current account balance ratio raises the probability of a large depreciation. For nominal exchange rates, a higher inflation rate also raises the probability of large depreciation, but this effect is absent when using real exchange rates. Higher GDP growth is associated with a reduced probability of a large depreciation, but this effect is significant in only a few specifications. Taking account of these variables is found to be marginally useful in an out-of-sample prediction exercise.

The plan for the remainder of this paper is as follows. The data that we use are described in section 2, including our definitions of a sharp depreciation. The econometric results are reported in section 3. Section 4 shows time series of the fitted probabilities of sharp depreciations for all the industrialized countries and contains some discussion of the interpretation and implications of the results. Section 5 concludes.

2. Data

We assembled exchange rate data for 21 OECD countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the United States. These are all the members of the OECD that are also classified as advanced economies by the IMF except for Iceland, Korea, and Luxembourg.[2] We used three measures of exchange rates: the OECD's nominal trade-weighted index, the OECD's real trade-weighted index, and bilateral exchange rates in terms of the IMF SDR.[3] The data are quarterly, spanning 1970 through 2005. Ten of these countries formed a monetary union in 1999.[4] Beginning in 1999, our analysis treats the euro area as a single economy with a single currency. Prior to 1999 current member countries of the euro area are modeled separately.

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[2] Both Iceland and Luxembourg have a population under 500,000 and thus lack a diversified economy. In addition, Iceland is atypical of industrial countries in its heavy dependence on natural resources, and Luxembourg lacks much of the data we required. We excluded Korea because it was considered a developing country for most of our sample period.

[3] The SDR, or special drawing right, is a weighted average of the U.S. dollar, the euro (previously the Deutschemark and French franc), the Japanese yen, and the British pound. The moving weights are determined by each country's exports and by other countries' use of these currencies as foreign exchange reserves.

[4] Luxembourg is a founding member of the euro area that is not in our sample. Greece joined the euro area in 2001.

Our goal in this paper is to consider the prediction of sharp depreciations in these exchange rate indices. We define a currency as undergoing a large depreciation in a given year if the following three conditions are all satisfied for any quarter in that year:

1). The exchange rate declined by 15 percent or more from its three-quarter centered moving average of four quarters earlier,[5]

2). The above exchange rate decline was at least 7.5 percentage points greater than the rate of decline over the previous four quarters (using three-month centered moving averages), and,

3). The exchange rate did not satisfy conditions (1) and (2) in the previous quarter.

We also created a more stringent definition of sharp depreciation by replacing criterion (1) with a 20 percent decline and criterion (2) with a 10 percent acceleration. For the real exchange rate series, a 20 percent criterion leads to only five instances of sharp depreciations in our sample, which are too few for statistical analysis. Thus, we conduct our analysis on five sets of sharp depreciations: 1) 15 percent nominal trade-weighted; 2) 20 percent nominal trade-weighted; 3) 15 percent real trade-weighted; 4) 15 percent nominal SDR; and 5) 20 percent nominal SDR.

All definitions of large depreciations are necessarily somewhat arbitrary. Our definitions of large depreciations are related to those used in Frankel and Rose (1996) and Freund (2005), and are designed to capture the idea of a depreciation that is sudden and sharp. Table 1 shows the years and countries for which we identified sharp depreciations under each of the above criteria. Austria, Germany, and Switzerland experienced no

[5] The use of a moving-average base period helps to minimize the effect of transitory exchange rate fluctuations, reducing the total number of episodes of sharp depreciations and focusing on those that were persistent.

sharp depreciations under any definition. The set of episodes that we identify has considerable overlap with that identified by Freund, but the two sets are not identical.

The goal of this paper is to predict these large depreciations, both nominal and real. We use a probit methodology. The dependent variable is a {0, 1} dummy variable that is 1 if and only if country i experienced a large depreciation in year t. The variables we used to predict these large depreciations include the current account balance/GDP ratio, the budget balance/GDP ratio, the CPI inflation rate, the real GDP growth rate, and the net international factor income/GDP ratio,[6] all of which are measured in percentage points and lagged one year. This choice of predictors focuses on imbalance variables that one might expect to be especially useful for predicting large currency movements. These variables were obtained at the annual frequency from *World Development Indicators* covering the years 1971-2004 (predicting exchange rate behavior in 1972-2005).[7]

3. Econometric Methodology and Results

The baseline equations we are estimating are of the form

$$P(y_{it} = 1) = \Phi(\alpha + \beta' x_{it-1} + \varepsilon_{it}) \qquad (1)$$

where y_{it} is the dummy variable that is 1 if and only if country i has a large depreciation in year t, the function $\Phi(.)$ is the standard normal cumulative distribution function, and x_{it-1} is a vector of predictor variables for country i in year $t-1$. We estimate these equations using our panel of 21 countries spanning 34 years.

[6] Net factor income represents the servicing burden of a country's external liabilities (net of labor income receipts and payments, which are small for these countries).
[7] In some cases (primarily for budget deficits) missing data were obtained from national sources through Haver Analytics.

It is important to be clear that our goal is simply reduced-form prediction of when a currency is more or less vulnerable to sharp depreciations. We are asking how likely is a large depreciation in year t given a particular set of predictors in year $t-1$ and no other information. This is not the same as the effect of an exogenous change in the predictors on year $t-1$ on the probability of a large depreciation in year t. The latter effect is not identified without certain strong assumptions that we are not making. For example, the correlation between a predictor variable and the exchange rate may reflect the influence of an exogenous omitted variable on both predictors and exchange rates, in which case there would be no direct causality between predictor and exchange rate. Reduced-form prediction is a modest goal. Modest goals are appropriate in exchange rate forecasting.

In equation (1), the effect of a predictor on the probability of a large depreciation is constant across countries and over time. That is a strong assumption, but it is unavoidable. Large depreciations are rare, and there are simply not enough of them for any one country or year to be able to get meaningful coefficient estimates for that country or year alone. It is only by using panel data and restricting the coefficients to be constant both across countries and over time that we can hope to obtain powerful tests.

The variables we are using to predict depreciations in year t do not include the change in the exchange rate during year $t-1$. There is a very trivial form of predictability, whereby if the exchange rate has depreciated by a little less than the 15 or 20 percent threshold at the end of year $t-1$ the probability a large depreciation over some four-quarter window ending in year t is relatively high because it only takes a modest further movement. We abstract from this simple arithmetic predictability by asking what the probability of a large depreciation is in year t without conditioning on the exchange rate at the end of the previous year.

3.1 *Econometric Issues*

We consider the usual maximum likelihood estimation of the probit equation, equation (1), pooling all countries and time periods. In the computation of the associated standard errors, ε_{it} is assumed to be uncorrelated over time, but heteroskedasticity and correlation across countries are allowed for, as we use heteroskedasticity-robust standard errors with clustering on countries. Making some allowance for potential cross-country correlation seems to be desirable.[8]

One could augment equation (1) with country fixed effects. However, it is by no means clear that one should want to do this. Fixed effects allow for the possibility that different countries may have different susceptibilities to sharp depreciations even after controlling for observed predictors. However, we are not attempting to identify structural coefficients, such as the effect of an exogenous shock in one predictor on the probability of a large depreciation. Our goal is simply reduced form prediction of when a currency is more or less vulnerable to sharp depreciations than the average across all currencies and years. As such, we want to use the pooled estimator without fixed effects, even if it might be biased as an estimate of a structural coefficient. In addition, the use of fixed effects causes technical issues. Fixed effects are not identified for any country that has never had a sharp depreciation and the inclusion of country fixed effects may cause the maximum likelihood estimator of β in the probit model to be biased in small samples.[9]

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[8] This is theoretically valid under the asymptotics in which the number of countries, n, is small while the number of time periods, T, is large. With $n=21$ and $T=34$, it seems that this asymptotic approximation might work well, but being sure would require simulation studies. In any case, we also considered heteroskedasticity robust standard errors without clustering. These give similar results, without relying on fixed n large T asymptotics.

[9] Technically, this estimator is asymptotically consistent when n is fixed and T is large, but not when T is fixed and n is large.

For these reasons, we use pooled probit without fixed effects.[10] In estimating each probit regression, the coefficients that we report are the effects of a one percentage point change in each predictor on the fitted probability of a large depreciation, when it is evaluated at the mean of the predictor variables. The effect of a one percentage point change is of course nonlinear in a probit model, and so will depend on where it is evaluated. Although the conventional R^2 is not defined in the probit model, we report the McFadden pseudo R^2 as a measure of equation fit (McFadden (1974)).

3.2 *Predicting Large Depreciations: The Results*

Table 2 shows the results of various specifications for predicting 15 percent nominal trade-weighted depreciations. For example, column 1 shows that using just the current account balance/GDP ratio to predict sharp depreciations implies that a one percentage point rise in the current account balance/GDP ratio is estimated to reduce the probability of a sharp depreciation by 0.66 percentage points. Though highly statistically significant, this effect is a small response to a large increase in the current account balance/GDP ratio. When evaluated at the largest negative value of the current account ratio in the sample (-16 percent of GDP) the marginal effect of a one percentage point increase in the current account ratio is, however, a substantial 5.1 percent.

A higher budget balance/GDP ratio also implies a lower risk of a large depreciation (column 2). This appears to run counter to the conventional Mundell-

[10] Notwithstanding these considerations, we redid the regressions with fixed effects (dropping countries which had no large depreciation) and also separately with decade dummies. For decade dummies, the significance and approximate magnitude of the coefficients on the current account balance/GDP ratio and inflation rate were unchanged. However, the use of country dummies tended to make the estimated coefficients on the current account more negative. This may reflect the small sample problems with this estimator or it may reflect the possible existence of an omitted variable in the regression without fixed effects that varies across countries (but not over time) such as the level of financial development of that country which is positively correlated with the current account balance but negatively correlated with the odds of a sharp depreciation.

Fleming analysis in which an increase in the budget surplus lowers the yield on domestic assets and so causes the exchange rate to depreciate. But recall that our work here is on reduced form exchange rate prediction, not the effect of an exogenous shock to the budget balance. There is, moreover, theoretical ambiguity about the effect of an exogenous decline in the budget balance on exchange rates, as this could cause long-run inflation expectations to rise, implying immediate exchange rate depreciation. Rubin, Orszag and Sinai (2004) argue that sharp exchange rate depreciation could occur once fiscal policy is perceived by the markets as unsustainable because of the possibility that the government will cause inflation at some point in the future to reduce the real value of public debt.

Higher inflation raises the risk of a large nominal depreciation (column 3) and higher GDP growth lowers the risk of a large depreciation (column 4). Higher net factor income lowers the chance of a large depreciation, but the effect is not statistically significant (column 5). Taken individually, each of these three variables has an effect in the expected direction.

Column 6 shows results from including all independent variables in the regression. The current account and GDP growth remain significant with the same sign. Net factor income, however, takes on the wrong sign. That is, if two countries have the same current account balance/GDP ratio, budget balance/GDP ratio, inflation rate, and GDP growth, the country with the higher net factor income/GDP ratio is estimated to actually have a significantly higher risk of a large depreciation. This is perhaps surprising, as one might have expected a country that was a net creditor would be better able to borrow from abroad without running the risk of depreciation than a country that was a net debtor in the first place. Recall again, however, that this is only a reduced-form prediction exercise.

Column 7 presents the results of a test-down procedure in which the least significant variable in column 6 is removed from the regression successively until all coefficients are significant at the 10 percent level. The current account and GDP growth remain strongly significant, and net factor income is also significant but with the "wrong" sign. Column 8 shows the specification that has the most general support across the different nominal exchange rate measures. Both the current account coefficient and the inflation coefficient are statistically significant with the expected signs. Additional lags of the independent variables were generally not statistically significant.[11]

Table 3 presents results for 20 percent nominal trade-weighted depreciations. Because 20 percent depreciations are less frequent than 15 percent depreciations, the coefficients—which relate to the probability of sharp depreciation—are almost always smaller than in Table 2. The current account and inflation rate stand out as the only individually significant variables. Only the inflation rate is significant in combination with other variables. The coefficient on the inflation rate is quite low. A one percentage point increase in the inflation rate raises the probability of a 20 percent depreciation by only 0.21 percent (column 3). But recall that this coefficient is interpreted at the mean value of inflation, which is only 6 percent. At the maximum sample value of inflation of

[11] In principle, the lagged dependent variable (depreciation dummy) could be a useful predictor. In practice, inclusion of the lagged dependent variable poses technical difficulties. For the 15 and 20 percent nominal trade-weighted depreciations and for the 15 percent real trade-weighted depreciations, no country ever had two sharp depreciations in a row. Under these circumstances, a sharp depreciation is a perfect predictor of no sharp depreciation in the following year, but of course this simply reflects the relatively small sample. For the 15 and 20 percent SDR depreciations, there was one back-to-back sharp depreciation in the sample. Including a lagged dependent variable in these regressions had little effect on the other coefficients, but it is not useful to try to interpret the coefficient on the lagged dependent variable in this case because it is based on an effective sample size of one.

25, each additional percentage point increase in the inflation rate raises the probability of a 20 percent depreciation by 2.14 percent.

Table 4 shows the results for 15 percent real trade-weighted depreciations. Both the current account and the budget balance are significant predictors. The test-down procedure (column 7) selects the budget balance alone, but the equation fit (R^2) is equally good for current account or budget balance. While inflation is always a significant predictor of sharp nominal depreciations, it is not even close to being a significant predictor of real depreciations. This result makes economic sense, as inflation is by definition the primary difference between nominal and real depreciation.

Table 5 shows the results for 15 percent depreciations in terms of SDR. This category has the most identified sharp depreciations, 45 in all. As might be expected, the coefficients in this regression are larger than in the others. The test down procedure identifies three jointly significant variables: the current account, inflation, and GDP growth. A one percentage point increase in the ratio of the current account to GDP reduces the probability of a sharp depreciation nearly one percent starting from an average current account ratio.

Table 6 presents results for 20 percent depreciations in terms of SDR. Individually, the current account, inflation, and net factor income each appear to be statistically significant with the correct signs. The test down procedure identifies only the current account (column 7), but including inflation (column 8) yields a correctly signed coefficient that is nearly significant.

3.3 *Out-of-sample Forecasting Exercise*

We did a simple out-of-sample forecasting exercise of estimating each model using data up to 1985 to predict for 1986. We then re-estimated each model using data up to 1986 to predict for 1987, and so on up through the end of the sample. In this way, we get a recursive estimate of the probability of a large depreciation for each country and for each year of the sample in 1986 and later, $\hat{p}_{it}$. We then measure the fit of each model using the root mean square prediction error defined as $\sqrt{\Sigma\Sigma(\hat{p}_{it} - y_{it})^2}$ where the sums are taken over all countries and over the years 1986-2005. We compare this to the benchmark in which the probit model has no predictor variables at all, other than the constant. Roughly speaking, this benchmark sets the estimated probability of a large depreciation to its historical average over all countries and all preceding years. It is the analog of a random walk benchmark.

The results are reported in Table 7 for all categories of sharp depreciations using three model specifications: 1) the current account alone, 2) the current account and the inflation rate, and 3) the current account, the inflation rate, and the GDP growth rate. These are the specifications that received the greatest empirical support in Tables 2 through 6. The numbers are reported as relative root mean square prediction errors. A number greater than one means that the model did less well out-of-sample than the benchmark model that has no predictor variables whatsoever.

Table 7 shows that none of the specifications lead to improved predictions of sharp real depreciations (row 3). However, most of the specifications do yield improved predictions of sharp nominal depreciations, especially for trade-weighted nominal depreciations (rows 1 and 2). Even in the best cases, however, the improvement in prediction is modest as is to be expected—exchange rate forecasting is hard.

4. Implications and Interpretations

Figure 1 shows a panel for each country plotting the historical fitted probabilities of a nominal trade-weighted 15 percent depreciation using three possible sets of predictors: (i) the current account alone, (ii) the current account and inflation, and (iii) the current account, inflation and growth. Vertical lines mark years of sharp depreciations. Many of the sharp depreciations were preceded by years in which the fitted probabilities were elevated. Several countries currently have fairly large current account deficits and correspondingly face somewhat elevated estimated odds of a sharp deprecation, including Australia, New Zealand and the United States, but the odds of a sharp depreciation in any one year remain low. The model with the current account alone implies that if the current account deficit remains in the range of 5 percent per annum for (say) a decade, the probability of there being a sharp depreciation at some point over that time is high, but in any one year it is not that high. This result is consistent with the work of Freund (2005) who finds that current account reversals typically occur when the current account deficit/GDP ratio is around 5 percent, but that some current account reversals do not begin until the external imbalance is notably more severe.

No countries' external liabilities can grow without bound indefinitely: the ratio of the net international investment position to GDP must stabilize at some point. Adjustment of the nominal exchange rate is a likely way in which this basic sustainability condition might be enforced, although there are of course other possible mechanisms including lower inflation at home than abroad, implying real exchange rate depreciation, or slower income growth at home than abroad. An adjustment of the nominal exchange rate could be sudden and sharp, but does not have to be. External imbalances can be maintained for extended periods without exchange rate depreciation. Indeed, the currencies of countries with current account deficits often appreciate. Such appreciation could be thought of as compensation for the risk of a large depreciation that might have occurred, but did not.

5. Conclusion

As is well known, it is hard or impossible to beat the random walk forecast of an exchange rate. In this paper, we have investigated the possibility that large depreciations may be more predictable than the level of the exchange rate, and find tentative evidence of predictability of large depreciations using a panel of exchange rates of industrialized countries. The predictability of these large depreciations remains modest, at best. In a reduced-form prediction exercise, countries with large negative current account/GDP ratios appear to be statistically more vulnerable to large exchange rate adjustments in any given year. Countries with high inflation are also more vulnerable, at least to depreciations in nominal terms. Strong GDP growth tends to reduce the chance of a sharp depreciation, but this effect is less robust than the effects of the current account and inflation. The predictive power of the current account and the inflation rate are consistent with standard economic theory. A large and growing current account deficit implies that a country's net international investment position is declining relative to its GDP. At some point this ratio must stabilize, and a sharp exchange rate depreciation is one mechanism to achieve such a stabilization. Similarly, a high inflation rate raises the prices of a country's goods and services relative to those of other countries. Exchange rate depreciation tends to offset this high inflation, adjusting in the direction of limiting the increase in relative prices.

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Table 1: Sharp Exchange Rate Depreciations

Year	15 Percent Nominal Trade-Weighted	20 Percent Nominal Trade-Weighted	15 Percent Real Trade-Weighted	15 Percent SDR	20 Percent SDR
1971					
1972					
1973					
1974					
1975	NZ		NZ	NZ	NZ
1976	IT,UK	IT,UK	UK	IR,IT,PT,UK	IT
1977	PT,SP	PT,SP		PT,SP,SD	PT,SP
1978	SD				
1979	JA	JA	JA	JA	JA
1980	GR			GR	
1981				BE,FR,IR,IT, NL,SP,SD,UK	IT
1982	PT,SD		SD	PT	PT
1983	GR,SP	GR,PT		AL,GR,SP,SD	GR,PT,SP
1984	NZ	NZ	NZ	NZ,UK	NZ
1985	AL,GR	AL,GR	AL	AL	AL
1986	NZ		US	CA,NZ	
1987					
1988					
1989					
1990			JA	JA	
1991				GR	
1992	FI			AL,CA,FI,IT, SD,UK	
1993	IT,SP,SD	SD	FI,IT,SP,SD, UK	GR,IR,NO,PT, SP	FI,GR,IT,PT, SP,SD
1994					
1995					
1996	JA		JA		
1997					
1998				AL,NZ	NZ
1999					
2000				NZ	
2001				AL	
2002					
2003					
2004					
2005					

Notes: This table reports the years in which there was one or more 15 (20) percent depreciation (nominal or real). The depreciation has to be 15 (20) percent in some quarter of that year (relative to a three-month centered moving average dated four quarters previously), and additionally must be 7.5 (10) percent more than the depreciation over the previous four quarters, and must not have been preceded by another such large depreciation in the previous quarter. Countries are Australia (AL), Austria (AT), Belgium (BE), Canada (CA), Denmark (DK), Finland (FI), France (FR), Germany (GE), Greece (GR), Ireland (IR), Italy (IT), Japan (JA), Netherlands (NL), New Zealand (NZ), Norway (NO), Portugal (PT), Spain (SP), Sweden (SD), Switzerland (SZ), United Kingdom (UK), and United States (US).

Table 2: Probit Regressions for 15 Percent Nominal Trade-Weighted Depreciations

Effect of 1 percentage point increase in predictor on the probability of a depreciation evaluated at the mean of the predictors, in percentage points, t-statistics in parentheses

Predictors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Curr.Acct.Bal/GDP	-0.66 (5.29)					-0.48 (3.69)	-0.69 (5.90)	-0.47 (3.13)
Budget Bal./GDP		-0.28 (2.35)				-0.10 (1.49)		
Inflation Rate			0.38 (3.61)			0.11 (1.30)		0.22 (2.05)
GDP Growth Rate				-0.68 (2.16)		-0.55 (2.65)	-0.53 (2.78)	
Net Factor Inc./GDP					-0.29 (1.58)	0.27 (1.99)	0.38 (2.49)	
McFadden R^2 No. Obs.	12.4 611	1.5 615	8.8 653	3.6 652	0.7 611	19.9 569	17.7 602	15.4 603

Notes: See Table 6.

Table 3: Probit Regressions for 20 Percent Nominal Trade-Weighted Depreciations

Predictors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Curr.Acct.Bal/GDP	-0.32 (3.10)					-0.18 (1.64)		-0.14 (1.51)
Budget Bal./GDP		-0.11 (1.37)				-0.03 (0.71)		
Inflation Rate			0.21 (3.04)			0.13 (2.22)	0.21 (3.04)	0.17 (2.37)
GDP Growth Rate				-0.20 (0.79)		-0.12 (0.70)		
Net Factor Inc./GDP					-0.13 (1.09)	0.09 (0.80)		
McFadden R^2 No. Obs.	8.6 611	0.8 615	13.3 653	0.9 652	0.4 611	16.1 569	13.3 653	16.4 603

Notes: See Table 6.

Table 4: Probit Regressions for 15 Percent Real Trade-Weighted Depreciations

Effect of 1 percentage point increase in predictor on the probability of a depreciation evaluated at the mean of the predictors, in percentage points, t-statistics in parentheses

Predictors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Curr.Acct.Bal/GDP	-0.32 (2.33)					-0.40 (1.78)		-0.39 (2.05)
Budget Bal./GDP		-0.29 (3.10)				-0.22 (2.81)	-0.29 (3.10)	
Inflation Rate			-0.02 (0.20)			-0.15 (0.92)		-0.13 (0.76)
GDP Growth Rate				-0.29 (0.79)		-0.34 (0.95)		
Net Factor Inc./GDP					-0.03 (0.20)	0.29 (1.84)		
McFadden R^2	3.8	3.8	0.0	1.2	0.0	8.4	3.8	4.7
No. Obs.	611	615	653	652	611	569	615	603

Notes: See Table 6.

Table 5: Probit Regressions for 15 Percent Nominal SDR Depreciations

Predictors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Curr.Acct.Bal/GDP	-1.31 (5.86)					-0.85 (2.02)	-0.93 (2.95)	-0.91 (2.96)
Budget Bal./GDP		-0.55 (2.11)				-0.24 (1.07)		
Inflation Rate			0.75 (3.48)			0.40 (1.65)	0.43 (1.72)	0.54 (2.15)
GDP Growth Rate				-1.27 (2.34)		-1.03 (1.69)	-0.92 (1.65)	
Net Factor Inc./GDP					-0.71 (2.15)	-0.11 (0.22)		
McFadden R^2	8.7	1.5	6.9	3.1	1.2	13.0	13.5	11.8
No. Obs.	611	615	653	652	611	569	602	603

Notes: See Table 6.

Table 6: Probit Regressions for 20 Percent Nominal SDR Depreciations

Effect of 1 percentage point increase in predictor on the probability of a depreciation evaluated at the mean of the predictors, in percentage points, t-statistics in parentheses

Predictors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Curr.Acct.Bal/GDP	-0.60 (5.92)					-0.45 (4.30)	-0.60 (5.92)	-0.47 (4.72)
Budget Bal./GDP		-0.32 (1.76)				-0.15 (1.37)		
Inflation Rate			0.33 (2.80)			0.07 (0.90)		0.16 (1.63)
GDP Growth Rate				-0.47 (1.15)		-0.39 (1.54)		
Net Factor Inc./GDP					-0.34 (2.66)	0.15 (1.08)		
McFadden R^2 No. Obs.	14.0 611	2.7 615	7.2 653	1.9 652	1.2 611	18.4 569	14.0 611	15.9 603

Notes: Maximum likelihood estimates of the probit equation, equation (1), using annual data from 1972 through 2005. All predictors are expressed in percentage points. For example, a one percentage point increase in the current account balance/GDP ratio is estimated to reduce the probability of a 20 percent SDR depreciation 0.60 percentage points. In the construction of the associated t-statistics, the errors are assumed to be uncorrelated over time, but heteroskedasticity and correlation across countries are allowed for, using heteroskedasticity robust standard errors with clustering on countries. The pseudo-R^2 goodness of fit measure of McFadden (1974) is also reported for each estimated equation. Missing data for some variables in some countries, particularly in the first few years of the sample, lead to small differences in the sample size across specifications. Column 7 presents results from a test-down procedure in which variables are dropped sequentially from the specification in column 6 until all remaining coefficients are significant at the 10 percent level. Column 8 is the parsimonious specification with the greatest support across all measures of sharp exchange rate depreciation.

Table 7: Out-of-Sample Relative Root Mean Square Prediction Error for 3 Models

Definition of Sharp Depreciation	Curr. Acct. (1)	(1) + Inflation (2)	(2) + Growth (3)
15 Percent Nominal Trade-Weighted	0.98	0.96	0.95
20 Percent Nominal Trade-Weighted	1.01	0.95	0.95
15 Percent Real Trade-Weighted	1.00	1.01	1.02
15 Percent Nominal SDR	0.99	0.97	0.97
20 Percent Nominal SDR	1.01	1.00	1.00

Notes: Out-of-sample relative root mean square prediction errors from the specified model to the naive benchmark alternative of using no predictors whatsoever. A number greater than one means that the model is doing less well than the naive benchmark. Forecasts are evaluated over the years 1986-2005.

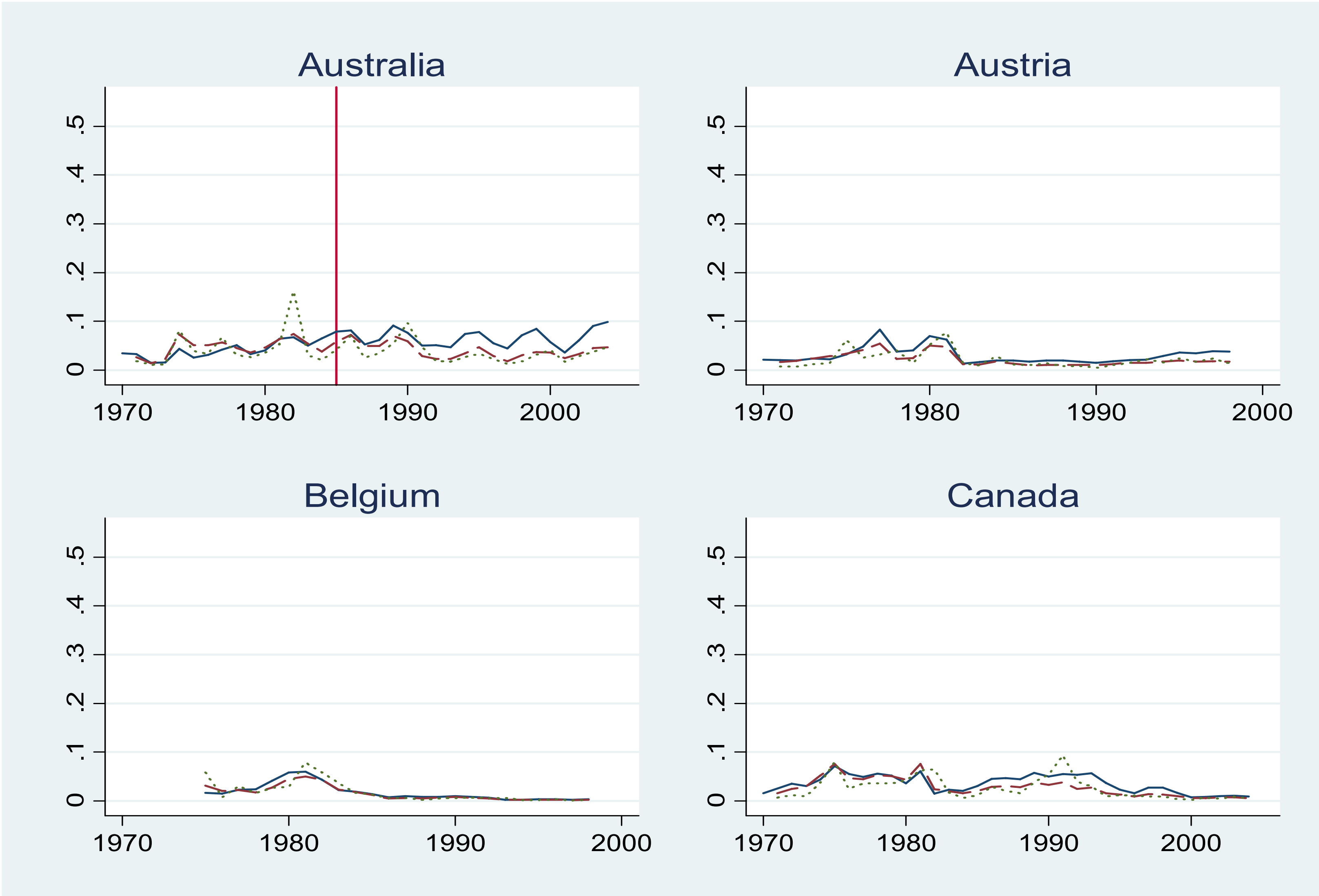

Figure 1: Estimated Probabilities of 15 Percent Nominal Trade-Weighted Depreciation
Model 1, solid; Model 2, dashed; Model 3, dotted. (See Table 7.)

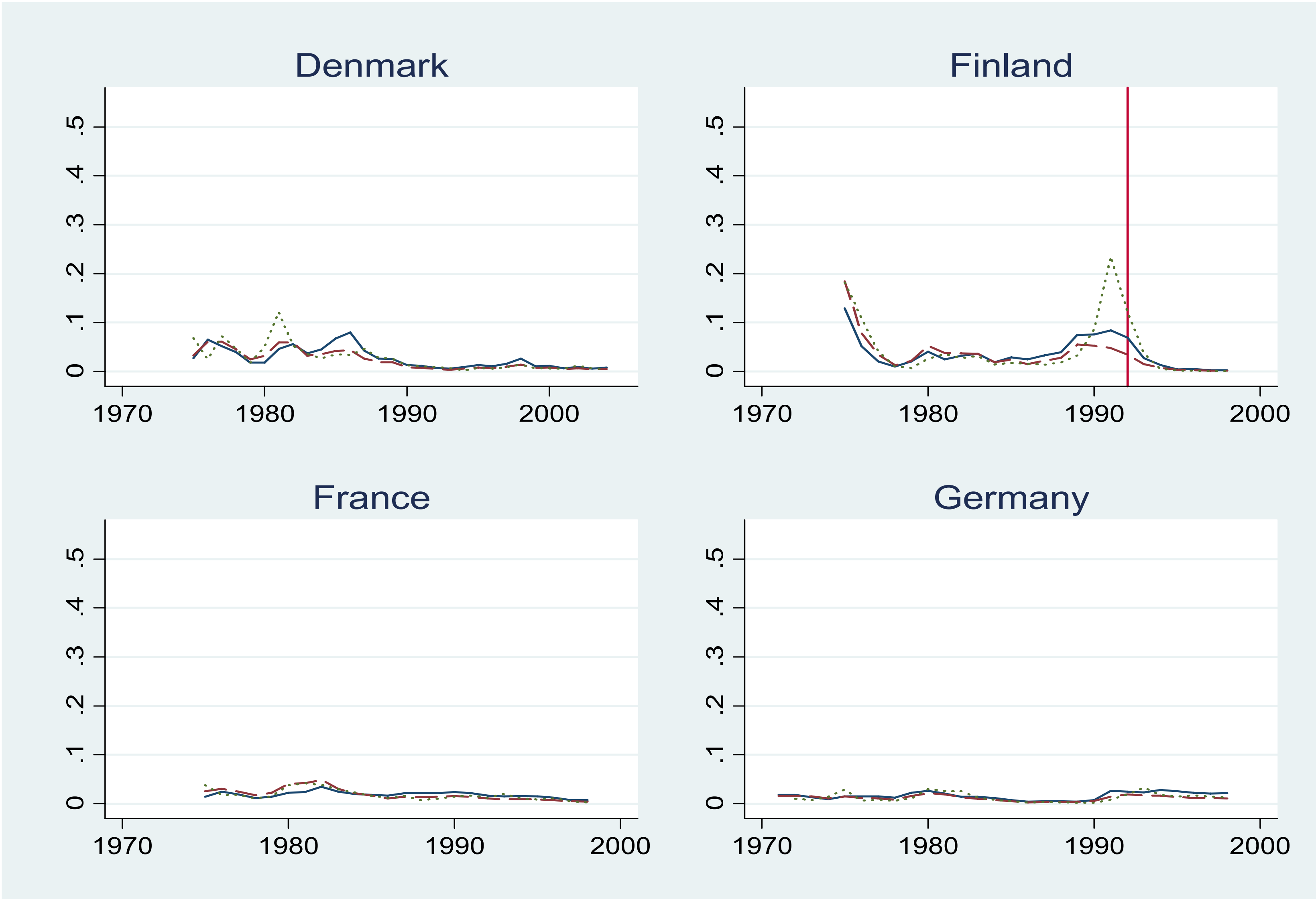

Figure 1 (cont'd.): Estimated Probabilities of 15 Percent Nominal Trade-Weighted Depreciation
Model 1, solid; Model 2, dashed; Model 3, dotted. (See Table 7.)

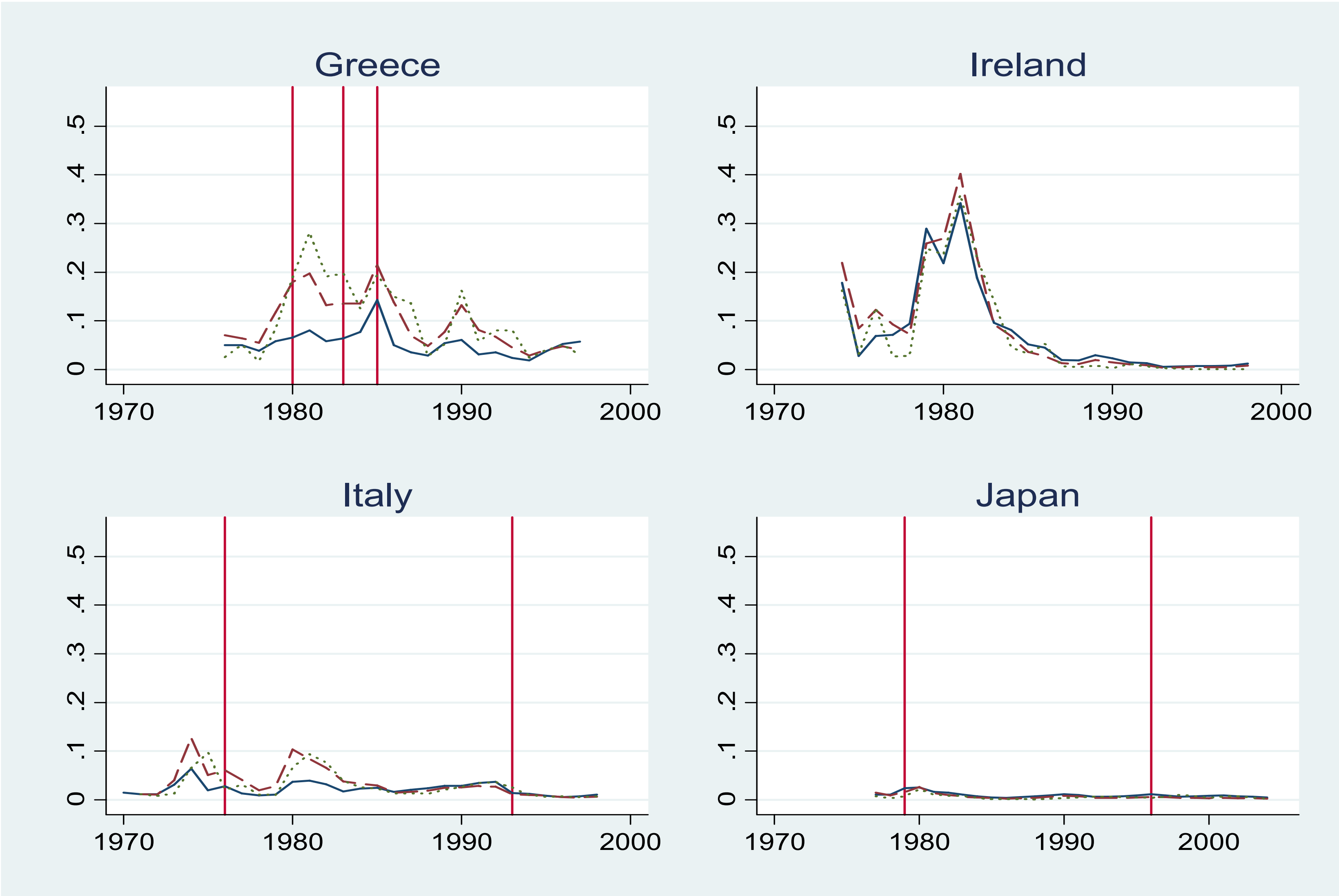

Figure 1 (cont'd.): Estimated Probabilities of 15 Percent Nominal Trade-Weighted Depreciation
Model 1, solid; Model 2, dashed; Model 3, dotted. (See Table 7.)

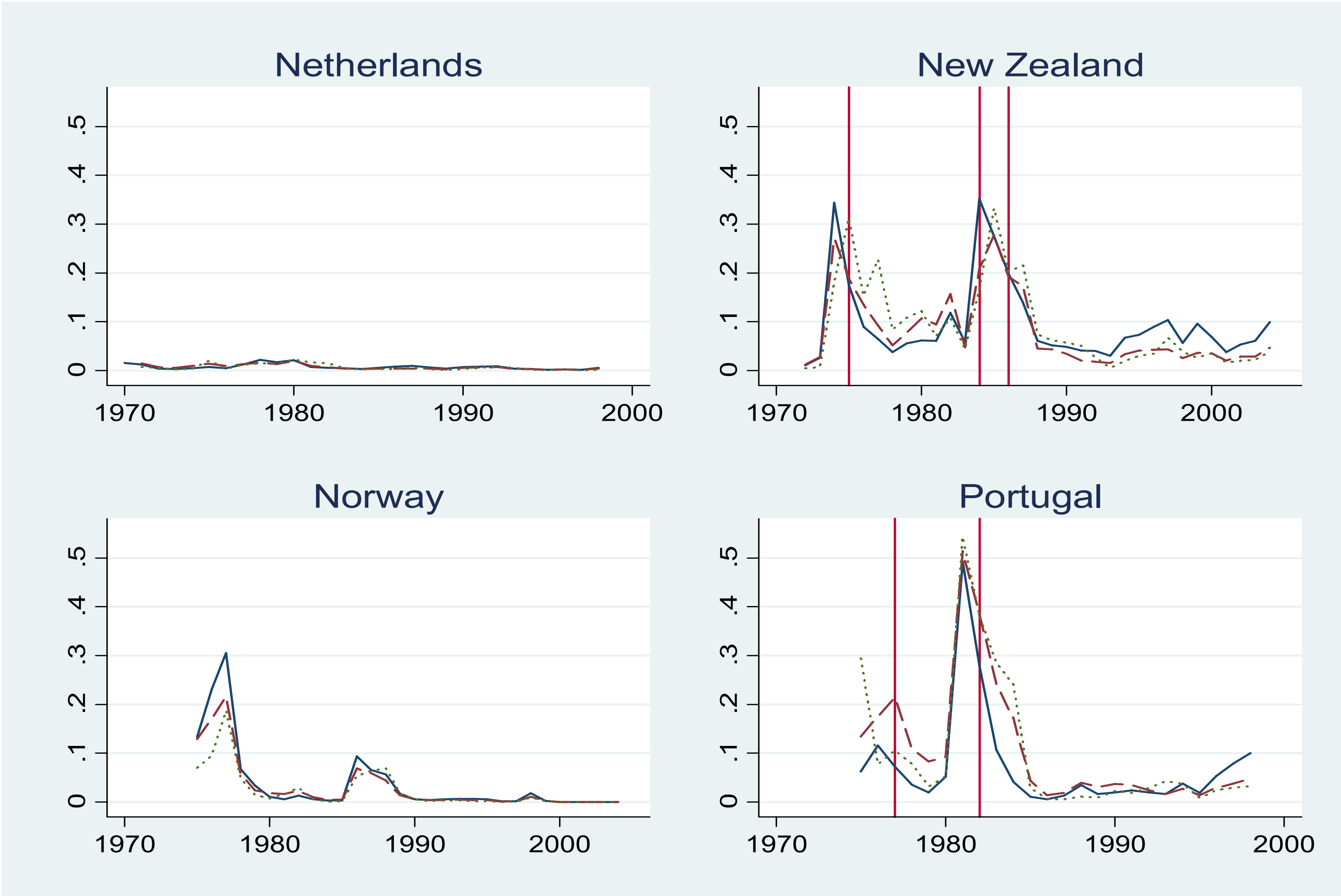

Figure 1 (cont'd.): Estimated Probabilities of 15 Percent Nominal Trade-Weighted Depreciation
Model 1, solid; Model 2, dashed; Model 3, dotted. (See Table 7.)

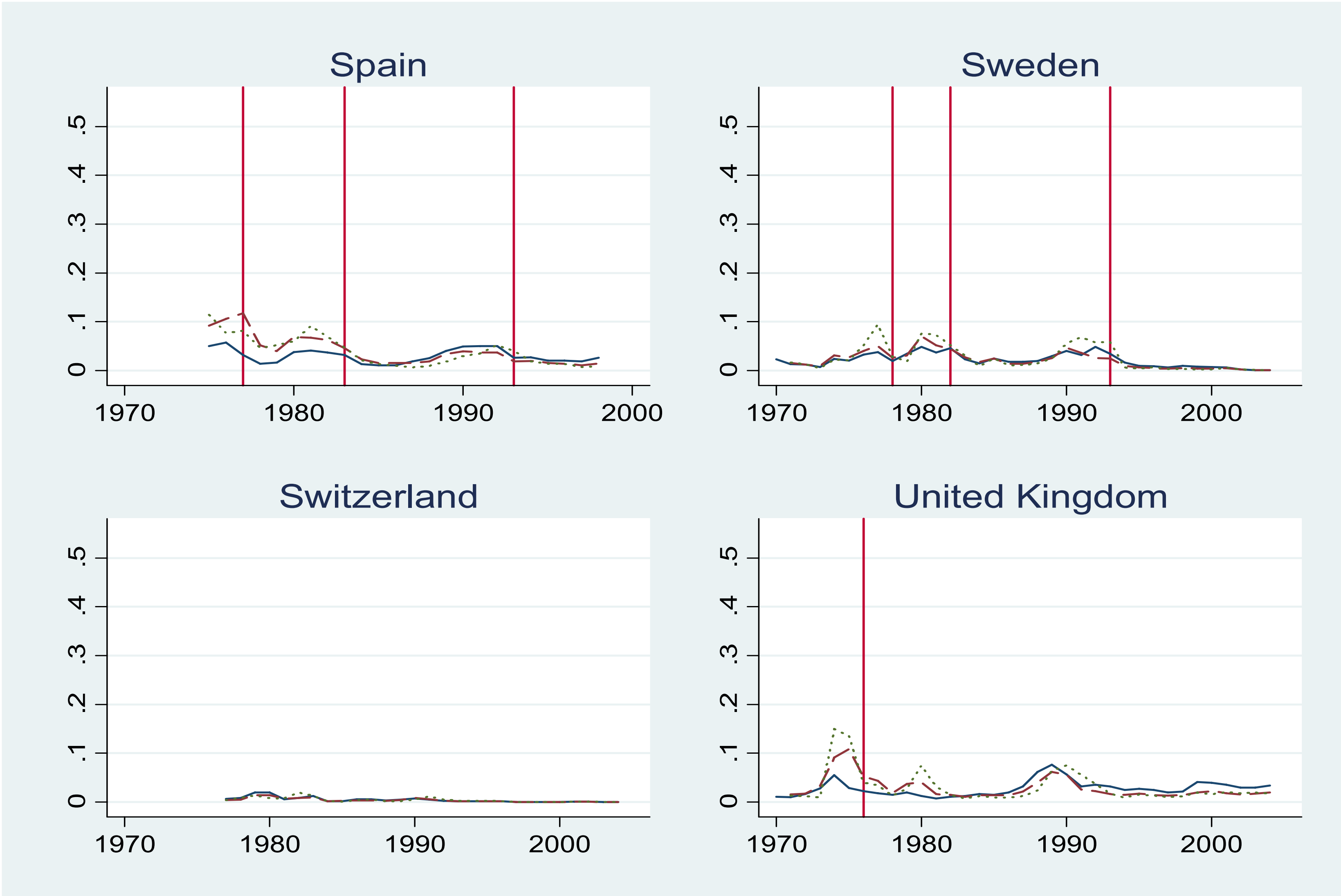

Figure 1 (cont'd.): Estimated Probabilities of 15 Percent Nominal Trade-Weighted Depreciation
Model 1, solid; Model 2, dashed; Model 3, dotted. (See Table 7.)

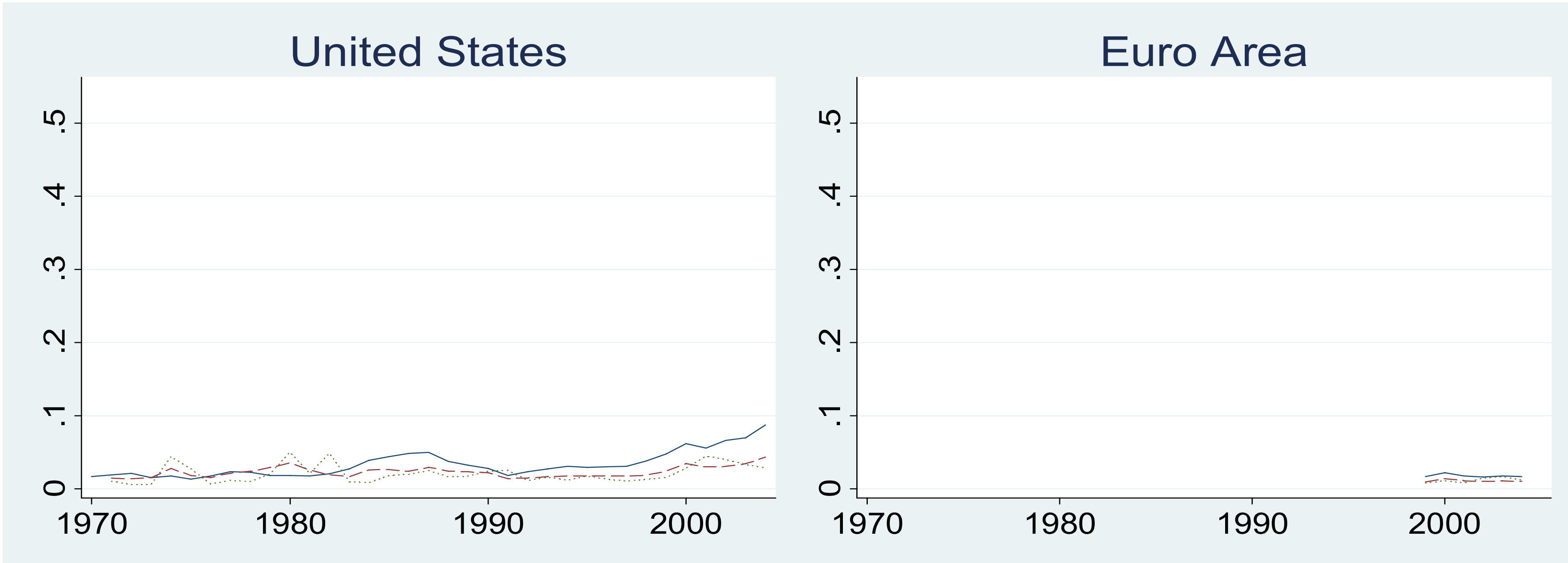

Figure 1 (cont'd.): Estimated Probabilities of 15 Percent Nominal Trade-Weighted Depreciation
Model 1, solid; Model 2, dashed; Model 3, dotted. (See Table 7.)