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Article (Accepted version)
(Refereed)

Original citation:
Plümper, Thomas and Neumayer, Eric (2011) *Fear of floating and de facto exchange rate pegs with multiple key currencies.* International Studies Quarterly, 55 (4). pp. 1121-1142. ISSN 0020-8833

DOI: 10.1111/j.1468-2478.2011.00686.x

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Available in LSE Research Online: April 2014

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Fear of Floating and de Facto Exchange Rate Pegs with Multiple Key Currencies

Published in:

International Studies Quarterly, 55 (4), 2011, pp. 1121-1142

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Author's note: Thomas Plümper is corresponding author (tpluem@essex.ac.uk). Equal authorship. We thank Kristina Bodea, Simon Hix, Lawrence Broz, Mick Laver, Jose Fernandez-Albertos, Robert Franzese and participants at the LSE Political Science and Political Economy seminar and at the ECPR standing group political economy's annual conference at IIIS, Dublin as well as anonymous referees for constructive comments. Data and a replication file for this article are available online at http://www.isanet.org/data_archive.html.

Electronic copy available at: http://ssrn.com/abstract=1276222

This paper adopts and develops the ‘fear of floating’ theory to explain the decision to implement a de facto peg, the choice of anchor currency among multiple key currencies and the role of central bank independence for these choices. We argue that since exchange rate depreciations are passed through into higher prices of imported goods, avoiding the import of inflation provides an important motive to de facto peg the exchange rate in import-dependent countries. This study shows that the choice of anchor currency is determined by the degree of dependence of the potentially pegging country on imports from the key currency country and on imports from the key currency area, consisting of all countries which have already pegged to this key currency. The fear of floating approach also predicts that countries with more independent central banks are more likely to de facto peg their exchange rate since independent central banks are more averse to inflation than governments and can de facto peg a country’s exchange rate independently of the government.

Electronic copy available at: http://ssrn.com/abstract=1276222

Political economists argue that the choice of a fixed exchange-rate regime is driven by two main motivations (see, for example, Broz and Frieden 2006): By pegging their own currency to an 'anchor currency', governments can hope to 'borrow' the low inflation credibility of the anchor currency, which may help to fight domestic inflation. This is not the only positive consequence: a fixed exchange-rate also reduces the exchange-rate risk for internationally operating corporations, which reduces transactions costs and facilitates trade and foreign direct investment. At the same time, however, pegs also have adverse consequences. A peg with narrow bands largely reduces monetary policy autonomy and, especially for countries that peg to keep inflation at bay, increases the risk of a severe exchange-rate overvaluation.[1]

Recently, Calvo and Reinhart (2002) have argued that countries may prefer stable exchange-rates[2] for a third reason: they reduce the volatility of the inflation rate and prevent

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[1] This can be derived from two complementary theories of exchange-rate regime choice known as time inconsistency theory and optimal currency area (OCA) theory, which are not the only, but the most popular of existing approaches. We discuss these theories in the discussion paper version of this manuscript in much greater detail (Plümper and Neumayer 2009), whereas here for space constraints we can only briefly summarize the literature and refer to the main contributions. Time inconsistency theories draw on the seminal paper of Frieden (1991), but also on Frieden (2002), Frieden, Ghezzi and Stein (2001), Frieden, Leblang and Valev (2008), Broz (2002), Bernhard, Broz and Clark (2002), Clark, Reichert, Lomas and Parker (1998), Clark (2002), Bernhard and Leblang (1999), Keefer and Stasavage (2002, 2003), Hallerberg (2002), and Bearce and Hallerberg (2008). See Broz and Frieden (2001, 2006) and Bernhard, Broz and Clark (2002) for a broader discussion. For OCA theories of exchange rate pegs, see Mundell (1961, 1962), Bayoumi and Eichengreen (1998), and Berger, Jensen and Schjelderup (2001). Eichengreen and Flandreau (1998) and Meissner and Oomes (2009) use OCA arguments to explain the choice of anchor currency. See Willett (2003) and Obstfeld, Shambaugh and Taylor (2005) for an overview and a historical discussion.

[2] Throughout the paper we use the terms de facto exchange-rate pegs and de facto exchange-rate stabilization quasi-interchangeably. A referee pointed out that such usage may seem at odds with conventional usage of the terms in the existing literature. It is of course possible to define de facto exchange-rate pegs and exchange-rate stabilization such that both terms have mutually exclusive meanings. In practice, however, this distinction becomes rapidly blurred. With de facto pegs, no central bank officially commits itself to defend the peg which makes these pegs virtually indistinguishable from extended periods of de facto exchange rate stabilization.

inflationary pushes that come with nominal exchange-rate depreciations. Since importing corporations pass-through exchange-rate fluctuations to domestic consumers and other corporations (Shambaugh 2008), governments and central banks have an incentive to stabilize or peg the exchange-rate in order to keep the negative consequences for the real economy at bay.

We augment the 'fear of floating approach' and thereby contribute to political economy explanations of exchange-rate regime policies in four important ways: first, we argue that 'fear of floating' not only explains exchange-rate stabilization, it also explains the choice of the anchor currency. Second, we argue that the choice of an anchor currency has network externalities. The more countries stabilize to a certain key currency, the higher the probability that other countries will also stabilize their exchange-rate to this key currency. When other countries de facto peg to a key currency, its imports from this key currency area increases. This logic explains why the number of key currencies remains small. Third, we maintain that the fear of floating approach changes the perspective on exchange-rate pegs. While the currently most popular time-inconsistency and optimal currency area (OCA) approaches perceive pegs as a signaling device with which governments seek to influence the behavior of economic agents, signaling is irrelevant in the fear of floating approach, in which only exchange-rate stabilization matters. As a consequence, the fear of floating approach focuses on de facto peg decisions (as it is usually called in the literature) or on exchange-rate stabilization (as we prefer to call it) rather than on de jure pegs, which are better explained by the time inconsistency and the OCA theories. Finally, our augmented version of the fear of floating approach sheds light on exchange-rate stabilization to a 'currency basket', which results from countries trading about equally with different currency areas. Though historically not many countries officially pegged to currency baskets, exchange rate stabilization to a currency basket cannot easily be explained by either the time inconsistency or the OCA approaches to exchange-rate policies.

Clearly, our research not only relates to the small but rapidly growing literature on 'fear of floating', it also contributes to political economy explanations of exchange-rate regime choice and

it adds to the evolving debate on policy signals and credibility. Using the effect of exchange rate pegs on inflation, Guisinger and Singer (2010) argue that governments can influence economic subjects more when a political signal, whose credibility is in doubt, is accompanied by a factual policy supporting the signal. Our argument rests on the notion that using pegs to signal is costly because governments put their credibility at risk when they do not deliver what they have signaled. Thus, governments prefer not to send this signal when the peg aims at preventing the import of inflation rather than at borrowing credibility or at signaling exchange-rate stability to traders and investors. Since governments would not send a potentially costly signal unless they have incentives to do so, the fear of floating approach clearly predicts de facto pegs while the causal mechanism suggested by both the time inconsistency and the optimal currency area approaches to exchange rate policies requires announced pegs and thus de jure pegs. In other words, if governments do not announce the peg but stabilize the exchange-rate, they are not very likely to have the motives purported by the traditional approaches. Likewise, if governments announce a peg, fear of floating cannot be their only motive, but the desire to prevent the import of inflation may still matter. Our argument is consistent with Guisinger and Singer's (2010), and – we believe – both arguments appropriately describe the political logic of signals in general but also of peg announcements in particular.

It follows that our paper identifies a third motivation for exchange rate stabilization. Without doubt, the existing literature identifies important incentives and trade-offs in the choice of an exchange-rate regime. Yet, we maintain that even a combination of the two theories does not provide a complete account of the logic of exchange rate regime choices in at least three respects: First, simply because sometimes countries peg to foster trade or to borrow monetary policy credibility does not mean that other monetary authorities cannot peg for another reason: to avoid the import of inflation caused by a depreciation of their currency. Like others before us (Calvo and Reinhart 2002; Levy-Yeyati and Sturzenegger 2005; Alesina and Wagner 2006), we thus argue that 'fear of floating' provides a third motive for exchange-rate stabilization. In this

additional account, the desire to keep inflation low increases the likelihood of a de facto exchange rate peg. However, while time inconsistency theories assume that governments borrow credibility, the fear of floating theory suggests that governments 'fear' an increase in inflation when the currency depreciates against the currencies of trading partners. And similar to the optimal currency area theory, the fear of floating approach suggests that countries peg to currency of the main trading partner. However, rather than pegging to signal the absence of an exchange rate risk to exporters, importers and investors, the fear of floating approach suggests that monetary authorities de facto peg to the currency of the main import partner (or partners) because a depreciation to these currencies would have the largest effect on the inflation rate (for a formal model see Plümper and Troeger 2008). Importantly, while there are other, and possibly superior, means to overcome time inconsistency problems (for example, granting full independence to the central bank) and other policies available for stimulating trade and investment (abolition of barriers to trade and capital flows), no practical policy alternative to exchange rate stabilization and de facto pegs allows governments and central banks to prevent the import of inflation.

Second, the two more established popular theories often fail to correctly predict the choice of anchor currency. For example, if governments just wanted to borrow external credibility to overcome domestic time inconsistency problems, they have potentially better options than choosing the relatively high inflation and high volatility US dollar as anchor currency. From a time inconsistency perspective, for example, the Swiss Franc and the Deutsche Mark certainly appear to be preferable anchor currencies. Similarly, countries often peg their currency to an anchor despite lack of output synchronicity with the issuing country and the relevant key currency area, which goes against optimal currency area theories.

Third, the two more established popular theories fail to offer a convincing explanation why governments sometimes peg without announcing the peg decision. Indeed, both theories model pegs as signals with which governments intend to change the behavior of private agents. In the case of time inconsistency theories, governments announce a peg decision to influence the

inflation expectations of economic subjects while OCA theories predict an official peg announcement because governments intend to signal a decline in exchange-rate risk to economic subjects. Yet, unannounced de facto pegs, as implemented by Canada between 1994 and 1998 and the UK from the Euro introduction to 2008, when the global financial crisis made a defense of the peg too costly for the Bank of England, are quite common. Their sheer existence would already suggest that existing theories cannot fully capture all motives for pegging. Contrary to existing accounts, our theory is consistent with unannounced pegs since monetary authorities merely seek to prevent an inflationary effect of exchange-rate depreciations. Therefore, while existing theories predict and explain official or de jure pegs, the fear of floating theory explains and makes predictions on unannounced or de facto pegs.[3] Our theory thus provides an explanation for Hainmueller and Simmons' (2009) finding that established theories are better suited to explain the choice of de jure than the choice of de facto pegs.

The next section describes the fear of floating approach toward exchange rate regime choice and develops the predictions of our theory. In the empirical part, we describe the data sources and estimation technique in some detail. We conduct two types of analyses: Employing multinomial logit estimations for 106 countries over the period 1974 to 2005, we assume that countries either uniquely peg to a single key currency or let their currency float. For this type of analysis, we code our own proxy for de facto pegs to multiple key currencies based on a persistently high correlation of the value of the currency of the potentially pegging country with the value of the key currency. While this analysis has the advantage of being relatively close to previous studies of de jure pegs, the fear of floating approach is also consistent with countries

3 In recent years, many political economists have turned their attention from de jure pegs (Frieden 1991; Bernhard and Leblang 1999; Bernhard, Broz and Clark 2002; Keefer and Stasavage 2003) to de facto pegs (Levy-Yeyati and Sturzenegger 2005; Hallerberg 2008). Simmons and Hainmueller (2008) show that models which explain de jure pegs perform poorly when studying de facto pegs. This paper argues that results differ because political incentives to implement a de jure peg differ fundamentally from reasons to choose a de facto peg.

stabilizing their exchange-rate to multiple key currencies simultaneously. In this second analysis we thus estimate seemingly unrelated regression models, in which we exploit the full variation in correlation among currencies. We find support for our theory in both types of analysis and we use various robustness tests to demonstrate that empirical evidence also supports our theory when we use alternative, but plausible, model specifications.

Fear of Floating and Exchange Rate Regime Choice with Competing Key Currencies

We develop our theory of exchange rate regime choice with competing key currencies in four steps. Drawing on the 'fear of floating' literature (Calvo and Reinhart 2002) and especially on the monetary policy model suggested by Plümper and Troeger (2006, 2008), we provide an additional argument for exchange rate stabilization: preventing the import of inflation. We then augment the fear of floating approach to demonstrate how this framework can be used to make predictions not only on the decision to peg but, more importantly, on the choice of anchor currency. Finally, we show that our theory can explain the existence of de facto pegging decisions in the absence of a de jure peg, whereas according to traditional theories countries should always prefer de jure pegs. In order to discriminate between time-inconsistency and fear of floating approaches, we discuss the role of central bank independence.

The fear of floating approach loosely builds on the standard workhorse model of political business cycles with predominantly rational expectations. Governments face a loss function in which both unemployment and inflation reduce government support by politically relevant actors, which we call constituents. Under normal conditions, governments can use monetary policy to stimulate the economy, but since individuals have predominantly rational expectations, the effect of stimulation vanishes quickly or may even be fully offset by economic subjects' rational anticipation. If, however, an unexpected shock occurs governments can reduce the interest rate or use other expansionary monetary policies to partly offset the adverse consequences, reduce the social costs of the shock and stabilize consumption and employment at the cost of a moderately

rising inflation rate (Giavazza and Pagano 1988; Persson and Tabellini 2000). In this case, economic subjects do not fully adjust their inflation expectations.

The degree to which monetary policy authorities offset the economic shock depends on their conservatism. More conservative authorities respond less to an economic shock than less conservative ones. If the monetary authority rests with an independent central bank then the response to economic shocks remains moderate (Barro and Gordon 1993; Bernhard 1998). The model predicts that in the short run and with conservative monetary policy authority, the volatility of inflation remains relatively low and the volatility of consumption relatively high. With significantly less conservative monetary policy authorities inflation becomes more and consumption less volatile. Starting from this generally accepted microfoundation, the fear of floating approach explains why and under what conditions governments and independent central banks opt for stabilizing the exchange rate with key currencies.

Choosing to Peg

Following from our assumption of opportunistic government behavior, monetary policy authorities stabilize exchange rates because a currency appreciation weakens domestic producers of tradable goods and services while a depreciation makes consumers worse off as prices of imported goods rise. The recent British experience illustrates that depreciation-induced imported inflation is a real phenomenon of significant size. After the outbreak of the financial market crisis in autumn 2008, the Pound depreciated approximately 30 percent against the Euro. Unless European producers hedge exchange rate risks over a long period of time, they suffer either a loss in profitability or in competitiveness in the British market. If they do not adjust the prices of their goods and services in Pounds, profitability declines. If they increase the Pound prices of their goods and services, they lose market share to their British competitors. Thus, the extent to which importing producers pass-through a depreciation of the importing country's currency depends on the competitiveness of markets, the maturity of hedging contracts, and on whether producers

perceive the devaluation as short-term (in which case they may just leave profits in the foreign currency and repatriate them after the foreign currency appreciates again). In the British case, the effect of the Pound depreciation on the UK inflation rate proved to be considerable. Instead of falling further, inflation jumped up to 3.2% in February 2009, an effect which Mervyn King, governor of the Bank of England, attributed to 'pass-through of the exchange rate depreciation to consumer prices' (King 2009) in his exchange of letters with Chancellor Alistair Darling. As the British example demonstrates, the strength of the effect is far from negligible even in a relatively large economy. Yet, depreciation-induced inflation becomes an even greater problem to more import-dependent countries (Calvo and Reinhart 2002; Plümper and Troeger 2008).[4] Monetary authorities of these countries are unlikely to ignore the effects of a depreciation on inflation and thus stabilize the exchange rate to key currency countries and their areas from which they import a significant amount of goods and services.

Thus, existing approaches and our fear of floating based theory make different predictions on what motivates governments to peg their exchange rate, but these theories are not mutually exclusive. If the fear of floating theory is correct it does not follow that the time-inconsistency or optimal currency area approaches are wrong. It just means that governments have more to win by

4 The effect of a currency depreciation on domestic inflation roughly follows a simple formula: depreciation times exchange rate pass-through times imports from the key currency country divided by the domestic country's GDP. Assume the country's exchange rate depreciates by 10 percent, of which 80 percent are passed-through by importers to consumers and imports from the key currency country sum to 10 billion Dollars while the country's GDP is 50 billion Dollars. In this case, and keeping everything else including prices of imports expressed in the foreign currency, the exchange rate to other currencies and monetary policy constant, the inflation rate increases by 0.1 x 0.8 x 0.2 = 0.016, that is, 1.6 percent. In reality, the inflationary effect will often be smaller since changes in relative prices affect consumer behavior. Yet, we thank an anonymous reviewer for pointing out to us that the effect may also be larger since domestic producers may also adjust their domestic prices. Importantly, the incentive to stabilize the exchange rate still increases with the imports to GDP ratio and the pass-through rate. See Hausmann, Panizza and Stein (2001), Shambaugh (2008), Campa and Goldberg (2005) and Devereux, Lane and Xu (2006) for evidence in support of the exchange rate pass-through hypothesis.

stabilizing the exchange rate than previous approaches have identified. In addition to gaining monetary policy credibility and trade and investment facilitation, the prevention of a depreciation-induced import of inflation also provides an incentive for countries to stabilize the exchange rate and the incentive is stronger the more open the country to imports.

The Choice of Anchor Currency with Competing Key Currencies

With more than one potential anchor currency, monetary authorities also need to choose one among competing key currencies. In making this decision, governments face a further trade-off, which adds to the Mundell-Fleming trade-off between monetary policy autonomy and a stable exchange rate (Mundell 1961, 1962): If governments stabilize the exchange rate against one key currency, their exchange rate to other key currencies will become more volatile (unless of course the exchange rates between key currencies are stable). Thus, the choice of an anchor currency is not only influenced by absolute import dependence. Rather, it also depends on the relative dependence on imports from multiple key currency countries. The larger the share of imports from one key currency country, the more likely the country pegs to this currency, because the import of inflation will be strongest if the country's currency were to depreciate relative to this key currency. Accordingly, the fear of floating theory predicts that countries peg to the key currency from which they import the most goods and services. For example, Canada and Mexico are more likely to peg to the Dollar, while Hungary and Poland likely implement a Euro peg.

Ignoring the case of the 'transferable ruble' and its role in Council of Mutual Economic Assistance trade relations, only four key currencies served as main anchor currencies for sovereign countries since 1973: the US Dollar, the British Pound, the French Franc, and the Deutsche Mark, with the latter two currencies now being united in the Euro. No country pegged to the Japanese Yen or the Swiss Franc, two countries with historically low inflation rates. That no country ever pegged officially to the Swiss Franc, a role model of monetary policy stability with

low inflation rates and low volatility suggests that time inconsistency theories cannot explain the choice of anchor currency.

Table 1. De facto Pegs to Key Currencies across Time

Year:	1975	1980	1985	1990	1995	2000	2005
threshold: 0.9							
Dollar	30	45	56	46	43	42	57
Franc	17	19	14	14	15	n.a.	n.a.
Pound	19	2	1	0	0	0	0
D-Mark	19	6	12	8	8	n.a.	n.a.
Euro	n.a.	n.a.	n.a.	n.a.	n.a.	38	36
Total:	85	72	83	68	66	80	93
threshold: 0.6							
Dollar	35	52	76	60	52	54	65
Franc	19	24	15	16	20	n.a.	n.a.
Pound	22	4	0	0	0	0	0
D-Mark	21	10	14	12	13	n.a.	n.a.
Euro	n.a.	n.a.	n.a.	n.a.	n.a.	41	40
Total:	97	90	105	88	85	95	105

Over the period 1973 to 2005, the Dollar accounted for between 35 and 75 percent of all pegs, with low points at the start of the post-Bretton Woods era and at the beginning of the 1980s (see Table 1).[5] However, in most years the majority of pegging countries preferred the Dollar as anchor currency. This dominant role appears as anomaly given that the United States' share of world exports never exceeded 16 percent during this period and falls short of German, European, Japanese, and recently also of Chinese shares of world exports. Yet, the dominance of the Dollar as anchor currency was at least partly inherited rather than earned. Since many countries maintained a Dollar peg despite the collapse of the Bretton Woods regime, imports from the Dollar area were always far larger than imports from the US. If a country's exchange rate depreciates vis-à-vis the Dollar it depreciates against currencies pegged to the Dollar. To the

5 See section 3 for a definition of what constitutes a de facto peg. We computed different thresholds of currency value correlations, which are indicated in the figure as the 0.6 and 0.9 thresholds, respectively.

extent that they import from those countries the effect of a depreciation against the Dollar on inflation goes beyond imports from the US.

More generally, the incentive for countries to peg the exchange rate to a key currency thus does not solely depend on the relative size of imports from the key currency country but also on imports from countries which have already pegged to the key currency. This simple logic makes peg decisions contagious: the more countries peg to a key currency, the more attractive the same peg becomes for other countries as well. In a world of contagious pegging, smaller anchor currencies need to make way and the number of key currencies declines as the experience of the British Pound shows. Thus, the number of anchor currencies must necessarily be small and becoming a new key currency turns out to be difficult for any currency.

Beyond Unique Pegs: Exchange rate Stabilization to Multiple Key Currencies

When countries import about equally from different key currency countries and their respective areas, exchange rate stabilization to one key currency may increase the import of inflation from other key currency areas. Our theory predicts that in these cases, governments either choose not to stabilize the exchange rate or to peg to a basket of currencies or, most likely, to de facto stabilize their exchange rate to multiple key currencies, which allows governments to continuously minimize the import of inflation and to respond to exchange rate fluctuations between the key currencies.

For many countries, a basket peg brings little advantage over a single currency peg. For some other countries a peg to a currency basket, though difficult to maintain, is clearly desirable. For example, Iceland used to peg to a basket of currencies, in which the Dollar and the European Currency Unit, an artificial basket of European currencies dominated by the D-Mark, entered with weights that were allowed to change over time. As Iceland's import dependence on European countries grew and its dependence on the US decreased, the official basket peg increasingly resembled a peg to the D-Mark and the Euro (Levy-Yeyati and Sturzenegger 2005), until the

recent financial market turmoil sent the Icelandic Krona into free fall. Similarly, Ireland historically pegged to the Pound, until the country joined the European Monetary System in 1979. The decision to introduce the Euro then marked the final step of its exchange rate policies, which went from Pound peg, to a European currency basket dominated by the D-Mark to the Euro. This development was associated with and, according to our theory, partly caused by a growing relative dependence on imports from continental Europe and a declining dependence on imports from the UK.

These examples show that exchange rate stabilization to multiple key currencies requires some flexibility to respond to fluctuations between the key currencies and to changes in economic dependence. In fact, exchange rate stabilization to multiple key currencies requires continuous adjustment rather than a dichotomous peg-no peg decision. As a consequence, officially announced de jure pegs to key currency baskets should be relatively rare, which concords with the reality of exchange rate policies. However, monetary authorities can de facto stabilize the exchange rate to a basket (Levy-Yeyati and Sturzenegger 2005). The fear of floating approach suggests that countries simultaneously de facto stabilize their exchange rate to multiple key currencies if they are import-dependent on multiple key currency countries and their respective areas. We therefore also go beyond analyzing unique pegs and test our theory based on the variation in exchange rate movements between a country's currency and all the key currencies.

De Facto Pegs and the Role of Central Bank Independence

The 'fear of floating' literature explicitly addresses the phenomenon "that countries that say they allow their exchange rate to float mostly do not – there seems to be an epidemic case of 'fear of floating'" (Calvo and Reinhart 2002: 379). For example, the Canadian government claims that the country has implemented a floating exchange rate since the early 1970s, even though the country implemented the role-model of an unannounced de facto peg to the US Dollar until early 1999. The Bank of England similarly stabilized the exchange rate at approximately 0.65 Pounds per

Euro (±10 percent) between the Euro introduction and the outbreak of the financial market crisis in November 2008. Yet, neither the Canadian nor the UK government officially announced a de jure peg during the relevant time period.

With governments in fear of floating, pegging on a de facto basis remained popular amongst countries even after the collapse of the Bretton Woods system. As shown in Figure 1, we find that on average around 50 percent of independent countries de facto peg their currency.

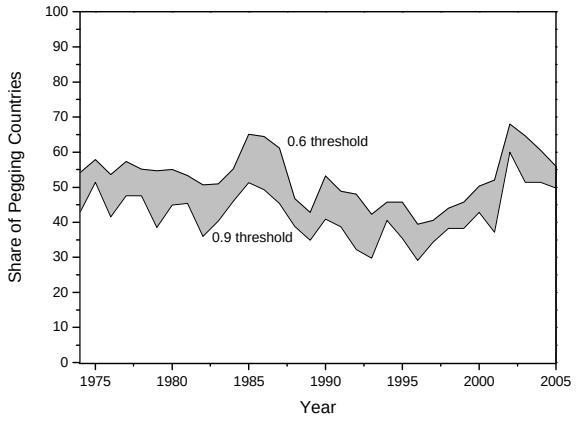

Fig 1. Share of Countries with De Facto Pegs, 1974 to 2005.

According to our measure, pegging appeared most attractive in the mid-1980s and in the early 2000s. While in the mid-1980s the boom was mainly caused by more governments pegging to the Dollar, the recent increase almost exclusively stems from Eastern European countries choosing the Euro as anchor currency. Using data from Bearce and Hallerberg (2008) on de jure pegs, we find that in 40 (35)% of observations countries had both de jure and de facto pegs, while in 24 (29)% of cases they had neither (figures in parentheses refer to the higher of our de facto peg threshold). Interestingly, however, in 14 (8)% of observations countries had a de facto peg without officially announcing a de jure peg, while in 22 (28)% of cases they officially announced a de jure peg, but did not live up to it in terms of de facto pegging their exchange rate. Not surprisingly, then, the de jure peg and our de facto peg variables are only modestly correlated at .26 and .32 for the lower and higher threshold of de facto pegs, respectively.

Both time inconsistency and OCA theories cannot explain why monetary authorities de facto stabilize their exchange rate without officially announcing this decision.[6] To change the inflation expectations of individuals, monetary authorities must announce and credibly commit to their peg decision if they wish to overcome the domestic time inconsistency problem. To foster trade and investment, monetary authorities must re-assure economic agents that their trading and investment decisions are not subject to exchange rate fluctuation risk. In both cases, the causal mechanism crucially depends on the credible announcement of an exchange-rate peg.

The fear of floating approach, in contrast, explains why some governments may prefer de facto over de jure pegs. Governments face a trade-off between avoiding the import of inflation (when the currency depreciates) and the desire to maintain monetary policy autonomy to limit the effects of asymmetric economic shocks. Thus, in the short run, governments have an interest in stable exchange rates to prevent the import of inflation caused by an exchange rate depreciation. For this, an officially announced peg is not necessary. De facto stable exchange rates suffice to prevent the import of inflation. Countries may choose to officially announce an exchange rate peg for other reasons, for course.

The fear of floating approach also predicts that central bank independence increases the probability of a de facto peg. Countries with truly independent central banks should have a stronger anti-inflationary bias than countries in which governments control dependent central banks (Barro and Gordon 1983). While central banks, independent or not, cannot make de jure peg decisions without the consent of the government, independent central banks can de facto peg or stabilize a country's exchange rate through adequate monetary policy measures independently of the government.

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[6] Likewise, Guisinger and Singer (2010) recently argued that "a government's attempt to keep prices stable by implementing a fixed exchange rate is less effective if it does not declare an official exchange rate target." There argument is perfectly compatible to ours, because we argue that governments may want to stabilize the exchange rate even though their monetary policy is 'credible'.

This prediction stands in contrast to time inconsistency theories (Broz 2002; Bernhard, Broz and Clark. 2002; see the discussion in Bodea 2010). These theories perceive a fixed exchange rate and central bank independence as functional equivalents and substitutes. Either institution should be enough to deliver low inflation. These theories should thus predict a negative effect of CBI on the probability of pegging a country's fixed exchange rate: a country which has a truly independent central bank does not additionally need to peg its exchange rate. This difference in predictions allows us to empirically discriminate between time inconsistency theories and fear of floating theories of exchange rate policies.

Summary

The fear of floating theory does not simply reformulate predictions of the two more established theories of exchange rate regime choice. Not only does it introduce a previously unexplored political incentive for choosing an exchange-rate regime, it also allows us to derive predictions which differ from the predictions derived from time inconsistency and OCA theories, as Table 2 illustrates. To start with, while existing theories are most suited to explain de jure pegs, the fear of floating approach explains de facto peg decisions. Our theory predicts that monetary authorities in more import dependent countries have larger incentives to de facto peg or stabilize their exchange rate. These countries are also more likely to choose the currency of their main trading partner. This stands in contrast to time inconsistency theories, which would predict the choice of any key currency with a proven record of low inflation. At first glance, predictions of our theory appear similar to the ones of OCA theories, but in the fear of floating approach monetary authorities do not peg to stimulate trade and investment. As a consequence, the import dependence hypothesis of the fear of floating theory does not depend on the existence of similar macroeconomic conditions and business cycle synchronicity with key currency countries. Finally, countries with central bank independence are more likely to choose a de facto peg or stabilize their exchange rate, an influence other theories do not predict.

Despite these differences, the fear of floating approach must be understood as complementing previous approaches, not replacing them. The political incentive to prevent the import of inflation caused by a depreciation supplements the list of advantages identified by the time inconsistency and the OCA approach. Like others before us (Calvo and Reinhart 2002; Levy-Yeyati and Sturzenegger 2005; Alesina and Wagner 2006; Shambaugh 2008, Plümper and Troeger 2008) we have argued that preventing the import of inflation via pass-through of exchange rate depreciations provides an important *additional* incentive to relatively open countries to peg or stabilize their exchange rate. Since the incentives identified by the three theories are complementary to each other, testing the theories against each other would not make much sense. Nor would it be possible to fully do so. For example, the very high correlation between trade and imports would cause an identification problem if one wanted to test the trade-dependence hypothesis of OCA and the import-dependence hypothesis of fear of floating approaches against one another. That a new theory partly makes predictions, which are difficult if not impossible to disentangle empirically from the predictions of an older theory, does not constitute a refutation of the newer theory or render it redundant. After all, two of the most admired theories in physics – Newton's theory of gravity and Einstein's relativity theory – face similar identification issues with respect to their empirical testing.

Table 2. A Comparison of Theories and Predictions

	time inconsistency theories	optimal currency area theories	fear of floating theories
de jure vs. de facto pegs	- de jure because officially announced pegs provide signal to economic subjects		- de facto because such pegs are easier to defend
peg decision	- high inflation	- trade dependence	- import dependence
choice of anchor currency	- any key currency with low inflation	- trade share with key currency country and key currency area - synchronicity of the business-cycle with key currency country (or key currency area) - similar macroeconomic conditions	- import share from key currency country and key currency area
relation to central bank independence	- functional substitutes: CBI reduces peg probability	(no prediction)	- complements: countries with independent central banks are more likely to de facto peg to fight inflationary pressures from imports

Data Sources and Operationalization

Researchers have suggested various classifications for de facto pegs among which the indices by Reinhard and Rogoff (2004) and Shambaugh (2004) are most prominent.[7] Reinhard and Rogoff (2004) classify an exchange rate regime as de facto peg if black market exchange rates exist, if monetary authorities announce a peg and if the exchange rate behavior accords with the announced peg decision. In contrast, Shambaugh (2004) focuses on the stability of the exchange rate to a potential anchor currency using narrow bands over "sufficient lengths of time" (Shambaugh 2004: 318) as the criterion to avoid coding errors caused by relatively calm periods and allowing for realignments.

We code our own de facto exchange rate peg variable based on the correlation of the value of a country's currency, expressed in Special Drawing Rights (SDRs), with any of the key currencies, also expressed in SDRs, using data from IMF (2007a) as source. We use two different thresholds. Our first operationalization of a 'de facto peg' requires that the country's currency is correlated above .6 for three consecutive years (the current and the two prior years) with a key currency. Using a correlation above .6 as the cut-off point for declaring a de facto peg may be regarded as too generous. For the second, alternative peg decision, we therefore use a correlation above .9 as the much more stringent cut-off point. The two peg variables are correlated at .84 with each other and more strongly correlated with Shambaugh's than with Reinhard and Rogoff's (2004) peg variable, but employing these alternative measures as dependent variable in our models does not substantively alter our results. Thus, we can replace our proxy with any currently available alternative without affecting the substantive results of our analyses. Still, as some point out, thresholds and cut-off points for defining pegs can make a difference in certain contexts

[7] Bubula and Otker-Robe (2002) suggest a fine-grained classification scheme that researchers often recode into a five category scheme (see Angkinand, Chiu and Willett 2009 and Chiu and Willett 2009). For our purpose, the time coverage of this index is too short and it does not identify the anchor currency to which countries peg either.

(Willett, Nitithanprapas, Nitithanprapas and Rongala 2005). Also, and perhaps more importantly, our theory is about exchange-rate stabilization rather than unique pegs. We therefore also estimate seemingly unrelated regression models, in which we use the full continuous correlation between countries currency and the key currencies as dependent variables.

We include two bilateral import dependence variables in the list of regressors. The first import variable measures the value of imports of goods and services from key currency countries divided by the GDP of the importing country.[8] The second import variable measures the imports from key currency areas, defined as the set of countries which have already pegged to a specific key currency. Of course, this variable is based on the above operationalizations of de facto peg. Ideally, one would want to adjust these import variables for potential differences in the rate of exchange rate pass-through, but lack of data prevents us from doing so. In addition, we do not argue that monetary authorities *respond* to exchange rate pass-through. Rather, we are saying that monetary authorities stabilize the exchange-rate to *prevent* pass-through.

The absence of a direct measure of CBI for a large group of countries over a long period of time renders a direct test of the effect of central bank independence on exchange rate regime choice difficult. We therefore use data from Dreher, Sturm and de Haan (2008) on the turnover rate of central bank governors – a widely used proxy variable in the literature (Cukierman and Webb 1995; Keefer and Stasavage 2003). Specifically, this variable measures the square root of the number of times the central bank governor has been replaced within the last 5 years, multiplied by -1 to make this a measure of central bank independence rather than dependence. The square root accounts for the concave nature of the relationship between turnover rate and central bank independence. Admittedly, this variable only approximates central bank independence. While a high turnover rate suggests large-scale government interference into the

[8] Imports data are taken from IMF (2007b) and Gleditsch (2001), while GDP data are sourced from World Bank (2007).

central bank's affairs, a low turnover rate need not imply the absence of such interference if the long-standing governor acts as an obedient servant of government orders such that the government sees no need to replace him or her. We include this variable for lack of a better alternative – direct measures of central bank independence typically exist only for single years and for a subset of countries, not for a large cross-sectional time-series sample.

In addition, we account for a number of confounding factors, which we define in detail in the appendix.[9] For example, time inconsistency theories suggest the inclusion of countries' history of high inflation periods to control for monetary authorities credibility in fighting inflation (Blackburn and Christensen 1989). The inclusion of variables measuring output asymmetry between a potentially pegging and each of the key currency countries follows the logic of optimal currency area theories. We also control for a country's economic size, democracy and per capita income. Bearce and Hallerberg (2008) suggest that small open democracies peg their exchange rate, while larger and less open democracies prefer to let it float. We account for this theory by interacting variables measuring democracy and economic size.

Temporal dependence likely exists in panel data analysis. Following Beck, Katz and Tucker (1998) we include two sets of cubic splines, for both peg and floating periods. Our sample covers 106 countries over the period 1974 to 2005, being restricted only by the availability of

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[9] The fear of floating literature also highlights the influence of sovereign foreign debt on exchange rate stabilization. With higher interest payments, governments have an incentive to overvalue their currency to reduce the share of debt service to total government revenues and to GDP. However, one has to keep in mind that countries need to 'earn' their debt service payments – preferably by maintaining a current account surplus, which is easier to achieve with an undervalued currency. Accordingly, the relation between foreign debt and monetary policy is hardly straightforward. Governments certainly have an incentive to minimize debt service in domestic currency, but they also need to avoid large current account deficits. In addition, data on the currency denomination of foreign debt is not available for a global sample and – more importantly – the preferred denomination of foreign debt may simply depend on the relative size of trade with key currency areas. In short, we cannot include currency denomination of foreign debts in our analysis but its inclusion in our model also does not seem warranted for theoretical reasons.

data. We start by estimating a multinomial logit model which assumes that a country can peg to only one of the key currencies, where the absence of a peg provides the baseline hazard.[10] We then additionally estimate a seemingly unrelated regression model employing the correlation among currencies as dependent variables. This research design models our argument that monetary authorities may prefer to stabilize their exchange-rates toward multiple key currencies rather than a single key currency (see section 2.3).

Unique De Facto Pegs and the Choice of Key Currency

Table 3 reports multinomial logit estimation results covering the years 1974 up to the year before the introduction of the Euro (1998), whereas Table 4 covers the period 1999 to 2005, both using correlations above .6 as cut-off point. Appendices 2 and 3 in Plümper and Neumayer (2009), the extended discussion paper version of this article, also show results using correlations above .9 as cut-off point. The results of our estimates, which we do not show here for space constraints, are fully robust to changing the de facto peg threshold. Significant coefficients mean that a higher value of the variable makes it more (positive coefficient) or less (negative coefficient) likely that countries peg to a key currency, relative to the base outcome of floating (no peg at all). Since the multinomial is a non-linear model, we also discuss the substantive effects of variables, which cannot be simply inferred from the coefficients, further below.

[10] Results are robust to using multinomial probit instead of logit.

Table 3. Multinomial logit results of exchange rate pegs to key currencies (1974-98).

	Franc	D-Mark	Pound	Dollar
imports from France [(a)]	107.0***	-27.28**	13.08	-14.26**
	(13.06)	(13.77)	(15.13)	(6.781)
imports from Germany [(a)]	-68.06***	13.86**	12.48	-21.69***
	(15.88)	(6.538)	(8.231)	(7.185)
imports from UK [(a)]	8.908	3.418	-4.511	-0.495**
	(13.74)	(3.747)	(2.976)	(0.223)
imports from USA [(a)]	-42.86***	-3.564	1.274***	0.292***
	(6.897)	(3.611)	(0.328)	(0.0956)
imports from Franc area [(a)]	44.32***	50.13***	-12.88	10.88
	(10.99)	(12.43)	(18.87)	(9.228)
imports from D-Mark area [(a)]	-7.003	34.78***	27.31***	1.120
	(7.272)	(7.223)	(9.515)	(3.904)
imports from Pound area [(a)]	27.43**	18.77	9.636	-26.97
	(10.91)	(19.24)	(11.70)	(27.65)
imports from Dollar area [(a)]	-51.36***	-22.58***	-65.17***	3.166***
	(6.670)	(7.244)	(12.15)	(1.020)
central bank independence	0.897***	0.608*	0.501	0.187
	(0.341)	(0.312)	(0.365)	(0.122)
high inflation history [(b)]	-0.886	-2.630**		0.495**
	(1.407)	(1.179)		(0.232)
output asymmetry with France	0.111	-0.0404	-0.522	0.343***
	(0.301)	(0.273)	(0.384)	(0.111)
output asymmetry with Germany	0.518***	-0.293	0.200	-0.0363
	(0.161)	(0.187)	(0.149)	(0.0592)
output asymmetry with UK	-1.124**	-0.497	0.347	-0.0165
	(0.465)	(0.457)	(0.570)	(0.144)
output asymmetry with US	0.524	0.755*	0.0910	-0.211*
	(0.319)	(0.417)	(0.550)	(0.120)
log gdp	-0.0745	0.929***	-0.670***	0.150***
	(0.116)	(0.224)	(0.216)	(0.0466)
level of democracy	-0.727**	2.139***	-0.0475	0.496***
	(0.342)	(0.481)	(0.670)	(0.119)
democracy * log gdp	0.0375**	-0.0829***	0.0165	-0.0218***
	(0.0147)	(0.0193)	(0.0306)	(0.00498)
per capita income	-0.0000337	0.0000784**	-0.000163***	-0.0000285*
	(0.0000421)	(0.0000310)	(0.0000585)	(0.0000156)
Observations	2042	2042	2042	2042
Pseudo R-squared	0.59	0.59	0.59	0.59

(a) divided by GDP of pegging country
(b) no country with high inflation history pegged to UK
Note: cubic peg splines, cubic non-peg splines and year dummies included

We find evidence for the predictions derived from our 'fear of floating theory'. Monetary authorities in more import-dependent countries are more likely to de facto peg their exchange rate. But such countries do not arbitrarily peg to any of the key currencies. Instead, they peg to the key currency from which they import most: higher dependence on imports from France and the Franc area, from Germany and the D-Mark area as well as from the US and the Dollar area, respectively, increase the probability of pegging to the Franc, the D-Mark and the Dollar,

respectively, and (in most cases) significantly reduce the probability of a peg to competing key currencies. Interestingly, higher imports from the Franc area also have a positive effect on the likelihood of an exchange rate peg to the D-Mark. France stabilized its exchange rate toward the D-Mark for many years during this period so that pegs to the Franc spilled-over to pegs to the D-Mark. It seems less obvious why higher imports from the UK or the Pound area do not provide an incentive to peg the exchange rate to the Pound. We thus conclude that the fear of floating theory contributes little to explaining the few instances of pegs to the Pound, but the same holds for other theories of exchange rate policies. Overall, however, we find broad support for the predictions of our theory that exchange rate pegs follow import flows for the major key currencies. Furthermore, in all estimates, greater CBI increases the likelihood of a peg decision, just as our theory predicts. This finding is significant for the Franc and the D-Mark, whereas the results remain insignificant at conventional levels for the Anglo-Saxon currencies. The estimation model performs fairly well in correctly classifying about 80% of exchange rate decisions.

In substantive terms, we find that an increase in key currency import dependence from half a standard deviation below to half a standard deviation above the median has the strongest effect on the likelihood of a peg to the French Franc, followed by the D-Mark and the Dollar. This increase in import dependence from France triples the predicted probability of a Franc peg, while simultaneously halving the probability of a D-Mark peg and lowering the probability of a Dollar peg by about one-fourth. An equivalent increase in import dependence from Germany raises the estimated probability of a peg to the D-Mark by slightly more than 50 percent, while halving the probability of Dollar peg. A one standard deviation increase in import dependence from the US doubles the estimated probability of a Dollar peg and drives the probability of a Franc peg practically to zero but leaves the probability of a D-Mark peg unchanged.[11] Effects for the import

[11] The relatively strong effects on the likelihood of a Franc peg probably reflect the high dependence of former French colonies, which almost always peg to the Franc, on imports from France. In the robustness section

variables from key currency areas are similarly substantively important. For example, a one standard deviation change in import dependence on the Dollar area reduces the probability of a Franc peg to one-fourth and roughly halves the probability of a D-Mark peg. Thus, the import dependence variables not only have statistically significant, but also substantively important effects. The same applies to central bank independence: an increase from one standard deviation below to one standard deviation above the median increases the likelihood of a peg to the Franc by one half and to the D-Mark by about one third.

Results stay similarly consistent with our hypotheses in the period after the introduction of the Euro (see Table 4). In this period, no country pegs its currency to the Pound according to our definition, and thus we exclude the Pound from the post-Euro estimations. Higher imports from Euro countries and the Euro area raise the likelihood of a Euro peg, higher imports from the US and from the Dollar area raise the likelihood of a Dollar peg. Higher imports from the Euro area also make a peg to the Dollar slightly more likely, but they raise the likelihood of a currency peg to the Euro significantly more. Greater CBI increases the likelihood of a peg to the Euro and the Dollar.

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below we account for political factors also informing peg decisions. Adding political controls reduces the effect size of our variables of interest, but the evidence supporting our hypotheses upholds and all effects remain substantively relevant.

Table 4. Multinomial logit results of exchange rate pegs to key currencies (1999-2005).

	Euro	Dollar
imports from Eurozone [(a)]	13.25***	-26.64***
	(4.804)	(5.740)
imports from USA [(a)]	-7.339***	0.446***
	(2.197)	(0.115)
imports from Eurozone area [(a)]	47.18***	34.04***
	(9.157)	(8.917)
imports from Dollar area [(a)]	-23.63**	7.604***
	(10.04)	(2.006)
central bank independence	1.339**	0.552*
	(0.563)	(0.282)
high inflation history	-0.0602	0.490
	(0.609)	(0.357)
output asymmetry with Eurozone	0.131	0.348
	(0.441)	(0.376)
output asymmetry with US	-0.277	-0.392
	(0.462)	(0.390)
log gdp	0.445	0.474**
	(0.327)	(0.211)
level of democracy	2.029**	2.456***
	(0.944)	(0.740)
democracy * log gdp	-0.0841**	-0.107***
	(0.0388)	(0.0312)
per capita income	0.0000170	-0.0000217
	(0.0000401)	(0.0000354)
Observations	653	653
Pseudo R-squared	0.72	0.72

(a) divided by GDP of pegging country
Note: cubic peg splines, cubic non-peg splines and year dummies included

Estimates reported in Table 3 show that in the pre-Euro era, governments are more likely to peg their currency to the Dollar and less likely to the D-Mark if they have suffered from high inflation in the past, but have achieved moderate inflation in the current period. This result is not simply determined by a Latin American effect. It holds up if we add a Latin American or a full set of regional dummy variables to the estimations (results available on request). As it seems, a history of high inflation induces countries to peg as time inconsistency theories argue, but they prefer the Dollar to other key currencies. Since the Dollar typically had higher and more volatile inflation rates than for example the D-Mark and the Swiss Franc, countries often do not choose the most credible monetary anchor.

We also find that output asymmetry with the anchor currency country statistically significantly decreases the likelihood of a peg to the Dollar and does not have a significant impact

on the likelihood of a peg to the D-Mark. This is consistent with findings reported by Meissner and Oomes (2009). Contrary to this study, however, we do not find an unexpected positive effect of output asymmetry on the likelihood of a peg to the Franc.[12] After the introduction of the Euro, output asymmetry no longer matters. If we interact the output asymmetry with the import variables, then we fail to find statistically significant interaction effects (results available upon request). More asymmetry thus does not decrease the effect that import dependence has on anchor currency choice.

Bearce and Hallerberg (2008) suggest that small open democracies peg their exchange rate, while larger, less open democracies prefer to let it float. To model this, we have interacted the democracy variable with economic size and expect to find a negative interaction effect. With the exception of pegs to the Franc and to the Pound, we indeed do find such a negatively signed and statistically significant interaction effect. Lastly, results for the per capita income variable suggest that richer countries prefer to peg to the D-Mark, while poorer countries dominantly peg to the Pound as well as, possibly, to the Dollar, but per capita income no longer has a significant effect after the introduction of the Euro.

De Facto Exchange Rate Stabilization with Multiple Key Currencies

We have argued that pegging to a single key currency offers the easiest but not always the best choice for a monetary authority which seeks to prevent the import of inflation caused by the depreciation of the exchange rate to the currency of multiple major trading partners. To see whether the evidence corroborating our hypotheses upholds when one goes beyond the analysis of unique de facto pegs, we now employ a seemingly unrelated regression (SUR) model with continuous currency value correlations with the key currencies as dependent variables, rather than

12 It is unclear to us why Meissner and Oomes (2009: 19) interpret their results as "additional support" for OCA theories.

dichotomous cut-off points for unique pegs. The SUR approach provides reliable answers here because it allows us to identify periods in which monetary authorities stabilize the exchange rate to various key currencies and to identify differences in the degree of stabilization. Estimation problems occur when the exchange rate volatility between key currencies becomes small. Yet, periods of high exchange rate stability between the key currencies remain rather rare and thus do not bias our results.

Tables 5 and 6 show the estimation results. Again, results lend support to the predictions of our fear of floating theory. Higher imports from France lead to higher correlation between the country's currency and the Franc, as do higher imports from Germany for the D-Mark, higher imports from the US for the Dollar and, from 1999 onwards, higher imports from the Euro zone for the Euro. As before, de facto stabilization to the Pound is not explained by imports from the UK and higher imports from France (and the Franc area) lead to higher correlation with the D-Mark, which is due to the fact that the Franc itself followed the D-Mark for a long time. Higher imports from the key currency areas lead to higher correlation with the relevant key currencies. In sum, therefore, higher dependence on imports from key currency countries and key currency areas induce countries to stabilize their exchange rate toward these key currencies. Countries with greater central bank independence tend to stabilize toward the Franc and the D-Mark and – later – the Euro, which again is consistent with our previous findings from the multinomial logit models. Results on the control variables are also similar to the ones reported for the multinomial logit models. All in all, support for our theory is thus independent on whether we analyze continuous exchange rate stabilization or, somewhat artificially, but in line with previous approaches, dichotomize the data into unique de facto pegs using two different thresholds.

Table 5. SUR results of exchange rate correlation to key currencies (1974-98).

	Franc	D-Mark	Pound	Dollar
imports from France [(a)]	7.380***	5.620***	0.767	-6.370***
	(0.785)	(0.788)	(0.775)	(0.787)
imports from Germany [(a)]	2.260***	3.333***	1.280**	-3.266***
	(0.600)	(0.603)	(0.592)	(0.601)
imports from UK [(a)]	0.00822	0.0239	-0.0655	-0.0657
	(0.0406)	(0.0408)	(0.0401)	(0.0407)
imports from USA [(a)]	-0.0399**	-0.0425**	0.0183	0.0515***
	(0.0173)	(0.0173)	(0.0171)	(0.0173)
imports from Franc area [(a)]	1.347***	1.475***	-0.355	-0.892*
	(0.473)	(0.476)	(0.468)	(0.475)
imports from D-Mark area [(a)]	0.536	0.982**	0.163	0.0925
	(0.481)	(0.483)	(0.475)	(0.482)
imports from Pound area [(a)]	2.860	5.263**	3.947*	-5.810***
	(2.185)	(2.195)	(2.158)	(2.191)
imports from Dollar area [(a)]	-1.803***	-1.698***	-0.636***	1.658***
	(0.177)	(0.178)	(0.175)	(0.178)
central bank independence	0.0601***	0.0583***	0.0196	-0.0290
	(0.0212)	(0.0213)	(0.0209)	(0.0213)
high inflation history	-0.172***	-0.167***	-0.00886	0.234***
	(0.0436)	(0.0438)	(0.0431)	(0.0437)
output asymmetry with France	-0.0536**	-0.0614***	-0.0464**	0.0603***
	(0.0213)	(0.0214)	(0.0211)	(0.0214)
output asymmetry with Germany	0.0176	0.0148	0.0147	-0.0240**
	(0.0115)	(0.0116)	(0.0114)	(0.0115)
output asymmetry with UK	-0.0507**	-0.0592**	0.00608	0.0769***
	(0.0248)	(0.0249)	(0.0245)	(0.0249)
output asymmetry with US	0.0927***	0.105***	0.0238	-0.115***
	(0.0216)	(0.0217)	(0.0213)	(0.0217)
log gdp	-0.0359***	-0.0345***	-0.0294***	0.0442***
	(0.00835)	(0.00839)	(0.00825)	(0.00837)
level of democracy	-0.0902***	-0.0963***	-0.0118	0.122***
	(0.0223)	(0.0224)	(0.0220)	(0.0223)
democracy * log gdp	0.00422***	0.00450***	0.000849	-0.00583***
	(0.000952)	(0.000956)	(0.000940)	(0.000954)
per capita income	0.0000147***	0.0000177***	0.000000124	-0.0000155***
	(0.00000271)	(0.00000272)	(0.00000268)	(0.00000272)
Observations	1853	1853	1853	1853
R-squared	0.401	0.432	0.239	0.414

(a) divided by GDP of non-key currency country
Note: year dummies included; import areas refer to threshold of .6.

Table 6. SUR results of exchange rate correlation to key currencies (1999-2005).

	Euro	Dollar
imports from Eurozone [(a)]	2.989***	-2.851***
	(0.271)	(0.271)
imports from USA [(a)]	-0.0763***	0.0781***
	(0.0222)	(0.0222)
imports from Eurozone area [(a)]	1.065**	-0.688
	(0.466)	(0.466)
imports from Dollar area [(a)]	-2.525***	2.204***
	(0.311)	(0.311)
central bank independence	0.0856**	-0.0821**
	(0.0381)	(0.0380)
high inflation history	-0.186***	0.210***
	(0.0477)	(0.0477)
output asymmetry with Eurozone	-0.0881**	0.0991**
	(0.0390)	(0.0390)
output asymmetry with US	0.0907**	-0.108***
	(0.0405)	(0.0405)
log gdp	-0.103***	0.0995***
	(0.0163)	(0.0163)
level of democracy	0.0000109***	-0.0000120***
	(0.00000349)	(0.00000349)
democracy * log gdp	-0.240***	0.276***
	(0.0536)	(0.0536)
per capita income	0.0104***	-0.0120***
	(0.00223)	(0.00222)
Observations	644	644
R-squared	0.54	0.50

(a) divided by GDP of non-key currency country
Note: year dummies included; import areas refer to threshold of .6.

Robustness

The preceding two sections have demonstrated that the predictions derived from our theory find ample support. We have already mentioned that our results are robust to using Reinhard and Rogoff's (2004) or Shambaugh's (2004) alternative de facto peg definitions instead. In this section, we briefly discuss the results from four additional robustness tests, each of which addresses a potential concern.

First, theory suggests that fixed exchange rates stimulate bilateral trade (Rose 2000). This may give rise to the concern that our results are driven by reverse causality. A similar concern might arise with respect to CBI. In principle, we have two options to tackle these potential problems. Valid instruments, though a standard textbook solution to endogeneity, are not only difficult to find but may also drastically reduce the efficiency of the estimate. We thus choose an alternative and replace the import value and the value of CBI of years in which countries have

pegged by the pre-peg value of imports and CBI. Thereby, we not only remove the increase in the import volume resulting from the peg but indeed likely overshoot as imports tend to increase over time due to economic growth in both the exporting and the importing nations. Results for the CBI and import variables remain unchanged. We can thus conclude that this form of endogeneity, though probably present, does not drive our results.

Second, we add political and further economic controls which may affect a country's a priori willingness to fix to a certain key currency. In particular, we control for colonial ties, joint membership in international alliances and similarity of voting behavior in United Nations General Assembly. Again, results turn out to be robust to the inclusion of these variables. In addition, we can include general trade openness (the sum of all exports and imports divided by GDP), capital account liberalization, and the amount of foreign reserves a country has to the estimation model without changing the main results.

Third, since France stabilized its exchange rate toward the D-Mark for many years during the post-Bretton Woods period, we exclude the Franc from the list of our key currencies. Coding pegs to the D-Mark and pegs to the French Franc as a peg to a single D-Mark/Franc currency does not alter the results substantively.

Fourth, in our main estimations we follow the standard procedure for dealing with temporal dependence in binary choice models and incorporate splines (Beck, Katz and Tucker 1998). If we ignore this advice and eliminate temporal dependence by the lagged dependent variable, our results still turn out to be robust. Similarly, we included regional dummy variables to account for some unobserved heterogeneity. The introduction of regional dummy variables, though often significant, does not alter our substantive results.

Conclusion

Political economists have long since argued that a government's aspiration to fight inflation influences exchange rate regime choice. Our theory concurs with this claim. However, while time inconsistency theories submit that governments merely borrow monetary policy credibility from the anchor currency, we have argued that governments also peg or stabilize their exchange rate because they seek to avoid the inflationary pressures from an exchange rate devaluation, which would raise the domestic prices of imported goods. Our theory identifies dependence on imports from the key currency countries and the key currency areas as main predictors of this choice. The results from our empirical estimations provide ample support for these predictions. Of course, existing theories and our own theory are not mutually exclusive. Different governments can simply have different motives for pegging. We thus regard the fear of floating theory of exchange rate stabilization with multiple key currencies and the two most popular existing theories of exchange rate regime choice as complements. Similarly, while the estimation results presented here support our theory, they are often not inconsistent with existing approaches either. For example, given the very strong correlation between imports, exports and therefore trade, our finding that *import* dependence matters for anchor currency choice invariably also lends support to the OCA theory claim that *trade* matters. However, since we find little evidence that output asymmetry determines anchor currency choice either directly or in interaction with import dependence, we submit that this choice does not appear to closely follow the logic of optimal currency theories. There might be single cases, of course, for which optimal currency area considerations affect policy choices.

Where our theory makes predictions contradicting those of existing approaches, the results confirm our hypotheses. We have argued and found confirming evidence that countries with more independent central banks are more likely to peg their exchange rate de facto. This evidence runs counter to time inconsistency theories which perceive CBI and de facto pegs as substitutes. Thus,

while our empirical evidence does not falsify time-inconsistency and OCA theories of exchange rate pegs, our fear of floating approach to pegs complements existing theories and can even explain phenomena which remain puzzling to or would contradict traditional approaches.

Appendix: Definitions and data sources for control variables.

high inflation history: Set to 1 if current inflation, as measured by GDP deflator, is below 20%, while post-1970 inflation has been above 50% in at least one year. The reason is that countries with a history of high inflation have an incentive to peg their currency, following time inconsistency theories, but can only do so at reasonable cost if they have already managed to reduce current inflation to a relatively low level. Source: World Bank (2007).

output asymmetry: The standard deviation over the last ten years of the difference between a country's growth rate of real output and that of the key currency country. Source: World Bank (2007).

log gdp: Gross domestic product at official exchange rates (logged). Source: World Bank (2007).

per capita income: Gross domestic product per capita at official exchange rates (logged). Source: World Bank (2007).

level of democracy: 21-point *polity2* measure of institutionalized democracy. Source: http://www.cidcm.umd.edu/polity/. This measure is not without problems (Authors 2010), but they are hardly relevant here.

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