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CLASSIFYING EXCHANGE RATE REGIMES: 20 YEARS LATER

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Classifying Exchange Rate Regimes: 20 Years Later

Eduardo Levy-Yeyati, Federico Sturzenegger[1]

Abstract

Twenty years ago, in Levy-Yeyati and Sturzenegger (2001) we proposed a *de facto* classification of exchange rate regimes which contrasted with the –at the time, standard– *de jure* classifications based on self-reporting by monetary authorities. This paper extends our original classification through 2021 more than doubling the number of country-year observations (from 3335 to 8491). It also introduces an updating methodology to keep the classification updated in real time. Also, based on this extension, the paper documents the main stylized facts about exchange rate regime choices in the past two decades, which shows a jump in the prevalence of flexible regimes in the early 2000s and a gradual convergence between *de jure* and *de facto* groupings over time.

JEL classification: F30; F33

Keywords: Exchange rate regimes; fear of floating; fear of appreciation

1. Introduction

The analysis of the implications of alternative exchange rate regimes is arguably one of the key questions in international economics, as well as one with important measurement obstacles. Up until the late 90s most of the empirical discussion on exchange rate regimes used the official (de jure) regime classification that the IMF compiled based on the exchange rate arrangements periodically reported by the country´s monetary

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authorities, despite well-documented mismatches between reports and reality. For instance, it was recognized that many alleged floaters intervened in foreign exchange markets so pervasively that, in terms of the exchange rate flexibility-monetary autonomy mix, in practice they behaved closer to a conventional peg. Conversely, many pegged regimes with autonomous (and often inconsistent) monetary policies realigned the parity so often that they behaved, for most practical purposes, as floats. These discrepancies, in turn, tended to mislead and ultimately frustrate empirical work in the field. Attempts to identify the benign effect of pegs on chronic inflation or the link between exchange rate flexibility and the depth of the business cycle or growth were hampered by miss-classification problems[2].

Levy Yeyati–Sturzenegger (2001) and (2005) addressed these concerns by building a de facto (LYS) classification based on the relative volatility of the exchange rate and the stock of reserve. This paper extends the original classification through 2021, more than doubling the number of country-year observations (from 3335 to 8477) and documents the main stylized facts about exchange rate regime choices in the past two decades. In addition, it introduces a methodology to update the classification in real time.

Underlying the LYS methodology was a textbook definition of exchange rate regimes, whereby fixed regimes are associated with changes in international reserves aimed at limiting the volatility of the nominal exchange rate, and flexible regimes are characterized by stable reserves and volatile exchange rates. The combined analysis of the classification variables should be sufficient, the authors argued, to assign regimes to a broad fix-float grouping, independently of the country´s official self-reporting.[2] This attempt was followed by similar efforts, most notably by Reinhart and Rogoff (2002) and Shambaugh (2004), that combined de jure and de facto aspects to characterize exchange rate policies more

[2] The paper clustered observations of three classification variables at a country-year level, and assign them intuitively: the cluster with relatively high volatility of reserves and low volatility in the nominal exchange rate was associated with pegs. Conversely, the cluster with low volatility in international reserves and volatility in the nominal exchange rate was identified with floats. Finally, countries with intermediate levels of volatility were labeled "intermediates" –a group that included, among others, economies with managed floats, *binding* exchange rate bands and frequently realigned pegs.

precisely.[3] Eventually, the IMF replaced its traditional de jure classification by a subjective de facto one prepared by its own country desks (Habermeier et al., 2009). These new de facto classifications have delivered a large and growing body of literature examining the determinants and consequences of exchange rate policy on many macroeconomic variables.[4]

The new millennium witnessed important developments regarding exchange rate regimes. In the early 2000s, low inflation, currency appreciation in many developing economies and the gradual decline in net foreign currency liabilities inverted the fear of floating motives (inflation and balance sheet effects from a real depreciation) leading to a fear of appreciation (Gluzmann et al. 2013) and a prevalence of leaning-against-the-wind exchange rate intervention, including by formerly non-interventionist countries like Israel (Hertrich and Nathan, 2022) or Switzerland (Jerman, 2017), in what a priori could be regarded as a comeback of active exchange rate policies. All this, against a backdrop of deep global financial cycles and frequent episodes of systemic stress such as the subprime and European crises or the recent Covid-19 pandemic, as well as a gradual flexing of the Chinese peg, previously blamed for neo-mercantilist currency manipulation (Bergsten and Ganon, 2016) and (Aizenman, 2007).

To what extent have the map and trends of exchange rate regimes changed in the past 20 years? We address this question, and identify new patterns, if any, using an updated, broader, and extended LYS dataset through the year 2021.

The plan of the paper is as follows. Section 2 describes the updated data and explains the grouping and updating methodology. Section 3 documents the main stylized facts of the evolution of exchange regime choices in the 2000s. In this section, we specifically focus on four main issues:

[3] In addition to providing a detailed story of exchange rate regimes at the country level, Reinhart and Rogoff "verified" the de jure regime: for example, a fixed exchange rate regime was verified if the exchange rate was fixed; if not, it was reclassified into another category. In addition, they considered the existence of dual exchange rates that used to be frequent in the developing world in the past. Shambaugh, in turn, used a purely statistical approach similar to the LYS classification, but base entirely on the volatility of the exchange rate.

- The *missing middle* hypothesis, pioneered by Fischer (2001), that argued that countries were moving away from conventional pegs towards hard pegs or relatively free floats: we find that in the last two decades the missing middle pattern continued. Indeed, a look at a balanced panel of countries shows, since 1990, a shift from intermediate to floating regimes, in line with the hypothesis;
- The trend towards more flexible arrangements that was identified for the 90s in the previous version of this classification: we find that this trend (which is particularly strong for large economies since the 80s and for medium-sized economies since the 90s, but non-existent for smaller economies), continued in the first ten years of the new millennium and stabilized thereafter.
- Calvo and Reinhart's (2002) *fear of floating*: the idea that floating regimes are characterized by significant intervention to avoid large depreciations. We identify this as de jure floaters that do not float de facto. We find that, after increasing steadily through the mid 90s, it stabilized, besides a transitory peak during the Global Financial Crisis; and
- Gluzman et al.'s (2013) *fear of pegging*: when countries intervene to avoid exchange rate appreciations. We identify this as countries that peg without claiming they do so. We find that after a steady increase in the late 90s it plateaued, at a lower level after the Great Financial Crisis.

2. Methodology

2.1. Classification variables

According to the textbook description, flexible exchange rates are characterized by little intervention in the exchange rate markets together with unlimited volatility of the nominal exchange rate. Conversely, a fixed exchange rate regime occurs when the exchange rate does not move while reserves are allowed to fluctuate. Under a crawling peg, changes in the nominal exchange rates occur with stable increments (i.e., low volatility in the rate of change of the exchange rate) while active intervention keeps the exchange rate along that path. Finally, a dirty float should be associated to the case in which volatility is relatively high across all variables, with intervention only partially smoothing exchange rate fluctuations.

With this description in mind, regimes could be broadly characterized by the relative behavior of three variables: the *exchange rate volatility* (σ_e), measured as the average of the absolute monthly percentage changes in the nominal exchange rate during a calendar year,[4] the *volatility of exchange rate changes* ($\sigma_{\Delta e}$), computed as the standard deviation of monthly percentage changes in the exchange rate, and the *volatility of reserves* (σ_r).

To compute the first two variables, we need to choose an appropriate reference currency. In some cases, this poses no problem (for example, the U.S. dollar for the Mexican peso, or the Deutsche Mark for the Italian lira) but the reference currency is not always obvious (for example, for the UK pound or the Swiss franc, the US dollar and the Deutsche Mark both appear to be, a priori, equally good candidates). To sort out these ambiguous cases we use the following criterion: if the country reports a peg, we use the legal peg currency; otherwise, we use the currency against which it exhibits the lowest exchange rate volatility. Countries that peg to a basket are treated equally, and eliminated from the sample if the central peg parity or the basket weights are not disclosed.[5] A list of the reference currencies used in each case is reported in Appendix B.

Our third classification variable, the *volatility of reserves* (σ_r), requires particular care. Reserves are notoriously difficult to measure, as there is usually a difference between changes in reserves and the actual volume of intervention.[6] To approximate as closely as possible the change in reserves that reflects intervention in the foreign exchange market, we subtract government deposits at the central bank from the central bank's net foreign assets. More specifically, we define net reserves in U.S. dollars as:

[4] Choosing a calendar year as unit of account implies that in years where the exchange rate regime changes, the yearly number will reflect a combination of both regimes.
[5] If the basket is not known it is impossible to assess whether the country is intervening or not to defend a predetermined parity.
[6] See Eichengreen et al. (1996) for a discussion on the difficulty arising from the use of derivatives, particularly swaps that confound realignment in parities to exchange rate interventions. We believe, however, this measurement problem to be minor, as most of the reserves are in dollar denominated assets.

$$R_t = \frac{ForeignAssets_t - ForeignLiabilities_t - CentralGovDeposits_t}{e_t},$$

where *e* indicates the price of a dollar in terms of local currency.[7] Our measure of the monthly intervention in the foreign exchange market, r_t, is in turn defined as

$$r_t = \frac{R_t - R_{t-1}}{\frac{MonetaryBase_{t-1}}{e_{t-1}}} = \frac{\Delta R_t}{\frac{MonetaryBase_{t-1}}{e_{t-1}}}.$$

Finally, our volatility measure is computed as the average of the *absolute* monthly change in net international reserves, r_t, relative to the monetary base at the beginning of the month.[8]

These three variables yield three-dimension country-year observations for each of the IMF-reporting countries included in the sample and each year of our time sample (1974-2021).[9] Of the potential 8491 observations, 759 are left out due to undisclosed basket pegs and another 1433 lack data for at least one of the classifying variables (though some of these can be classified at a later stage), leaving a final sample of 6299 observations.

2.2. Classification procedure

We use centroid sorting cluster analysis (KMC; Anderberg, 1973) to identify the regime groups based on the previously described classification variables.[10] Cluster analysis assigns individual cases to the

[7] All central bank items are denominated in local currency and the time period for all variables corresponds to the end of period for a specific month.

[8] In practice we use line 11___ (or FASAF when available) from the IFS for foreign assets, line 16c___ (or FASLF when available) for foreign liabilities and 16d___ (or FASLG when available) for central government deposits. Line 14___ (or FASMB when available or14a__ if previews options were not available) lagged one month is used as a measure of the monetary base. *Contrary* to Calvo and Reinhart (2002) we use the changes relative to the monetary base rather than the percentage change in reserves. We believe this is a better measure, as a given percentage change in reserves in countries with low monetization implies a larger relative intervention in forex markets.

[9] As in the original paper, countries that are not IMF members such as Liechtenstein, Monaco and Vatican City, as well as semi-independent countries, dependencies or territories, are excluded. Three countries (Andorra, Nauru and Tuvalu) joined the IMF in the 2000s and are added to the dataset.

[10] See Levy Yeyati and Sturzenegger (2005) for a more detailed description.

cluster with the smallest distance between the case and the center of the cluster (centroid). The number of clusters, *K,* is specified *ex-ante* by the user, and cluster centers are iteratively estimated from the data.

Once the three classification measures are computed for our universe of countries, the KMC algorithm assigns the data to five different groups that represent a distinct exchange rate regime (Table 1). Because KMC uses the relative distance between points, it is important that all three measures should be comparable. To that end, we first eliminate the two percent-upper tail of observations for each of the three classification variables, which excludes 271 outliers out of 6299 data points.[11] We then z-normalize the remaining 6028 observations.

In turn, since observations that display little variability along the three variables cannot be assigned to any group at this stage, they are labeled "inconclusives" and left unclassified.[12] This initial, first-round classification assigns 2642 data points and allocates a large number of observations (3386 out of 6028) to the "inconclusive" category. While variations in the classification variables within this group may be small relative to the data points clustered in the first round, the data still displays enough volatility to identify exchange rate regimes within the inconclusive group. This is done in a second round using the same methodology but only applied to the inconclusive data of the first one. The second-round procedure assigns 1859 out of the 3386 inconclusive observations, leaving 1527 observations unclassified. Figure 1 shows the clustered data.

Table 2 shows, for each cluster, the central values as well as the upper and lower bounds of the classification variables. Comparing the centroid values, fixed regimes are characterized by relatively low nominal exchange rate volatility (with an average absolute change of 0.59% per month as opposed to 1.51% in the case of floats), and high

[11] Because these outliers do not present classification problems, we re-classify these observations ex-post, by assigning them to the cluster with the nearest centroid. The 2% threshold was chosen arbitrarily. Alternative values for this threshold delivered virtually identical classifications.

[12] If neither the nominal exchange rate nor reserves move, the exchange rate regime that the country is actually implementing is not obvious from direct comparison with the rest of the sample.

volatility in reserves (18.87% against 5.16% for floats). The two intermediate groups, on the other hand, exhibit not only substantial intervention in the exchange rate market but also the highest exchange rate volatility. The table also shows that second round groups present less overlap between fixers and floaters. While the former exhibits an absolute monthly volatility of the nominal exchange rate that ranges from zero to 0.35% and a centroid at 0.02%, the minimum exchange rate volatility for the latter is 0.11%. Regarding international reserves, floaters display an average absolute change ranging between 0.0% and 7.58% of the monetary base, in contrast with a minimum reserve variability of 6.09% for fixers.

This procedure assigns an exchange rate regime to most data points in the sample, but leaves 1527 second-round inconclusives unclassified. Additionally, the sample includes 1433 country-years for which some of the classification variables were not available. Many of these unclassified observations can still be identified in an uncontroversial fashion (e.g., Panama's or Ecuador´s unilateral dollarization or Hong-Kong's currency board agreement). To include as many observations as possible, we extend the classification assigning a fixed exchange rate regime to inconclusives that met one of these two criteria: (i) exhibits zero volatility in the nominal exchange rate, or (ii) was identified as a peg by the IMF and had an average volatility in the nominal exchange rate smaller than 0.1% (placing them safely off-limits from the second round-float and dirty-float clusters). 1349 out of the 1527 cases are classified as pegged regimes in this way. In addition, Euro countries obviously lack data for their monetary bases, but are directly classified as floaters.

Table 3 shows the final three-way distribution of observations into floats, intermediate (including crawling pegs and dirty floats) and fixed regimes. Table 4 provides a diagram of the whole process and Appendix C provides the country year classification.

2.3 Keeping the classification updated

Our exercise 20 years later allows us to check the robustness of our classification procedure. Figure 2 shows the centroids for the first-round classification with data until 2000, and the new centroids with twenty-one years of additional data. Now we have a sufficiently long period to

assess if these centroids are stable or not. Notice that the centroids for the float and fixed clusters appear close to each other, meaning that there is not much volatility in our classification cutoffs over time.

When comparing the classification at both moments in time we observe that, naturally, some country data has been updated (in a handful of cases mistakes corrected). When looking at the fixed-float dichotomy we find that from the 3335 original datapoints, only 19 country year observations with data that has not been updated switch from a fix classification in 2000 to a floating one in 2022. This shows that the classification procedure is quite stable across time.

Given this new evidence, we consider it is a sufficiently appropriate methodology to update yearly our classification, using the centroids obtained from our latest clustering. This will allow this classification to update regularly and not only at very long intervals.

3. Two decades of exchange rate regimes: A quick look at key stylized facts

3.1. The missing middle and the shift towards floats

Fischer (2001) argued that, faced by the inherent vulnerability of conventional pegs to speculative currency attacks, countries were shifting away from them and towards floats and super fixed extremes, a phenomenon that he dubbed "the missing middle". This process is strongly validated in the data as shown in Figure 3 which extends our estimation with 20 years of additional data. The graph shows that process has continued in the new millennium, albeit softened. Intermediate regimes, which had lost traction in the first three decades after the demise of Bretton Woods continued to do so, and today represent a lesser fraction of exchange rate regimes today.

A first glance at the classification in Figure 3 suggests that the steady decline in the number of fixes in favor of floats, a strong trend since the demise of Bretton Woods, continued in the first decade of the new millennium and stabilized in the 2010s, regardless of the emergence of the Euro (Figure 4). As a result, while it is known that most large

economies have adopted flexible exchange rate arrangements, we can also say (in contrast to our 2005 paper when we could not) that floats are today the most prevailing exchange rate regime in the world.

The literature has also argued theoretically and documented empirically the convenience and preference for conventional pegs by small island and open economies.[13] It is only natural then to examine whether the trends away from intermediate and conventional pegged regimes toward the extremes (particularly, floats) depends on the country size. Figure 5, which reproduces Figure 4 for large, medium, and small countries (proxied by the 10-million and 1-million population thresholds), confirms the previous conjecture. Small economies largely peg, whereas large economies are the ones that more ostensibly show the trends highlighted in the literature: away from pegs and towards floats. Medium-sized economies, in tun, lie in between, displaying the same trend, with a declining albeit still prevalent propensity to peg. Similar results show up when splitting the sample between developed and emerging markets on one side and non-industrial countries on the other as we do in Figures 6 and 7. Richer economies have shifts towards floating whereas poorer countries tend to rely more on fixed regimes.

Related with the discussion above, part of the variation in the distribution of regimes may reflect changes in the dataset, as new, typically smaller countries appeared during the post-Bretton Woods period, particularly after the collapse of the Soviet Union. A quick look at a balanced sample of the economies classified for each of the post-Bretton years in Figure 8, shows a somewhat different pattern, with pegs stable since the 90s and a gradual shift from intermediate to floating regimes, in line with the falling out of grace of fragile conventional pegs in favor of floating regimes, often coupled with a version of inflation targeting.

3.2 Fear of floating and fear of pegging

13 See Levy Yeyati et al. 2010 and references therein.

The number of countries that run a fixed exchange rate regime without explicitly stating that they do, (labelled "fear of pegging" in Levy Yeyati and Sturzenegger (2001)) increased until the mid 90s and has remained stable since as we show in Figure 9. The same could be said of regimes that are officially, but not de facto floating (Calvo and Reinhart´s (2002) "fear of floating") in Figure 10. This is in line with the relative stability of the groupings in the past two decades.

Predictably, the Great Financial Crisis disrupted these trends, increasing the fraction of countries with fear of floating and decreasing those with fear of pegging. While the share of fear of floaters soon returned to its pre-crisis level, the proportion of fear-of-peggers remained at a somewhat lower mark. In combination we conclude that the divergence between de jure and de facto regimes has diminished somewhat over recent years.

4. Final remarks

Several de facto versions of the traditional de jure exchange regime classification developed in the past 20 years have become a critical input for researchers in international finance. Here, we contribute to that end by broadening and extending Levy Yeyati and Sturzenegger´s (2001, 2005) de facto classification to the present, and by providing a mechanism to keep the classification updated in the future. We use this extended dataset to update the main stylized facts identified in the original paper.

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Table 1
Classification criteria

	σ_e	$\sigma_{\Delta e}$	σ_r
Inconclusive	Low	Low	Low
Flexible	High	High	Low
Dirty float	High	High	High
Crawling peg	High	Low	High
Fixed	Low	Low	High

Table 2
Cluster boundaries

	Average monthly volatility in the exchange rate			Average monthly volatility in the change of the exchange rate			Average monthly volatility in international reserves (relative to monetary base)		
1st Round Boundaries									
	Minimum	Centroid	Maximum	Minimum	Centroid	Maximum	Minimum	Centroid	Maximum
Float	0,08%	1,51%	4,09%	0,00%	1,60%	1,52%	0,23%	5,16%	13,82%
Dirty	2,78%	5,86%	9,64%	3,72%	9,49%	1,52%	1,50%	10,67%	33,92%
Dirty/CP	0,33%	3,42%	7,94%	0,53%	3,98%	1,52%	0,67%	8,16%	29,20%
Fixed	0,00%	0,59%	3,55%	0,00%	0,69%	1,52%	11,74%	18,87%	34,97%
2nd Round Boundaries									
Float	0,11%	0,36%	1,03%	0,00%	0,31%	0,73%	0,00%	3,62%	7,58%
Dirty	0,26%	0,64%	1,08%	0,24%	0,75%	1,52%	0,26%	3,94%	9,11%
Dirty/CP	0,18%	0,55%	1,24%	0,12%	0,55%	1,17%	5,67%	8,68%	11,98%
Fixed	0,00%	0,02%	0,35%	0,00%	0,03%	0,39%	6,09%	8,45%	12,34%

Table 3
LYS classification

LYS Classification

Regime	1st Round	2nd Round	Outliers	Inconclusives	Ad-hoc	LYS
Float	1451	442	0		354	2247
Intermediate	578	555	151			1284
Fix	613	862	120	1349	648	3592
Total	**2642**	**1859**	**271**	**1349**	**1002**	**7123**

Table 4
Classification tree

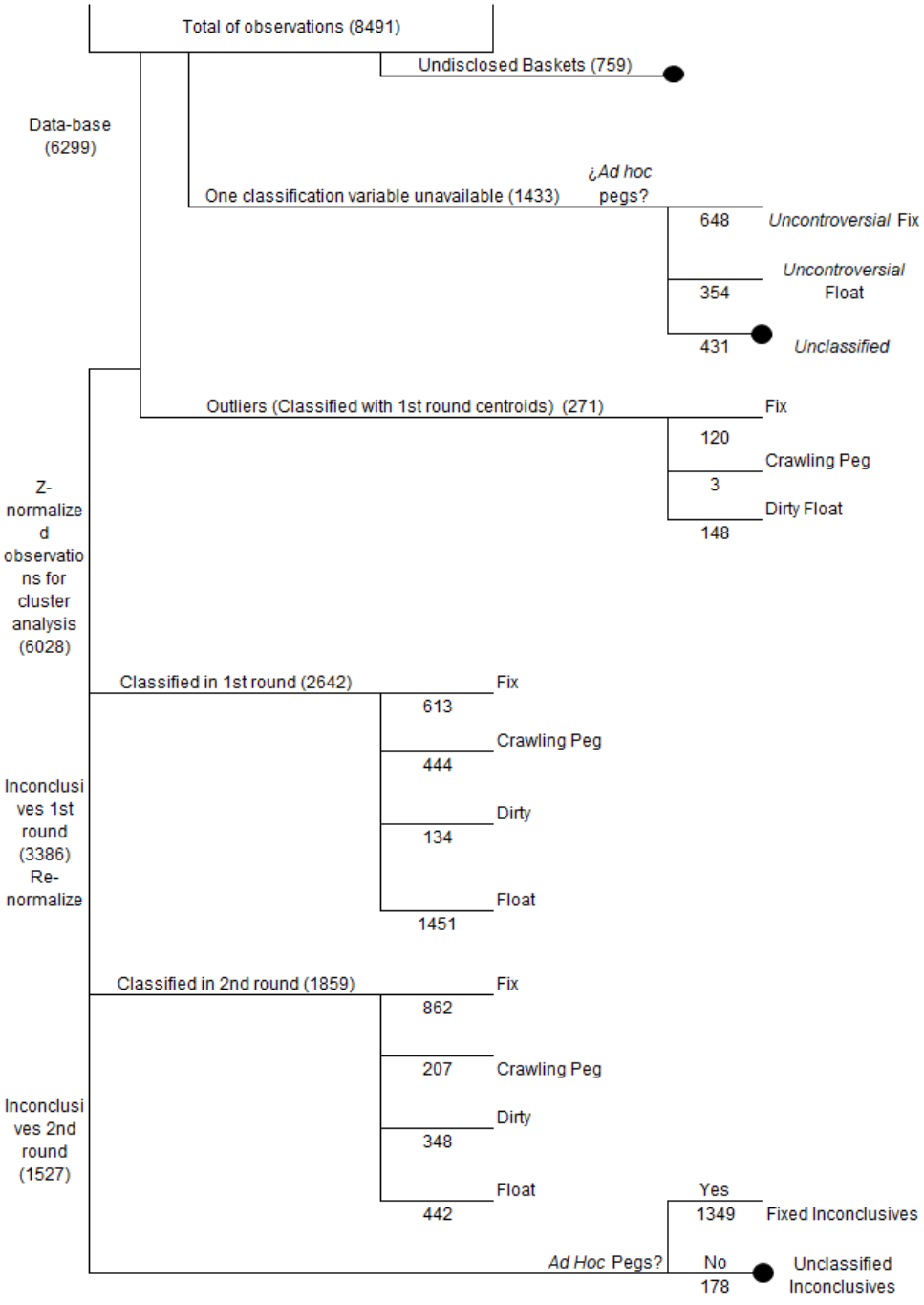
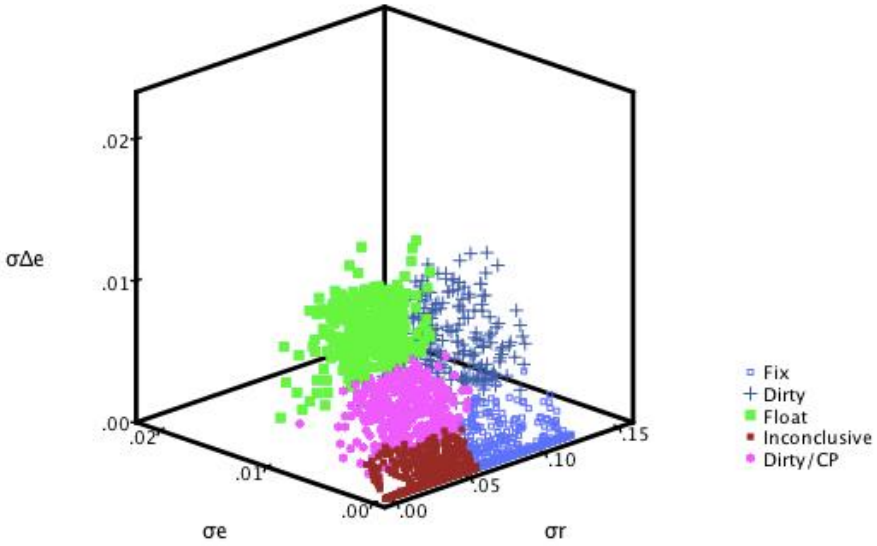


Figure 1. Exchange rate classification.

1st round (a)



2nd round (b)

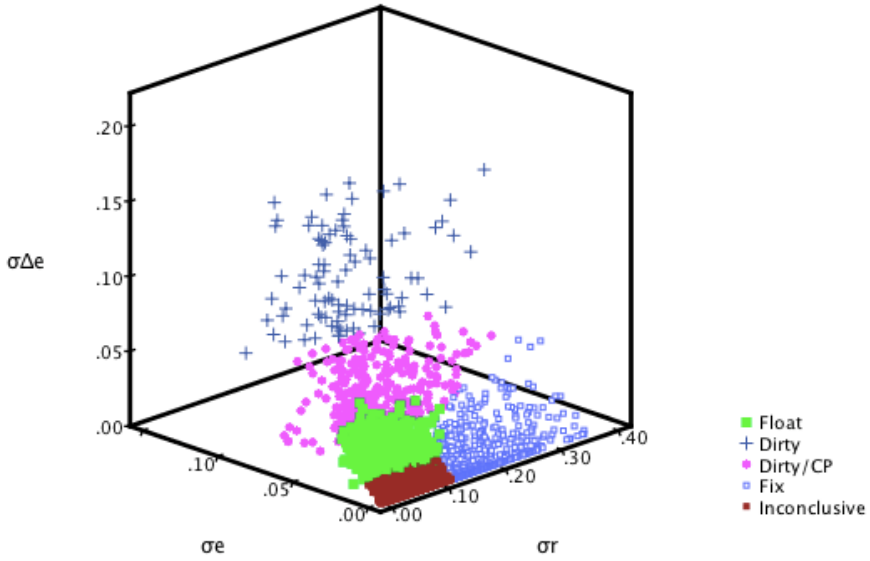


Figure 1. First-round (a) and second-round (b) observations.

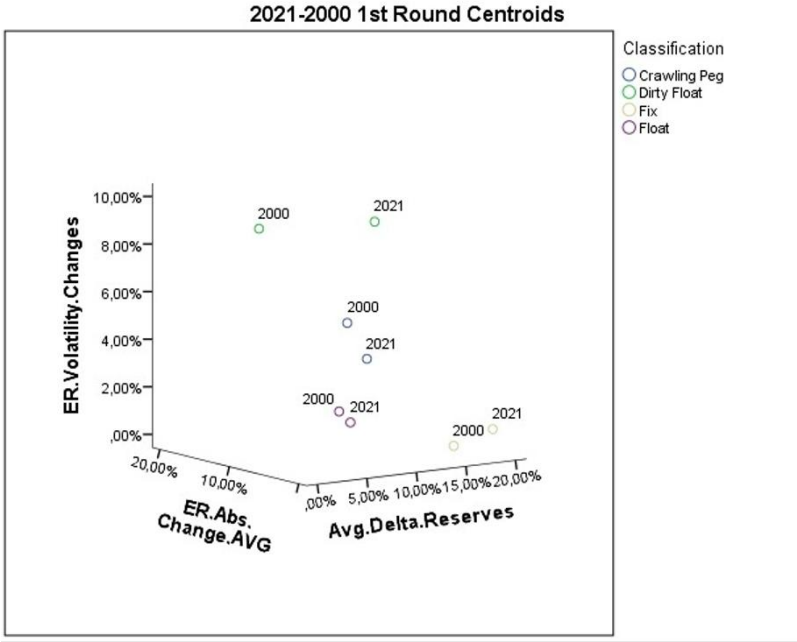


Figure 2: Cluster's centroids for LYS2000 classification and LYS2021 classification

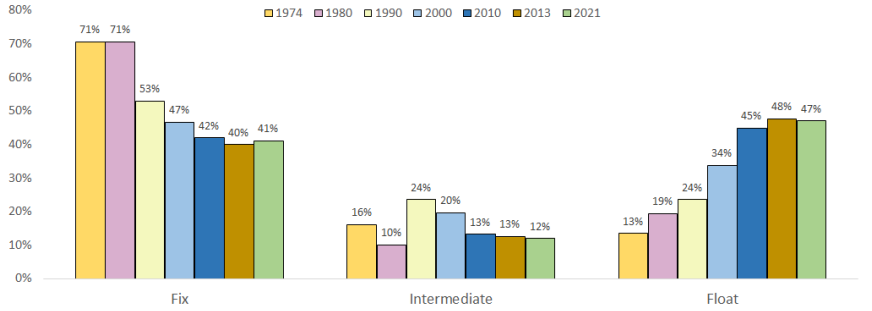


Figure 3. Distribution of exchange rate regimes. LYS classification (1974-2021)

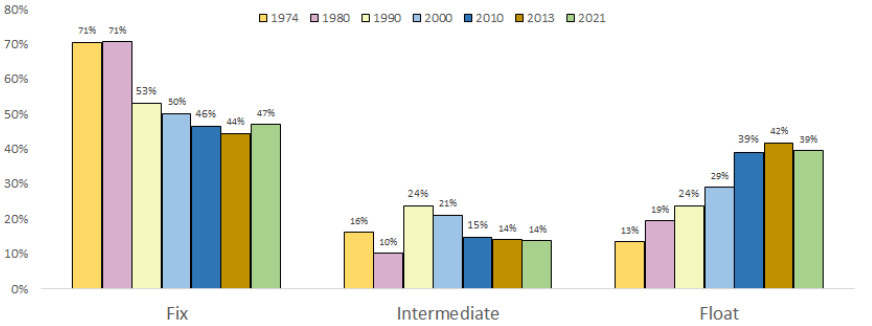


Figure 4. Distribution of exchange rate regimes excluding countries in the Euro Zone. LYS classification (1974-2021)

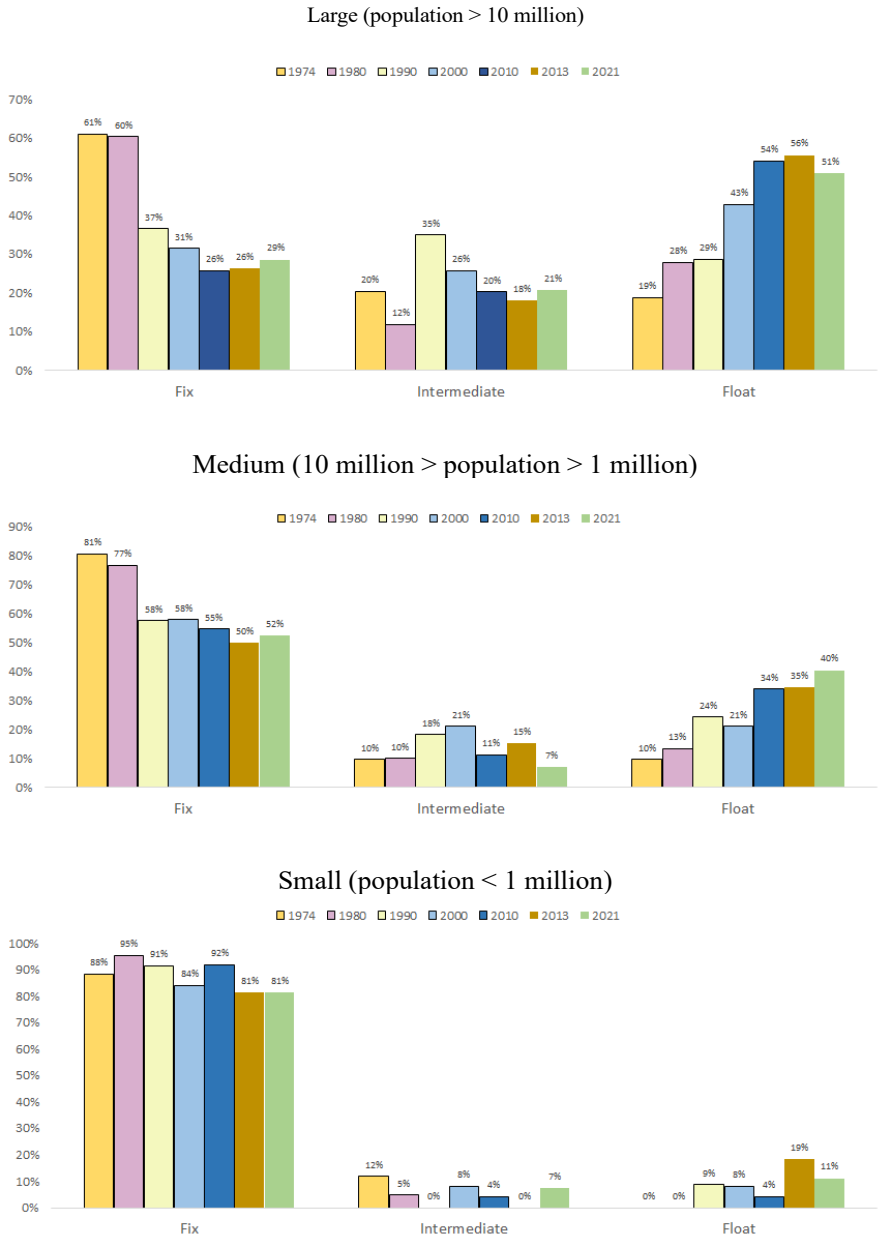


Figure 5. Distribution of exchange rate regimes excluding the Eurozone.
LYS (1974-2021). By country size.

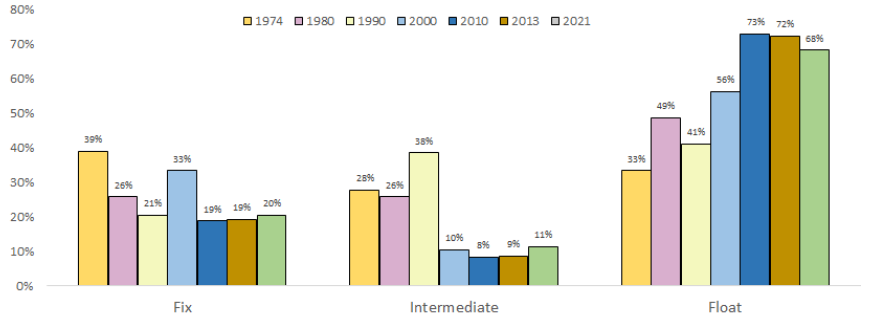


Figure 6. Distribution of exchange rate regimes in developed and emerging countries. LYS classification (1974-2021)

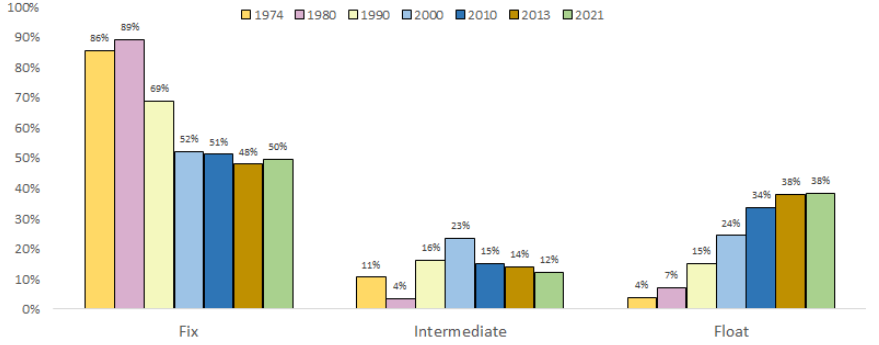


Figure 7. Distribution of exchange rate regimes in non-industrial countries. LYS classification (1974-2021).

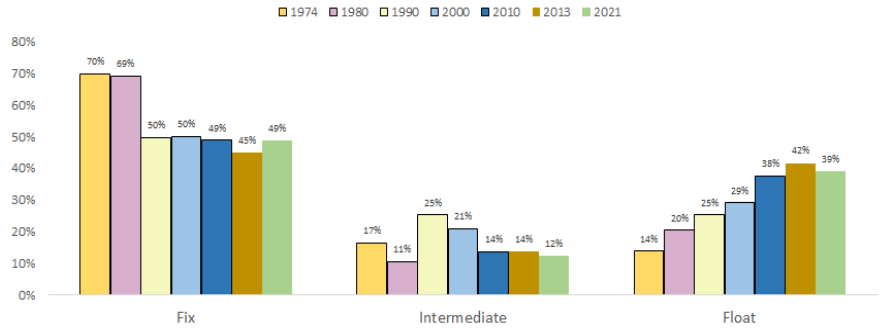


Figure 8. Distribution of exchange rate regimes, balanced sample. LYS classification (1974-2021).

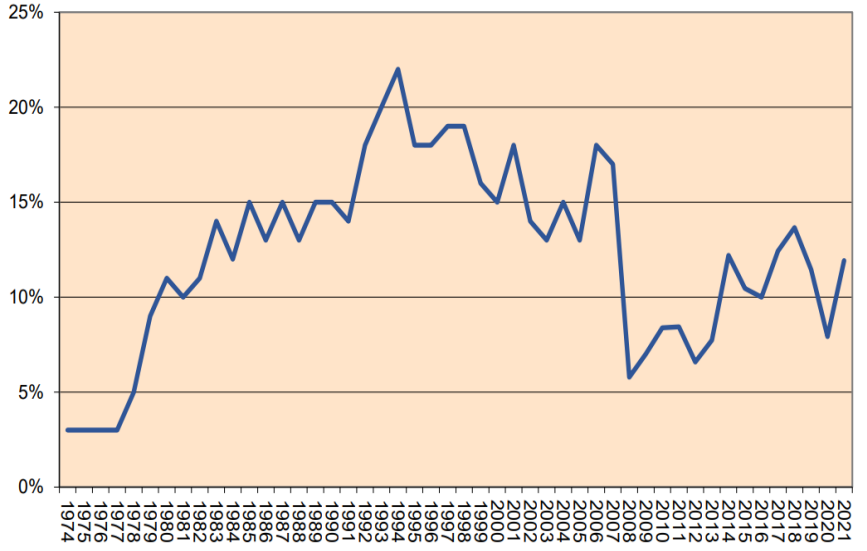


Figure 9: Fear of Pegging

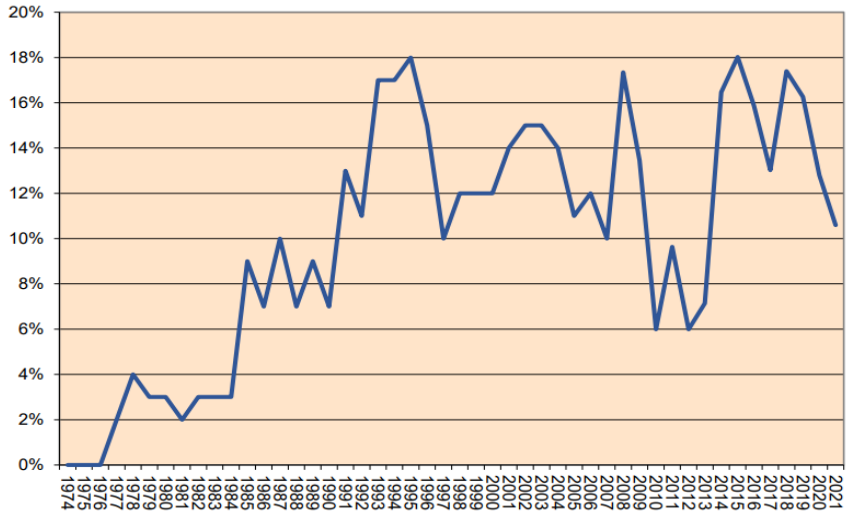


Figure 10: Fear of Floating

Appendix A. K-means cluster algorithm[14]

The following notation is used throughout this appendix unless otherwise stated:

NC	Number of clusters requested
M	*i* Mean of ith cluster
X	*k* Vector of kth observation
$d(x_i,x_j)$	Euclidean distance between vectors x_i and x_i
d_m	$\min_{k/} d(M_i,M_i)$
8	Convergence criteria

The computation involves three steps.

A.1. Selecting initial cluster centers

[14]Based on Hartigan (1975)

(a) If $\min_i d(xk,Mi) > d_{mn}$ and $d(xk,M_m) > d(xk,Mn)$, then x_k replaces M_n. If $\min_i d(x_kM_i) > d_{mn}$ and $d(x_k,M_m) < d(x_k,M_n)$, then x_k replaces **M_m;** that is, if the distance between *xk* and its closest cluster mean is greater than the distance between the two closest means (M_m and M_a), then x_k replaces either M_m and M_n, whichever is closer to *xk.*

(b) If *xk* does not replace a cluster mean in (a), a second test is made:

Let M_q be the closest cluster mean to *xk,* and M_p be the second closest cluster mean to x_k. If $d(x_k,M_p) > \min_i d(M_q,M_i)$, then $M_q = x_k$; that is, if x_k is further from the second closest cluster's center than the closest cluster's center is from any other cluster's center, replace the closest cluster's center with xk.

At the end of one pass through the data, the initial means of all *NC* clusters are set.

A.2. Updating initial cluster centers

Starting with the first case, each case in turn is assigned to the nearest cluster, and that cluster mean is updated. Note that the initial cluster center is included in this mean. The updated cluster means are the classification cluster centers.

A.3. Assign cases to the nearest cluster

The third pass through the data assigns each case to the nearest cluster, where distance from a cluster is the Euclidean distance between that case and the (updated) classification centers. Final cluster means are then calculated as the average values of clustering variables for cases assigned to each cluster. Final cluster means do not contain classification centers.

When the number of iterations is greater than one, the final cluster means in step 3 are set to the classification cluster means in the end of step 2, and step 3 is repeated again. The algorithm stops when either the maximum number of iterations is reached or the maximum change of cluster centers in two successive iterations is smaller than *8* times the minimum distance among the initial cluster centers.

Appendix B. Reference currency

B.1 To the US dollar

Afghanistan, Algeria, Angola, Antigua and Barbuda (77-), Argentina, Armenia (94-), Aruba, Australia, Azerbaijan (94-), Bahamas, Bahrain, Bangladesh (79-), Barbados (75-), Belarus (95-),Belize (77-), Bolivia, Brazil, Bulgaria (94-95), Burundi (74-83; 93-), Cambodia, Canada, Chile (74-89; 99-), China, Colombia, Democratic Republic of Congo, previously Zaire, (74-75;83-), Costa Rica, Curacao & St. Maarten, Djibouti, Dominica (79-), Dominican Republic, Ecuador, Egypt, El Salvador, Eritrea, Ethiopia, Euro Area, The Gambia (86-), Georgia, Germany (74-98), Ghana, Grenada(77-), Guatemala, Guinea (86-), Guyana (76-), Haiti, Honduras, Hong Kong (74,76-81,83-), Hungary (74-93), India (75-), Indonesia, Iran (74-86;89-99;2003-), Iraq, Israel, Jamaica, Japan, Jordan (74; 88-), Kenya (74;87-), Korea, Kuwait, Kyrgyz Republic, Lao PDR, Lebanon, Liberia, Libya (74-86), Lithuania (91-01), Malawi (74; 84-), Malaysia, Maldives, Marshall Islands, Mauritania, Mauritius (83-), Mexico, Micronesia, Mongolia, Mozambique, Nepal (74-84), Netherlands Antilles, New Zealand, Nicaragua, Nigeria, Oman, Pakistan, Palau, Panama, Papua New Guinea (95-96; 98-), Paraguay, Peru, Poland (74-80), Qatar, Romania (74-03), Russia (7404), Rwanda (74-82;94-), Sao Tome and Principe, Saudi Arabia, Seychelles (2006-), Sierra Leone (83-), Solomon Islands (83-), Somalia, South Africa, South Sudan, Sri Lanka, St. Kitts and Nevis (77-), St.Lucia (77-), St. Vincent and the Grenadines (77-), Sudan, Suriname, Syrian Arab Republic, Tajikistan (95-), Tanzania(74; 93-), Thailand, Trinidad and Tobago (76-), Turkey, Turkmenistan (93-), Uganda (74-76; 81-), Ukraine, United Arab Emirates, United Kingdom (74-86;95-), Uruguay, Venezuela, Vietnam; Yemen, Zambia (74-75;83-), Zimbabwe.

B.2 To the British pound

Antigua and Barbuda (74-76), Bangladesh (74-78), Barbados (74), Belize (74-76), Dominica (74-78), The Gambia (74-85), Grenada (74-76), Guyana (74-75), India (74), Iran (87-88), Ireland (74-78), Iran (2013-2014), Seychelles (74-78), Sierra Leone (74-78), St. Kitts and Nevis (74-76), St. Lucia (74-76), St. Vincent and the Grenadines (74-76), Trinidad and Tobago (74-75).

B.3 To the German mark (until 98)

Albania, Austria, Belgium, Bosnia and Herzegovina (93-), Bulgaria(96-), Croatia, Czech Republic, Denmark, Estonia, Finland, France, Greece, Hungary(94-), Iceland, Ireland (79), Italy, Macedonia, Moldova, Netherlands, Norway, Poland (80-), Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom (87-94), United States, Yugoslavia.

B.4 To the French franc (until 98)

Benin, Burkina Faso, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Republic of Congo, Cote d'Ivore, Equatorial Guinea, Gabon, Guinea Bissau (74-77;84), Madagascar, Mali, Morocco, Niger, Senegal, Togo, Tunisia, Vanuatu.

B.5. To the SDR

Burundi (84-92), Democratic Republic of the Congo, previously Zaire (76-82), Guinea (74-85), Guinea Bissau (78-83), Iran (01-03), Jordan (75-87), Kazakhstan, Kenya (75-86), Latvia (95-2004), Libya (87-), Malawi (75-83), Mauritania, Mauritius (74-82), Myanmar, Rwanda (83-93), Sierra Leone (79-82), Tanzania (75-79), Seychelles (79-95), Tanzania (75-79), Uganda (77-80), Zambia (76-82).

B.6. To the Euro (from 1999)

Albania, Andorra, Austria*, Belgium*, Benin, Bosnia and Herzegovina, Bulgaria*, Burkina Faso, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Republic of Congo, Cote d'Ivore, Croatia, Cyprus*, Czech Republic, Denmark, Equatorial Guinea, Estonia*, Finland*, France*, Gabon, Germany*, Greece*, Guinea Bissau, Hungary, Iceland, Ireland*, Italy*, Latvia (05-), Lithuania (02-), Luxembourg*, Macedonia, Malta*, Madagascar, Mali, Moldova, Montenegro, Morocco, Netherlands*, Niger, Norway, Poland (80-), Portugal*, Senegal, Slovak Republic*, Romania (04-), Serbia (02-), Slovenia*, Spain*, Sweden, Switzerland, Togo, Tunisia, United States.

B.7. Other

Armenia (-93), Russian Ruble
Azerbaijan (-94), Russian Ruble
Bhutan, Indian Rupee
Botswana, South African Rand
Bosnia and Herzegovina (92), Yugoslav dinar
Brunei Darussalam, Singapore Dollar
Chile (90-98), Central band parity as published by the Central Bank of Chile
Cyprus, ECU (90-98)

Fiji, Australian Dollar
Georgia (-93), Russian Ruble
Kazakhstan (-93), Russian Ruble
Kiribati, Australian Dollar
Kyrgyz Republic (91-93), Russian Ruble
Lesotho, South African Rand
Luxembourg (74-78), Belgium Franc
Macao, Hong Kong Dollar
Malta (74-78), Italian Lira
Moldova (-92)
Morocco (2001-), Dual currency basket (Dollar-Euro)
Namibia, South African Rand
Nauru, Australian Dollar
Nepal (93-), Indian Rupee
Papua New Guinea (-94; 97), Australian Dollar
Russia (05-), Dual Currency Basket (Dollar-Euro)
San Marino, Italian Lira/Euro
Solomon Islands (74-82), Australian Dollar
Swaziland, South African Rand
Tonga, Australian Dollar.
Tajikistan (91-94), Russian Ruble
Turkmenistan (91-93) Russian Ruble
Tuvalu, Australian Dollar
Uzbekistan (91-93), Russian Ruble

*Members of the Eurozone:

Joined in 1999: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain.

Joined in 2001: Greece.

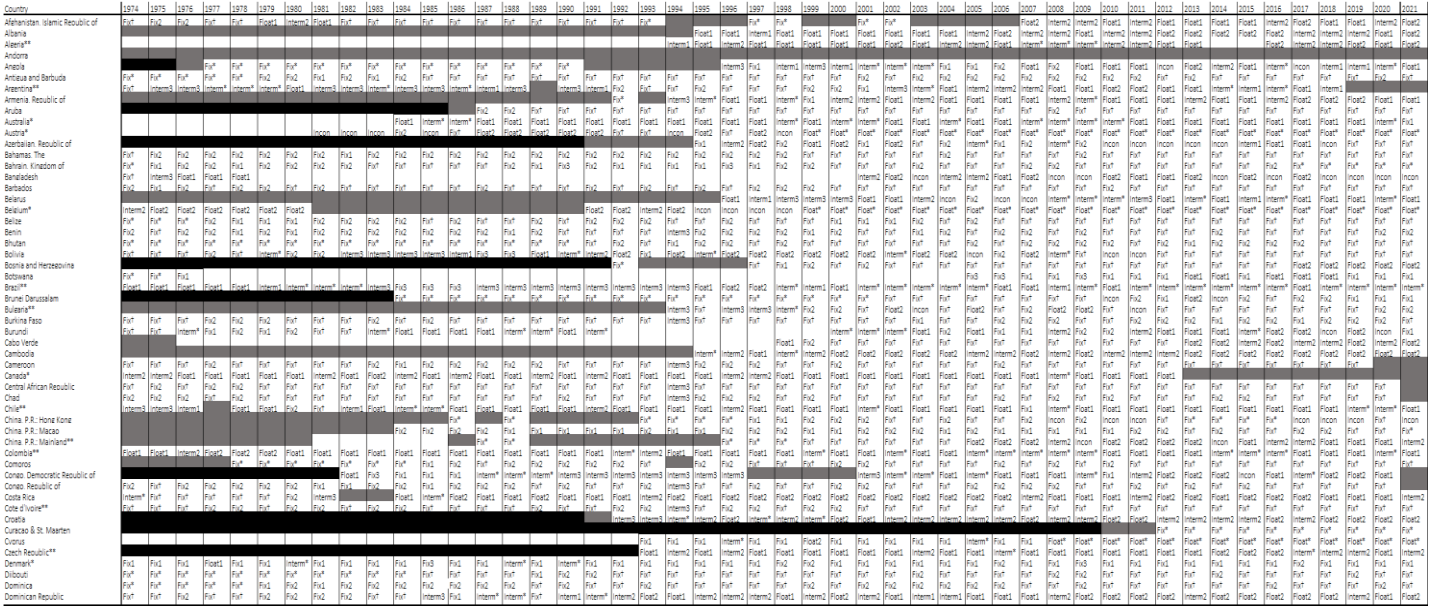
Joined in 2007: Slovenia.

Joined in 2008: Cyprus, Malta.

Joined in 2009: Slovak Republic.

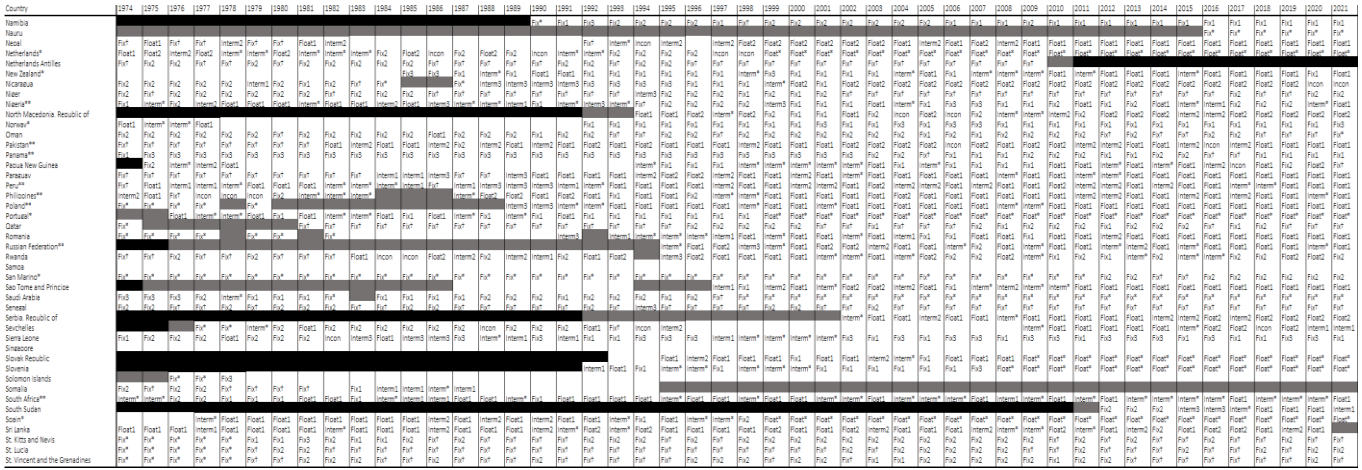
Joined in 2011: Estonia.

Appendix C. Regimes



Appendix C *(continued)*

Appendix C *(continued)*



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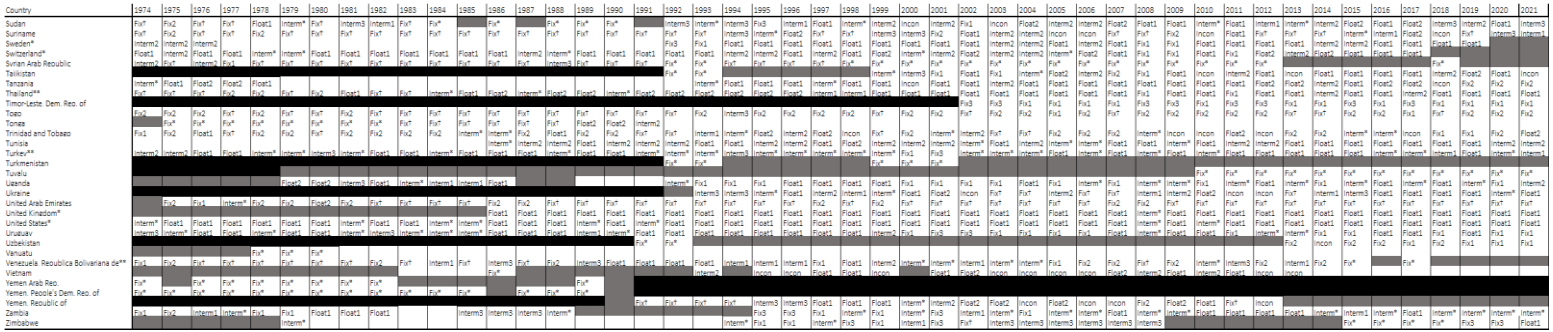

	Basket.
	Not existing or not independent country.
	One classification variable not available.
Fix†	Inconclusives.
*	Uncontroversials.
Interm	Dirty
Interm*	Dirty/CP
2	Classified in second round
3	Outliers
*	Industrial Countries
**	Emerging Economies