PARIS SCHOOL OF ECONOMICS
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Capital exit from developing countries*

Measurement and correlates

Denis Cogneau† and Léa Rouanet‡

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Capital flight is often put forward as one cause of underdevelopment, in particular for Africa. It weakens domestic investment directly, by reducing the volume of savings channeled through the domestic financial system, and indirectly because it can discourage foreign investment or aid. It also impacts the government's budget balance, by reducing the tax base and by increasing public debt.

Defining and measuring capital flight calls for drawing a line between normal capital flows and flows that can be labelled as illicit or illegal. Available data makes it difficult. In this exploratory study, we prefer to speak of capital exit, as our starting point is to be agnostic regarding the motives for capital mobility. In particular, we do not assume that the exit of assets is meant to avoid some special features of the domestic economy, such as taxation.

The first stage of our analysis is to compare indirect and direct methods for the estimation of capital exit. Indirect estimates measure capital exit as a residual of balance-of-payments components (e.g., Boyce and Ndikumana 2012). Direct estimates identify and analyze specific variables that are outcomes of capital exit, such as bank deposits held abroad (e.g., Andersen, Johannesen, Lassen, and Paltseva, 2014). To our knowledge the two kinds of estimates have not yet been contrasted. We find little correlation between "usual" balance of payment estimates and deposits held abroad.

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† Paris School of Economics - IRD
‡ Paris School of Economics

In a second stage, we focus on deposits held abroad, and ask about their interpretation. First, their variation across time may stem from events having nothing to do with capital exit: exchange rate gains, capital gains from other assets (houses, shares, etc.), any kind of reallocation of assets held abroad. Second, even when they are the outcome of capital exit, as already said this exit is not necessarily abnormal, illegal or illicit. Walking in the footsteps of Andersen et al. (2014), we explore the correlates of the variation of deposits held abroad. Andersen et al. chose to focus on the correlation of deposits held in tax havens with petroleum rents in oil-producing countries. Our exploratory and descriptive analysis does not restrict itself to tax havens nor to oil rents. One bad reason is we only exploit publicly available aggregate deposits figures, which do not distinguish tax havens from other places of destination. Another reason is that it is still unclear to us to which extent the correlation with oil rents captures capital flight, as Andersen et al. argue.[1]

We present descriptive statistics of the bank deposits held abroad according to region of residence, as well as of their variation in the medium-term (1980-2010) or over the last decade. Sub-Saharan Africa as a whole appears as a rather extroverted continent, while Asia is strikingly closed. Yet, the recent period of growth in Africa does not seem to have spurred capital exit on foreign bank deposits, compared to other areas. Besides, within-regions heterogeneity is high, even among OECD countries. Capital flows to foreign bank accounts are also pretty much volatile. Still, like Andersen et al., we find suggestive evidence that oil price windfalls are passed to bank deposits abroad, with transmission rates ranging from 2 to 12%, depending on the period or the area covered. We also find some support for a ratchet effect: a fraction of oil rents is sent abroad in good times (price of oil is high), and do not return in bad times (price of oil is low).

This document is very preliminary. More research is warranted to find other robust relationships linking country-level capital exit to financial flows like foreign direct investment or foreign aid inflows.

1/ Confronting methods

A priori, not every unrecorded exit of assets should be identified as capital exit. We define as "capital exit" for a given country and year all exits of assets which are not administratively

[1] We note in particular that their analysis is not as convincing as they claim when distinguishing democracies from non-democracies, or badly governed from well-governed countries: in their results, oil-producing non-democracies indeed send more money abroad in time of oil price booms, when compared to other non-democracies; however, the deposits held by residents of democracies also seem to move with the price of oil.

recorded, aiming at some investments: financial, real estate, etc. These exclude the reimbursements of debts as we want to capture the exit of assets which purpose is to finance an investment. In the literature, capital flight is described as a process aimed at insulating licit or illicit savings from domestic taxation, legal suits or expropriation (in case of expected political changes). The laundering of illicit earnings (from narco-trafficking for instance) via legal capital exit can or cannot be (conceptually) included. Hence for developed countries, capital flight is often identified by looking at capital flows going to tax havens. In poor countries, tax rates are low and not always enforced, so that tax evasion is not necessarily the main issue compared to securing money abroad against expropriation risks.

Existing definitions and measuring methods of capital exit can be classified in two main groups. Indirect methods define capital flight indirectly, very often as a residual of some other variables. Direct methods identify variables that are outcomes of capital flight and seek data directly for these variables.

1.1/ Indirect measures of capital flight: Balance of Payment methods

Indirect methods define capital flight broadly, as "unrecorded capital flows between a country and the rest of the world" (Boyce and Ndikumana 2012). In this method, capital flight (KF^I_{it}) is taken as a residual of four balance-of-payments components: the increase in debt owed to foreign residents ($\Delta DEBT_{it}$), the net inflow of foreign direct investment (FDI_{it}), the increase in foreign-exchange reserves (ΔRES_{it}), and the amount of the current-account deficit (CA_{it}).

$$KF^I_{it} = \Delta DEBTADJ_{it} + FDI_{it} - (CA_{it} + \Delta RES_{it})$$

The premise is that the two inflows finance the two outflows, so that any inability of the two "sources of funds" to finance the two "uses of funds" is indicative of capital flight. This residual method measures capital flight by comparing the sources of capital flows with the uses of these inflows, it measures the amount by which capital inflows exceed their uses.

Year-to-year changes in the stock of foreign debt can be measured using World Bank's *World Debt Tables*, after reducing the change in debt stock due to cross-country exchange-rate fluctuations, and adding back to the annual change the forgiven or reduced debt and debt service ($\Delta DEBTADJ_{it}$).[2] Data on the current account balance, foreign direct investment,

[2] As far as we understand, the way indirect measures are constructed generates a mechanical positive correlation between capital flight estimates and changes in debt. This mechanical correlation is difficult to interpret as external borrowing is flowing back as capital flight in the same year, as in Ndikumana and Boyce (2003).

external debt stocks and total reserves (all in current US dollars) are extracted from the World Bank's *World Development Indicators* database. To take into account exchange rate fluctuations for the change in debt, we use exchange rate data from the World Bank's World Development Indicators database, and SDR/USD exchange rates from IMF's International Finance Statistics. This way we compute our own estimate, covering most countries in the developing world from 1980 to 2010.[3]

Sophistications of this method have been developed in the literature.

A first step is to add trade misinvoicing of international trade transactions (sum of exports and imports misinvoicing) in the residual estimate. Misinvoicing is calculated as the gap between trade flows declared by the country and trade flows declared by trading partners, corrected for the cif/fob differential. The underlying assumption is that causes for trade misinvoicing are mainly linked to capital flight-linked, either because of exports underinvoicing or imports overinvoicing. The US NGO Global Financial Integrity produces estimates (Kar and Spanjers 2014) where trade misinvoicing is said to constitute the major engine of capital flight (two thirds of estimated flows).

Additionally to trade misinvoicing, Boyce and Ndikumana introduce a correction for unrecorded workers' remittances, in the estimates of capital flight they produce for African countries (Boyce & Ndikumana 2010):

$$\mathrm{KF}_{\mathrm{it}}^{\mathrm{BN}} = \Delta\mathrm{DEBTADJ}_{\mathrm{it}} + \mathrm{FDI}_{\mathrm{it}} - (\mathrm{CA}_{\mathrm{it}} + \Delta\mathrm{RES}_{\mathrm{it}}) + \mathrm{MISINV}_{\mathrm{it}} + \mathrm{RID}_{\mathrm{it}}$$

Generally speaking, the major drawback of indirect methods is the assumption that all unrecorded flows are to be attributed to capital flight. Hence lack of administrative capacity or informality become major determinants of estimated capital flight, which is questionable.[4]

1.2/ Direct measures of outcomes of capital flight

Alternatively, we can try to identify variables that are direct outcomes of the exit of capital to foreign countries.

Likewise correlations with FDI flows or current account components are also very difficult to interpret as causal relationships.

[3] World Debt Tables do not cover OECD countries.

[4] Moreover, rather than being overinvoiced, imports may be underinvoiced ('technical smuggling') or not recorded at all ('pure smuggling') to circumvent customs duties.

One could think of using housing ownership data broken down by the country of residence or the nationality of the owner: we tried this on the case of France as a destination country (see Appendix 1). However this approach is intrinsically limited in coverage, across space (one only destination country) and time (data for France are not available since long).

Data from deposits held abroad by country of residence, from the Bank of International Settlement (BIS), have much wider coverage. Each of the 44 BIS countries' individual bank provides to central banks a decomposition of its foreign liabilities on the residence country of the counterpart. Those are then aggregated by central banks at the country level. We observe liabilities of banks in all 44 BIS countries against residents of more than 200 countries.

Publicly available data are not bilateral: all 44 BIS countries are considered as a whole. Changes in the coverage of the sample of banks are not controlled either. Especially for the early years (until 1996), a significant part of the variation in deposits may stem from sample variation. Those data exist for years 1977 to 2011, quarterly; we take simple averages over one year. Looking at loans and deposits, we focus on liabilities to non-banks (versus to all sectors). For each country, we measure amounts outstanding of residents' liabilities to non-banks, in millions of US dollars, valued at respective end-of-period exchange rates. From these, we obtain the yearly change in residents' liabilities towards the rest of the world. Ideally, we would like to have data on deposits only: our data include debt securities. In practice we have deposits-only data only for recent years and we prefer to extend our time sample. However, on this limited sample, we checked that the deposits measure and the liabilities measure were highly correlated.

As already underlined, the major drawback of direct methods stems from the fact that only potential and partial outcomes of capital flight are observed. The variation of housing ownership or of bank deposits have other determinants than pure capital flight, and capital flight may also have other uses. Another shortcoming is of course that capital flight can use nominees ("prête-noms"), so that the official owner of houses or of bank deposits can be in another country of residence than the true owner of assets. Last, the coverage of BIS statistics varied across time, although major countries of destination are present since the beginning in 1977 (see Appendix 2); getting access to bilateral data would allow us to deal with this issue.

1.3/ Confronting direct and indirect methods

We tried correlating the above described indirect estimates from balance of payments and trade statistics with direct estimates from bank deposits. We looked at the correlations between short-term annual flows, over the 1980-2010 period or only last decade. And we also explored long-term cross-sectional correlations between cumulated flows and stocks.

Indirect measures are only available for a sample of developing countries, as debt statistics from the World Bank are not available for OECD countries. Moreover, the Ndikumana estimates are only available for Africa.

Table 1 - Correlation of bank deposits held abroad with indirect measures of capital flight

	In level (US $)		In % of GDP	
Time period	1980-2010	2000-2010	1980-2010	2000-2010
Panel A: Annual flows in current $	Variation of deposits			
BoP residual (own estimate)	0.408*	0.456*	0.020	0.008
GFI estimate[(a)]	-	0.446*	-	-.121*
Ndikumana estimate[(b)]	0.169*	0.126*	0.010	-0.081
Panel B: Cumulated flows 2010 $	Deposits 2010		% GDP 2010	
BoP residual (own estimate)	0.584*	0.667*	-0.004	0.042
GFI estimate[(a)]	-	0.635*	-	0.162
Ndikumana estimate[(b)]	0.380*	0.278	0.097	0.106

Sources: BoP estimate: own calculations from World Debt Tables and World Development Indicators (World Bank). GFI estimate: Kar and Spanjers (2014). Ndikumana estimate: http://www.peri.umass.edu/300/
Coverage: OECD countries not included. Liberia not included (BIS deposits reach more than 14 times GDP). Countries counting less than 500,000 inhabitants in 2010 not included. (a): 2003-2010 only; (b): Geographical Africa only.
Method: See text. For computing cumulated flows, flows in dollars are all deflated by the US GDP deflator and expressed this may in 2010 US dollars.
Note: Pearson's correlation coefficients between the indirect measure reported in row and the direct measure reported in column. *: $p<0.05$

Due to size effects, correlations are positive and significant when variables are expressed in dollar terms (levels): larger countries display larger flows and stocks. However, all correlations vanish when expressed in proportion of GDP (Table 1), whatever the period that

is considered, and whether we look at annual flows or at cumulated flows and stocks. Capital flight, as approached by various indirect methods, does not seem to translate in any significant variation of bank deposits held in major developed countries or tax havens, whether in the short or in the long run. This lack of correlation certainly testifies for the inaccuracy and drawbacks of both approaches, that we already underlined.

Yet, we argue that this absence of cross-validation should lead to handle indirect estimates with great caution. Further, when expressed in percentage of GDP, the three indirect measures are not very correlated with each other either, although constructed around the same principles. On the sample of African countries our own annual estimate correlates positively and significantly with the one of Ndikumana (0.385 for 1980-2010 and 0.284 for 2000-2010). Likewise, the Ndikumana estimate also correlates with the GFI's (0.415 for 2003-2010), probably because of the trade misinvoicing component. As our own annual estimate does not include the latter component, it is not correlated at all with the GFI estimate (-0.017). With regards to cumulated flows estimates, the only positive and significant correlation is between Ndikumana and GFI, even if all three estimates display rather similar orders of magnitude: for Sub-Saharan Africa, cumulated flows over 2000-2010 weight around 30% of 2010 GDP.

In the remainder of this document, we carry on exploring the potentials and the interpretation of direct estimates.

2/ Bank deposits abroad in 2010

We first ask about the relative financial extroversion of regions of the world, as measured by the amounts of bank deposits held abroad in 2010, compared to domestic money and quasi-money (M2 monetary aggregate). Both variables are expressed in proportion of the GDP of the origin countries.[5]

A look at standard deviations signals great heterogeneity within regions. In particular, as large countries are more closed than small ones, the regional ratio differs from the mean of individual countries' ratios.

[5] We use GDP rather than GNI for its availability, especially in earlier periods. We checked that our descriptive analysis is not changed when replacing GDP by GNI. See Appendix Table A1.

The OECD group is on the whole the most extroverted, with total deposits abroad representing 11.8% of total GDP (Table 1, column 1). Small size outliers bring the mean of ratios even higher to 31.2% (column 4): Luxembourg (with an individual ratio of 300%), Ireland (121%), Cyprus (85%), followed by United Kingdom (41%), Netherlands (35%) and Switzerland (31%). At the other extreme, Eastern Europe and Asia appear as rather closed regions: deposits abroad do not make more than 2% of GDP. Exceptions are Singapore (29%), Papua New Guinea (20%) and Solomon Islands (10%).

Table 2 - Bank deposits held abroad by region of residence in 2010

	Ratio to 2010 GDP			**Mean of country ratios**		
	(1)	(2)	(3)	(4)	(5)	(6)
	BIS Deposits	M2 Aggregate	BIS/ (M2+BIS)	BIS Deposits	M2 Aggregate	BIS/ (M2+BIS)
SSA						
Mean	0.053	0.482	0.099	0.086	0.366	0.165
Sd				0.165	0.221	0.122
N	39	39	39	39	39	39
Excl. S. Afr.						
Mean	0.061	0.333	0.154	0.087	0.355	0.168
Sd				0.167	0.213	0.122
N	38	38	38	38	38	37
MENA						
mean	0.072	0.609	0.106	0.094	0.812	0.099
Sd				0.078	0.542	0.064
N	15	15	15	15	15	15
Asia-Pacific						
mean	0.020	1.396	0.014	0.045	0.762	0.057
Sd				0.075	0.419	0.078
N	19	19	19	19	19	19
EECA						
mean	0.021	0.493	0.041	0.020	0.435	0.048
Sd				0.010	0.171	0.024
N	13	13	13	13	13	13
LAC						
mean	0.058	0.549	0.095	0.211	0.483	0.176
Sd				0.616	0.155	0.148
N	21	21	21	21	21	21
OECD & EU						
mean	0.118	1.364	0.079	0.226	1.325	0.085
Sd				0.551	0.953	0.089
N	34	34	34	34	34	34

Coverage: Liberia not included (BIS deposits reach more than 14 times GDP). Countries counting less than 500,000 inhabitants in 2010 not included. OECD includes all countries that were members of the organization as of 2010 (i.e. including Estonia and Chile). Croatia is included in EU as well.

Notes: Columns (1)-(2) Ratio of total deposits to total GDP in 2010 dollars. Columns (4)-(5): Mean of individual countries' ratios to GDP. Sd means standard deviation.

The Middle East and North Africa Region comes in second rank after OECD (6.4%). Oil emirates stand out, like Bahrain (20%), or Kuwait (19%), but also Lebanon (25%) and Jordan (18%).

Latin American and Caribbean countries come in third rank: they have 5.8% of total GDP in foreign bank deposits. Panama (290%), and more secondarily Uruguay (22%), are the most salient outliers; at the opposite, with a ratio of 1.2% Brazil drags the continental average downwards.

However Sub-Saharan Africa comes just after (5.3%), and even before MENA and LAC when withdrawing South Africa (6.7%). Here the main outliers are two very different (and small) countries: Mauritius (103%) and the oil-rich Equatorial Guinea (34%). Again excepting South Africa, Sub-Saharan Africa can be considered as the most extroverted region if we contrast foreign deposits with domestic money and deposits (33.3%, column 2). For African countries, the deposits held abroad represent about 15% of total money and quasi-money. For LAC, the same ratio is only 9.7% and it is even lower in any other region. The common perception of a high level of capital exit in Africa here finds an echo: it is not so much that a high fraction of income flees abroad, it is more that an important fraction of monetary *savings* is found outside rather than kept at home.

Discarding the most salient outliers listed above (i.e. ratios of deposits abroad to GDP higher than 25%), we check that the main regional contrast is the one that distinguishes Asia and Eastern Europe, as rather closed regions, to the rest of the world. Regarding the ratio of foreign deposits to domestic deposits, the most salient divide isolates Sub-Saharan Africa and Latin America, from the rest: in an average SSA or LAC country, deposits held abroad represent more than one sixth of domestic money and quasi-money (see Table 1 column 6).

3/ Bank deposits abroad across time

During the 2000-2010 decade, a lot of developing countries experienced high rates of economic growth (see Table 3 column 6 for the countries in our sample). In the meantime,

their real exchange rates also pretty much appreciated with respect to the US dollar. These two features make that the weight of foreign deposits in GDP tended to decrease in most areas/countries, except OECD countries, as the comparison of column (1) and (2) in Table 3 shows. When correcting for the evolution of real exchange rates by setting GDP in 2000 US dollars (column 3), then the evolution of deposit ratios turns positive in every region (column 4).

Table 3 - Bank deposits held abroad from 2000 to 2010

	Ratio of deposits to GDP					GDP
	(1)	(2)	(3)	(4)	(5)	(6)
	2000	2010	2010 at 2000 prices	(3)-(1)	(3)-(1) without outliers	Average Annual growth
SSA						
Mean	0.057	0.052	0.112	+0.055	+0.030	+0.041
N	42	42	42	42	40	42
Excl. S. Afr.						
Mean	0.071	0.059	0.134	+0.063	+0.024	+0.047
N	41	41	41	41	39	41
MENA						
mean	0.122	0.072	0.143	+0.021	+0.012	+0.041
N	15	15	15	15	12	15
Asia-Pacific						
mean	0.021	0.020	0.036	+0.015	+0.015	+0.076
N	19	19	19	19	18	19
EECA						
mean	0.022	0.021	0.068	+0.046	+0.046	+0.049
N	16	16	16	16	16	16
LAC						
mean	0.081	0.058	0.110	+0.029	-0.009	+0.033
N	21	21	21	21	20	21
OECD & EU						
mean	0.059	0.112	0.161	+0.102	+0.052	+0.012
N	37	37	37	37	31	37

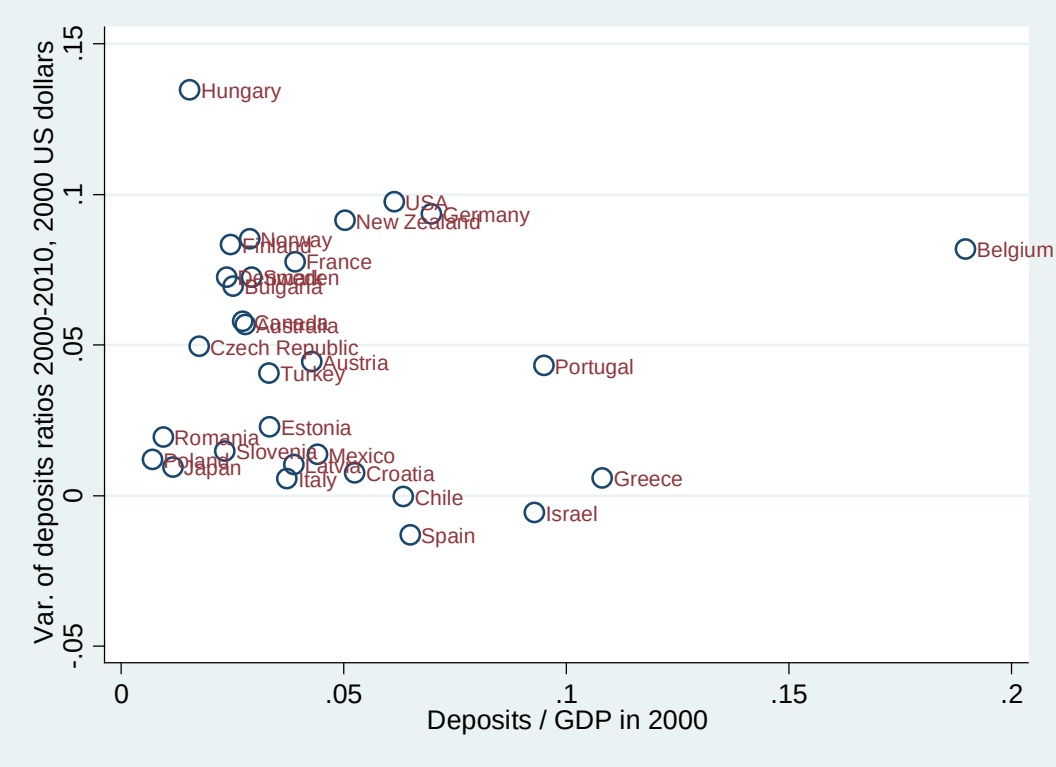
Coverage: Liberia not included (BIS deposits reach more than 14 times GDP). Countries counting less than 500,000 inhabitants in 2010 not included.

Notes: Columns (1)-(2) Ratio of total deposits to total GDP in current US dollars. Column (3): Ratio of total 2010 deposits in 2000 US dollars: at the numerator, deposits are deflated by the US GDP deflator; at the denominator; GDP in 2010 is deflated by the country's GDP deflator and converted in dollars at the 2000 exchange rate.

Even after this correction, the OECD area still keeps a first rank position for the increase in deposits ratios, with a +10.2 percentage points variation between 2000 and 2010. This increase is in particular driven by the huge growth of deposits of residents in countries which already stood as outliers in terms of 2010 levels: Luxembourg, Ireland, Cyprus, United Kingdom, Netherlands, and Switzerland.[6]

Column 5 in the Table reports variations where such outliers, defined as having a deposit ratio above 25% of GDP in 2000 or a variation higher than 25 percentage points (negative or positive), have been discarded (see also Appendix Figures 1a and 1b). Without outliers, the increase in foreign deposits of OECD residents is halved (+5.2 pp). In Figure 1, we can see that OECD countries that were particularly hit by the financial crisis of 2008 are among those where foreign deposits increased the less or decreased: Greece, Spain, Italy, Estonia, Latvia, Slovenia and Japan.

Figure 1 - Foreign deposits of OECD & EU residents 2000-2010

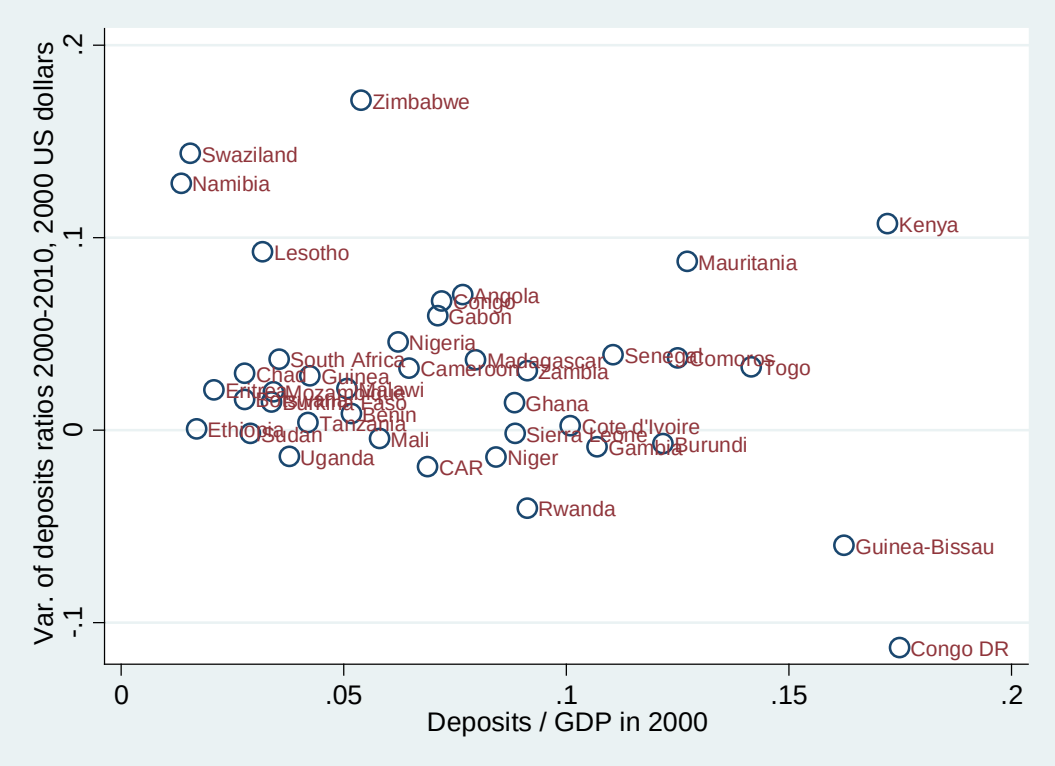


Note: Luxembourg, Ireland, Cyprus, United Kingdom, Netherlands, and Switzerland lie outside of the picture (see A1a).

[6] Part of the growth observed for United Kingdom could be due to the inclusion of Isle of Man, Guernsey, and Jersey into the sample in 2001.

Sub-Saharan comes second (+5.5 pp) after OECD, but again due to the contributions of Mauritius (+105 pp) and Equatorial Guinea (+76 pp), without which the increase would be +3.0 pp only. Figure 2 reveals that foreign deposits from residents of Congo Democratic Republic and of Guinea-Bissau collapsed, while those from Austral countries near South Africa boomed. The main African oil-producers (Angola, Nigeria, Gabon, Congo, Cameroon), excepting Sudan, lie at the center of the picture with deposits in 2000 weighing around 7% of their GDP. They do not seem to have experienced a particularly large boom in deposit ratios, despite the boom of the international price for crude oil by 182%.[7]

Figure 2 - Foreign deposits of Sub-Saharan Africa residents 2000-2010



Note: Mauritius and Equatorial Guinea lie outside of the picture (see A1a).

A comparison with similar graphs for Sub-Saharan Africa for the two previous decades: 1980-1990 and 1990-2000 (Appendix Figures A6a & A6b), suggests that the deposit ratio is very volatile. Between 1980 and 2010, a majority of countries experienced an increase in deposit

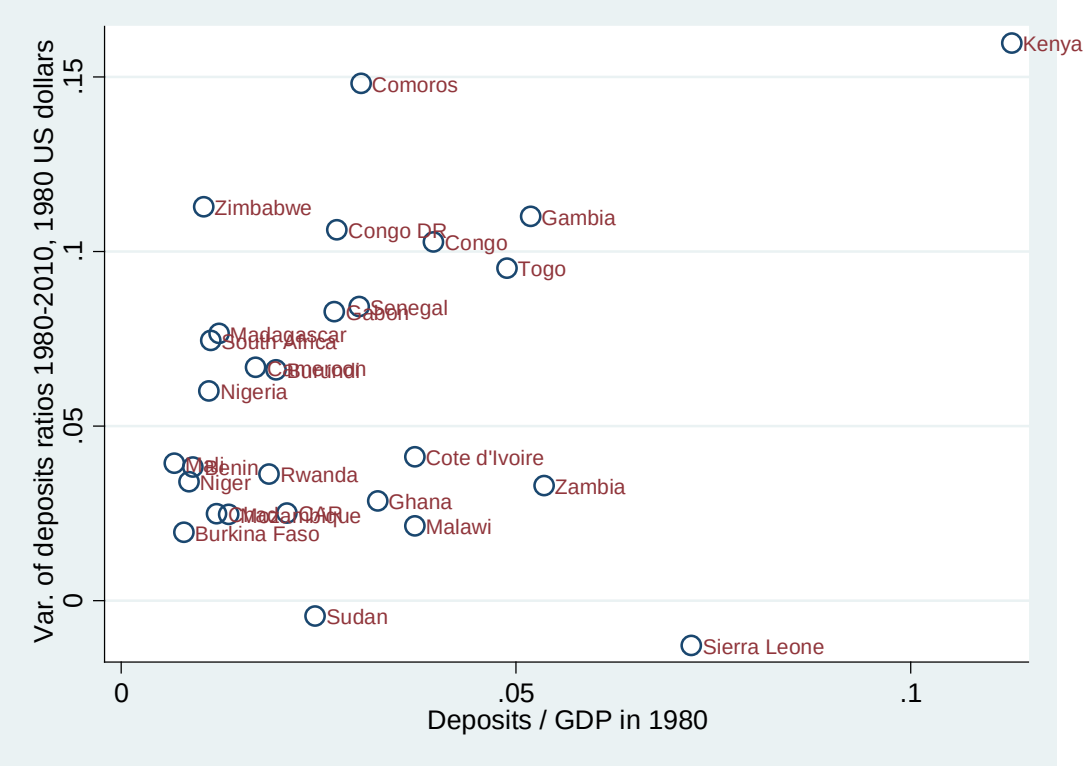
[7] In the MENA region during the same period, the experiences of oil-producers are very heterogeneous (see Appendix Figure A5).

ratios ranging between 0 and 5 percentage points. It is hard to discern any robust pattern distinguishing winners and losers, outside of deep political crises or huge economic bonanzas.

For instance, in the 1980 foreign deposits of Sierra Leone residents boomed (Appendix Figure 6b), then fell when political order was restored at the end of the 1990s (Appendix Figure A6a1). A similar pattern was observed for Guinea-Bissau: boom in the 1990s, collapse in the 2000s. Likewise, the boom of foreign deposits of Zimbabweans in the 2000s (Figure 2) is likely to have responded to the political context in this country. Mobutu's kleptocracy in former Zaire (nowadays Congo DR) is also well illustrated by huge increases in deposits abroad in the 1990s (until his fall in 1997; see Figure 3 and Appendix Figure A6a1), followed by a collapse in the 2000s. On the side of bonanzas, the boom in deposits from Equatorial Guinea is straightforwardly related to the boom of oil rents in the 2000s.

Yet many other evolutions, like for Namibia, Lesotho and Swaziland, or for Kenya, Gambia and Mauritius, are more difficult to account for, without a better knowledge of changes in the banking sector regulations, or in the costs associated to exporting money savings abroad.

Figure 3 - Foreign deposits of Sub-Saharan Africa residents 1980-2010



Note: Mauritius and Equatorial Guinea lie outside of the picture (see A1a).

The high volatility of foreign deposit ratios, GDP growth and of the political context of developing countries is illustrated by Table 4. We correlate current variations in deposit ratios with lagged variations, either on an annual basis or on a decadal basis. The two measurements of deposit ratios introduced in Table 3 are used: either with current GDP as denominator, or real GDP in t-1 (or t-10) US dollars; we add also the ratio to lagged GDP, where only the numerator (variation of deposits in US dollars) varies across time. We also calculate the same auto-correlations for GDP growth (in real terms) and for the polity II score of democracy (only on a decadal basis for the latter).[8]

Table 4 - Auto-correlation of variations of bank deposits abroad across time

	All	OECD & EU	Non-OECD	SSA
Panel A: Annual (1980-2010)				
Var. in deposits to GDP ratio[(a)]	+0.114*	+0.247*	+0.100*	-0.009
Var. in deposits to GDP in t-1 US dollars[(b)]	+0.115*	+0.288*	+0.086*	+0.030
Var. in deposits to GDP t-1[(c)]	+0.175*	+0.375*	+0.137*	+0.071*
GDP growth	+0.338*	+0.408*	+0.299*	+0.275*
Panel B: Decadal (1980-90/1990-2000/2000-10)				
Var. in deposits to GDP ratio[(a)]	-0.385*	+0.203	-0.527*	-0.381*
Variation in deposits to GDP in t-10 US dol.[(b)]	-0.144	+0.181	-0.291*	-0.344*
Variation in deposits to GDP in t-10[(c)]	-0.204*	-0.023	-0.270*	-0.476*
GDP growth	+0.359*	+0.220	+0.362*	+0.088
Polity II score of democracy	-0.343*	+0.008	-0.411*	-0.518*

Coverage: EECA countries not included. Data points with initial deposits weighting more than 25% of GDP or with variations above 25% are discarded (see Appendix Figures 1a and 1b for 2000-2010).
Notes: (a): First difference of ratio of total deposits to GDP, in current US dollars (b): First difference of ratio of total deposits in t-1 (or t-10) US dollars: at the numerator, deposits are expressed in t-1 (or t-10) dollars using the US GDP deflator; at the denominator; GDP is expressed in t-1 (or t-10) US dollar terms. (c): First difference of ratio of total deposits to GDP in t-1 (or t-10); only the numerator (deposits) moves here.
Note: Pearson's correlation coefficients between the variable mentioned in row and its lagged value. The polity II score ranges between -5 (autocratic regimes) and 10 (non-autocratic regimes).

[8] Outliers with very large deposit ratios or deposit variations are again discarded from this analysis.

*: $p<0.05$

OECD and EU countries display in general positive auto-correlations for the variation of the deposit ratios, signaling some limited persistence in capital flows. The auto-correlation of growth spells is also positive (+0.408 for annual, +0.220 for decadal). The polity score displays no auto-correlation at all, its time variability being fairly limited for OECD and EU countries.

Developing countries, and Sub-Saharan Africa in particular, display a different pattern of auto-correlations, that points to significant volatility in all three dimensions. On an annual basis, the variation of deposits displays very low persistence. On a decadal basis, it displays negative auto-correlation, reflection some degree of reversion to a more stable mean level.

While annual growth spells display some persistence, decadal growth spells of Sub-Saharan countries are not correlated.[9] The political score displays very pronounced oscillations.

4/ Oil rents and bank deposits abroad

Following Andersen et al. (2014), we ask whether variation in oil rents are passed to bank deposits abroad.[10]

In Table 5, we look at the variation of bank deposits over the decade 2000-2010, when the price for crude oil nearly tripled (+182%), and contrast oil-producers with other countries. Among 104 non-OECD countries for which we have sufficient data, we distinguish 26 countries where oil rents represent more than 5% of GDP. This latter share reaches 30% in the average oil-producer. In 2000, the bank deposit ratio to GDP in 2000 is only slightly (and non-significantly) higher in the average oil-producer compared to the average non-producer.[11] Strikingly enough, the polity II score of democracy is much lower in the oil-producers' sample.

[9] For non-SSA countries, the autocorrelation of growth is positive although insignificant for decadal spells. In particular, growth in Asian countries was more stable throughout the 1980-2010 period.
[10] As already underlined, Andersen et al. (2014) focus on bank deposits in tax havens, which our data do not allow us to do.
[11] For countries on which data is available, no difference in past trends (e.g. 1990-2000) is identified either.

The initial oil price boom would have increased the oil rent to GDP ratio by 126% on average (i.e. +182% minus the change in international prices by 20%), or by 37 percentage points of initial GDP . The oil rent ratio actually increased more, by 56 percentage points, thanks in particular to increases in oil production.

In the meantime, we see that the deposit ratio to initial GDP grows by 9.1 percentage points, by 4.8 pp only in other countries, the 4.3 pp difference being statistically significant. If we were to refer the initial price shock to this increase in deposits, then we could say that around 12% (4.3/0.37) of the price shock was passed to deposits abroad.

Table 5 - Oil rents in non-OECD countries between 2000 and 2010

	Oil Producers Mean level	Other Countries Mean level	Diff.
Oil rent / GDP 2000	0.299	0.004	+0.294*
Polity II score	-2.6	2.4	-5.0*
Deposits / GDP 2000	0.088	0.063	+0.025
Oil price shock on oil rent[(a)] / GDP 2000	0.370	0.005	+0.365*
Var. Oil rents / GDP 2000	0.564	0.031	+0.533*
Var. Deposits / GDP 2000[(b)]	0.091	0.048	+0.043*
Average annual Growth of GDP	0.053	0.042	+0.011
Var. Deposits / GDP at 2000 prices[(c)]	0.011	0.011	+0.000
Var. Real exchange rate[(e)]	-0.412	-0.258	-0.153*
Var. Deposits / GDP[(d)]	-0.028	-0.008	-0.020*
N	26	78	104

Coverage: Equatorial Guinea, Mauritius and Panama are not included, as extreme outliers in deposit variations.
Notes: Oil rent is calculated by the World Bank as oil output minus extraction costs. Oil-producers are defined as having an oil rent to GDP ratio higher than 5% in 2000: Angola, Cameroon, Congo, Gabon, Nigeria, Sudan, Indonesia, Malaysia, Vietnam, Azerbaijan, Kazakhstan, Russian Federation, Turkmenistan, Uzbekistan, Colombia, Ecuador, Trinidad & Tobago, Venezuela, Algeria, Bahrain, Egypt, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates. According to this definition, the only OECD oil-producer would be Norway.
(a): Oil rent in 2000 reevaluated at crude oil price of 2010 (deflated by US GDP deflator), minus oil rent in 2000.
(b): First difference of ratio of deposits (deflated by US GDP deflator) to GDP in 2000; only the numerator (deposits) moves here.
(c): First difference of ratio of deposits to GDP in 2000 US dollars: at the numerator, deposits are deflated by the US GDP deflator; at the denominator; GDP is expressed in 2000 US dollar terms.
(d): First difference of ratio of total deposits to GDP, in current US dollars.
(e): Negative means appreciation versus US dollars and prices.
*: $p<0.05$ (for difference only). White's robust standard errors.

Yet the oil price shocks also had second round consequences on GDP growth (1 percentage point higher for oil-producers), and on the real exchange rate (higher appreciation for oil-

producers, by 15 percentage points). The growth effect was enough to cancel out the difference in deposit ratios, when no longer computed in terms of initial (2000) GDP, but in terms in final (2010) GDP at initial prices. The exchange rate appreciation effect was even enough to revert the differential evolution: the deposit ratio in terms of current GDP relatively decreases for the average oil-producer. However we can think that these figures provide suggestive evidence that the oil price shock was partially passed to bank deposits abroad. Oil-producing countries display less democratic checks and balances, it is plausible that some of this money sent abroad was the result of increased corruption, although of course this cannot be definitely ascertained.[12]

Table 6 - Annual variation in oil rents and bank deposits abroad

	(Deposits in t - Deposits in t-1) / GDP t-1					
	2000-2010	2000-2010	1980-2010	1980-2010	2000-2010 SSA	1980-2010 SSA
	(1)	(2)	(3)	(4)	(5)	(6)
Var. Deposits t-1 / GDP t-1	+0.012	+0.010	+0.096	+0.093	+0.092	-0.005
	(0.070)	(0.070)	(0.050)	(0.050)	(0.065)	(0.072)
Var. Oil rent / GDP t-1	+0.029*		+0.038*			
	(0.011)		(0.017)			
Var. Oil rent t-1 / GDP t-1	+0.016		+0.006			
	(0.012)		(0.010)			
Sum Var. Oil rent t & t-1	+0.046*		+0.044*			
	(0.020)		(0.022)			
Oil price shock / GDP t-1		+0.041*		+0.043*	+0.031*	+0.008
		(0.016)		(0.021)	(0.010)	(0.006)
Oil price shock t-1 / GDP t-1		+0.026		+0.015*	+0.012	+0.015
		(0.016)		(0.016)	(0.010)	(0.008)
Sum Oil price shocks t & t-1		+0.067*		+0.058*	+0.043*	+0.023*
		(0.030)		(0.025)	(0.017)	(0.010)
N	1187	1187	2745	2745	427	1083
Countries	115	115	116	116	41	42

Coverage: Data are also trimmed: for each variable, values which lie above or below the mean by more than 5 standard deviations are set to missing. Equatorial Guinea, Lebanon, Mauritius and Panama are not included, as extreme outliers in deposit variations.

Notes: Dependent variable is the variation in ratio if bank deposits abroad in t-1 US dollars to GDP of country of origin in t-1. All variables are expressed as ratios to GDP in t-1. OLS regression with country fixed effects. Errors are clustered by country. Standard errors between parentheses

*: $p<0.05$

[12] When contrasting the developments of deposit ratios of the 27 countries with the worst Polity II scores (i.e. lower than -3 on a scale from -10 to 10) with the 77 others, we do not observe such a significant difference.

We then wonder whether the same transmission of oil price shocks was observed on an annual basis. We could indeed expect to observe even higher transmission rates, as bank deposits abroad could only be a transitory location for capital flight, some of the money being then invested in other less liquid assets, like housing or shares. In Table 6 we regress the variation of the deposit ratio to initial GDP (in t-1) on the variation of oil rents from one year to another, or alternatively on the pure oil price shock.

Provided that we discard a few extreme observations, we again find a significant transmission of increases in oil rents to bank deposits abroad. However, the annual transmission rate is found to be lower than the decadal one. For oil price shocks, it is found to lie between 2.3% to 6.7, depending on the geographical area (all non-OECD or Sub-Saharan Africa only) and on the period (2000-2010 or 1980-2010), i.e. much less than the previous decadal estimate of 12.2%. Measurement errors could account for this attenuation.

We then test for a ratchet effect on oil rents. If passing some fraction of oil rents to bank deposits abroad is motivated by securing savings in foreign countries, one should expect a dissymmetrical effect of positive variations of income, compared to negative variations, i.e. some kind of ratchet effect: capital exits in good times but does not return in bad times.

Table 7 - Ratchet effect on annual variations of oil rents over 1980-2010

	(Deposits in t - Deposits in t-1) / GDP t-1			
	(1)	(2)	(3) With t-1 lags	(4) With t-1 lags
Var. Deposits t-1 / GDP t-1	+0.094	+0.093	+0.094	+0.092
	(0.049)	(0.049)	(0.049)	(0.050)
Var. Oil rent / GDP t-1 if <0	+0.008		-0.001	
	(0.010)		(0.027)	
Var. Oil rent / GDP t-1 if >0	+0.063*		+0.076*	
	(0.028)		(0.035)	
Diff. positive effect - negative effect	+0.055*		+0.077	
	(0.027)		(0.046)	
Oil price shock / GDP t-1 if <0		+0.009		+0.043
		(0.019)		(0.038)
Oil price shock / GDP t-1 if >0		+0.076*		+0.072*
		(0.031)		(0.030)
Diff. positive effect - negative effect		+0.068*		+0.030
		(0.029)		(0.041)
N	2745	2745	2745	2745
Countries	116	116	116	116

Coverage: Data are also trimmed: for each variable, values which are above the mean by more than 5standard deviations are set to missing. Equatorial Guinea, Lebanon, Mauritius and Panama are not included, as extreme outliers in deposit variations.
Notes: Dependent variable is the variation in ratio if bank deposits abroad in t-1 US dollars to GDP of country of origin in t-1. All variables are expressed as ratios to GDP in t-1. OLS regression with country fixed effects. Errors are clustered by country. Standard errors between parentheses. Columns (1) and (2) only consider the impact of current oil rent shocks (year t), while columns (3) and (4) add t-1 lags, as in Table 6.
*: $p<0.05$

We tried to test for this ratchet effect by distinguishing positive variation of oil rents (or of oil price) from negative variations, all over the 1980-2010 period. Results provide some support to the ratchet effect hypothesis. The impact of negative variations in oil rents is always null or insignificant, while the impact of positive variations is positive and always significant.

More research is warranted in order to uncover the determinants of bank deposits abroad, in that they could reflect capital exit or even capital flight.[13]

5/ Temporary conclusions

1) Figures on bank deposits abroad could be deemed a better approach to the phenomenon of capital flight than indirect measurements from balance of payment and trade statistics. The latter depend on a number of questionable assumptions, and are revealed to have no correlation at all with bank deposits.

2) From the viewpoint of bank deposits held abroad, Asia is still a closed continent, while Sub-Saharan Africa and Latin America look more extroverted, especially when deposits located in foreign countries are contrasted with domestic monetary aggregates. In these countries, savings held abroad on bank deposits can make more than 15% of total monetary savings.

3) Yet, bank deposits abroad are only one potential outcome of capital exit or flight, also impacted by other forms of capital mobility across assets, and by exchange rate gains or losses (given the currency composition of deposits). They are volatile and display extreme variations for some countries, due to idiosyncratic economic and/or political shocks.

[13] With similar estimates as in Table 6, we tried correlating variations in deposits ratios with foreign direct investment or foreign aid inflows. We could not find any robust relationship.

4) There is suggestive evidence that rents stemming from oil production are passed to bank deposits abroad in good times, and do not return in bad times. More research is warranted to study other potential channels, like foreign aid or foreign direct investment. In this respect, more detailed bilateral data is needed, in order to control for changes in the sample of declaring banks and countries, for compositional effects of exchange rate variations, and also to be able to differentiate capital exit motives according to countries of destination (former colonizer, tax haven, bank secrecy, etc.).

Appendix 1: Real estate investments in France

Capital exit can be studied through real estate investments abroad. Ideally, one would want an exhaustive dataset on all real estate investments made by foreign residents, by investor's country. Such precise data do not exist. However, this study uses a very complete dataset, containing all real estate properties owned in France. It relies on the French Property tax dataset, which reports one observation per French property. The country of residence of the property's owner is reported and the dataset provides this information for years 2003, 2005, 2007, 2009, 2010, 2011, 2013. Thus, for each of these years, we are able to compute the estimated value of properties held in France by residents of a given country.

	Real Estate Properties in France	
	Ratio to 2010 GDP	**Mean of country ratios**
	(1)	(2)
Africa – ex French colonies	170.23	158.35
N	17	17
Africa - other	8.31	11.35
N	15	15
Asia	3.15	9.46
N	14	14
EECA	8.19	4.76
N	8	8
LAC	2.97	15.05
N	19	19
MENA	20.68	36.38
N	14	14
OECD	21.24	28.62
N	32	32

Notes: Column (1): Ratio of total deposits to total GDP in 2010 dollars. Columns (2): Mean of individual countries' ratios to GDP. Ratios are multiplied by 10^6.

We obtain a dataset containing countries × years, and the estimated value of real estate properties owned in France by each country's residents, for a given year. In the table above, we report continent mean of this estimated value in 2010, divided by the 2010 GDP. Given the low order of magnitude of real estate properties values compared to GDP, all the ratios are multiplied by 10^6. Relatively to GDP, former African French colonies are the biggest investors in France, followed by OECD countries (for which real estate investments relative to GDP are still more than three times lower). From there, we can have a look at the top countries in terms of residents' real estate ownership in France in 2010.

Real Estate Properties in France: top countries in terms of 2010 stock/2010 GDP

Senegal	Madagascar	Comoros	Gabon	Togo	Cote d'Ivoire	Switzerland	Belgium
381	304	283	269	223	222	213	208
Morocco	Benin	Congo, Rep.	Dominica	Lebanon	Central Afri. Rep.	Mauritania	Cameroon
143	143	139	122	121	119	116	111

Appendix 2: Coverage of BIS data

BIS locational banking statistics provide quarterly data on international financial claims and liabilities of bank offices resident in the BIS reporting countries broken down by country of residence of counterparty. In this dataset, both domestic and foreign-owned banking offices in the reporting countries report their outstanding positions.

BIS Reporting countries, data available from:

Australia	1997	Ireland	1977
Austria	1977	Isle of Man	2001
Bahamas	1983	Italy	1977
Bahrain	1983	Japan	1977
Belgium	1977	Jersey	2001
Bermuda	2002	South Korea	2005
Brazil	2002	Luxembourg	1977
Canada	1977	Macao SAR	2003
Cayman Islands	1983	Malaysia	2007
Chile	2002	Mexico	2003
Chinese Taipei	2000	Netherlands	1977
Curaçao	1983	Norway	1983
Cyprus	2008	Panama	2002
Denmark	1977	Portugal	1997
Finland	1983	Singapore	1983
France	1977	South Africa	2009
Germany	1977	Spain	1983
Greece	2003	Sweden	1977
Guernsey	2001	Switzerland	1977
Hong Kong SAR	1983	Turkey	2000
India	2001	United Kingdom	1977
Indonesia	2010	United States	1977

Appendix Figures and Tables

Figure A1a - Outliers for the increase in deposits abroad between 2000 and 2010

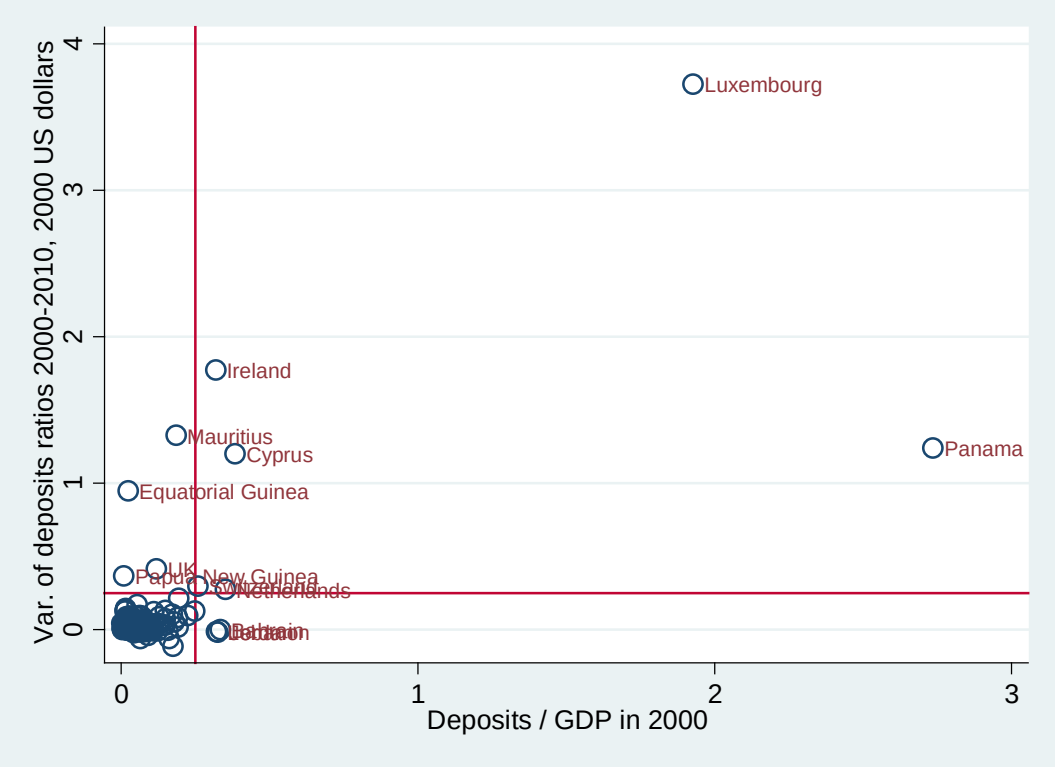


Figure A1b - All countries except outliers (SW corner of Figure 1)

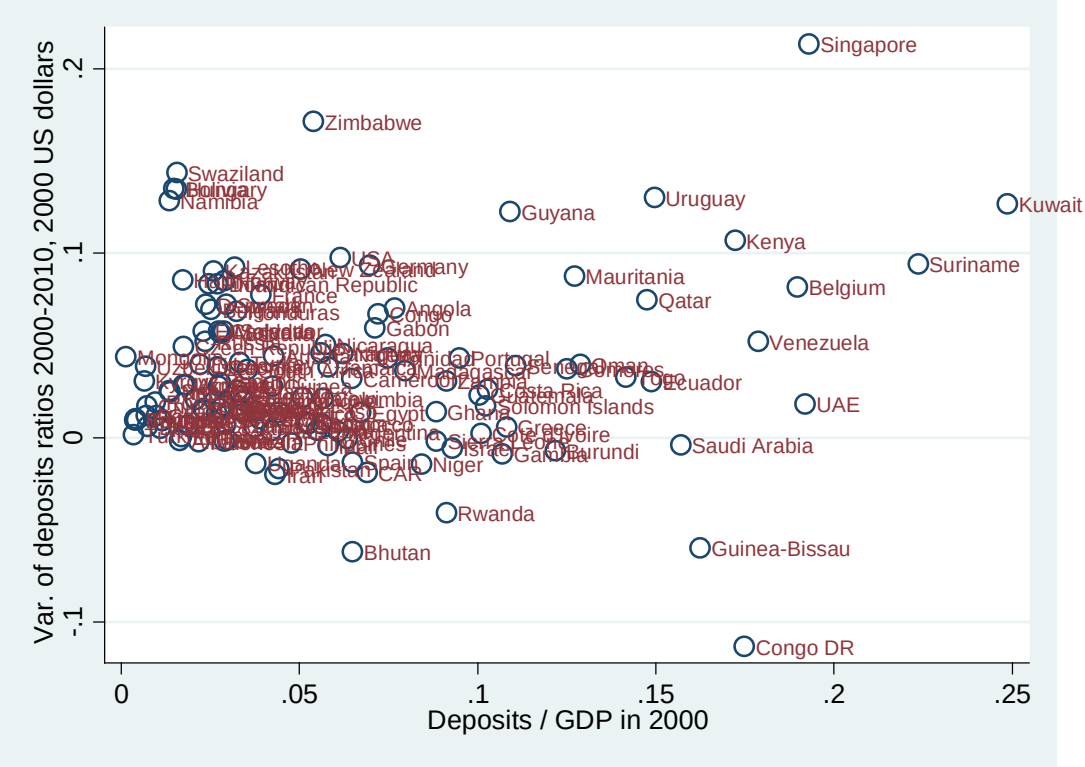
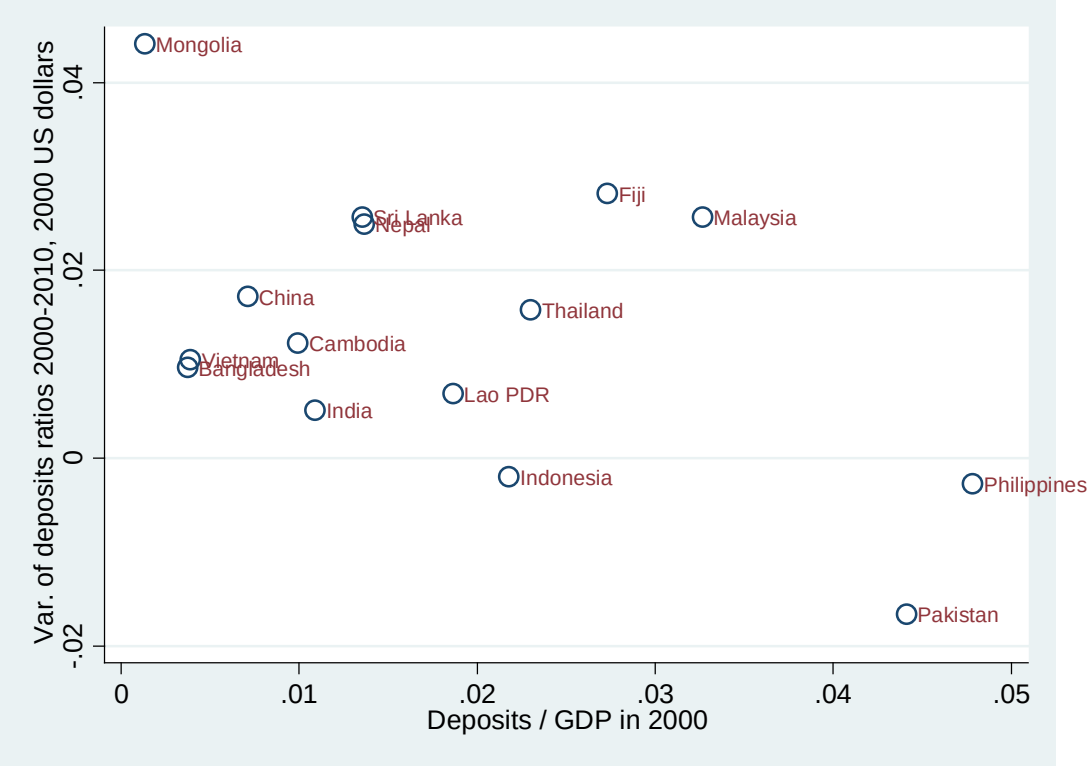


Figure A2 - Foreign deposits of Asia-Pacific residents 2000-2010



Note: Singapore, Bhutan and Solomon Islands lie outside of the picture (see A1b).

Figure A3 - Foreign deposits of EECA residents 2000-2010

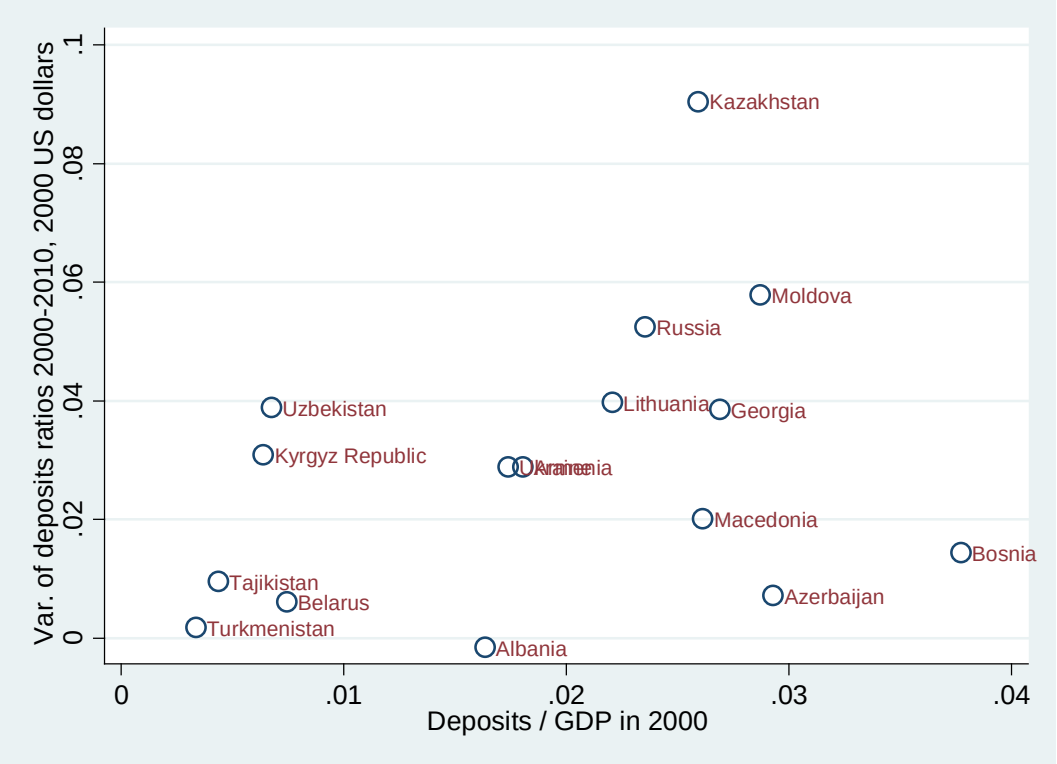
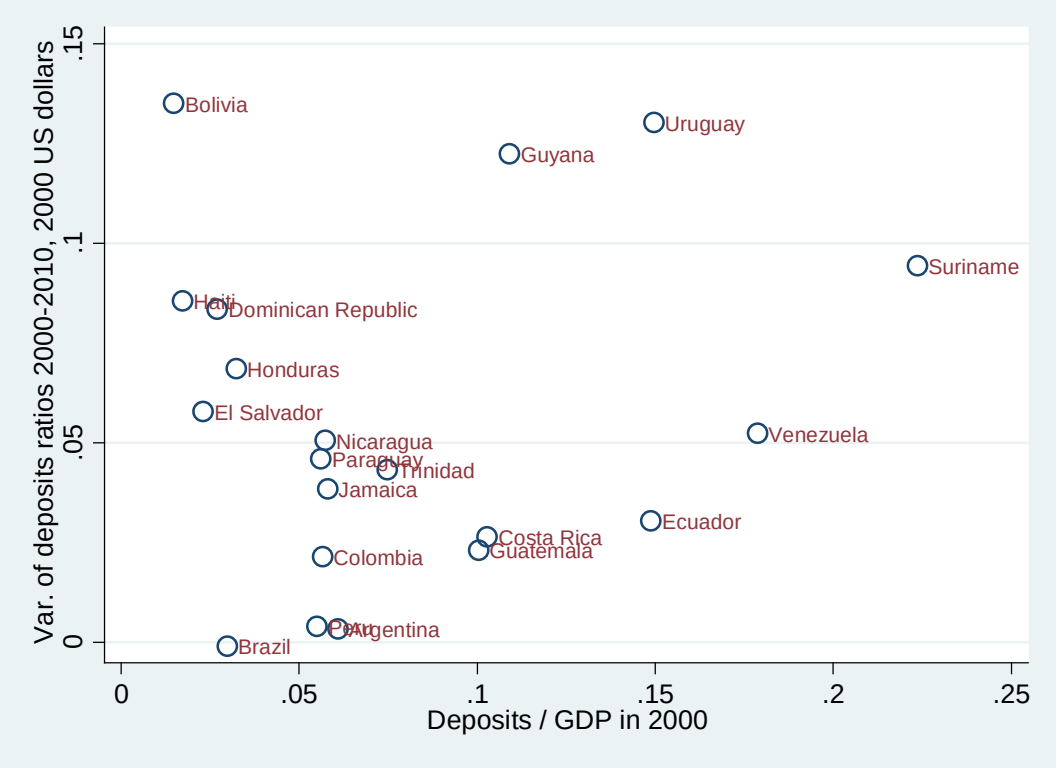


Figure A4 - Foreign deposits of LAC residents 2000-2010



Note: Mexico and Chile are displayed in the OECD figure. Panama lies outside of the picture (see A1a).

Figure A5 - Foreign deposits of MENA residents 2000-2010

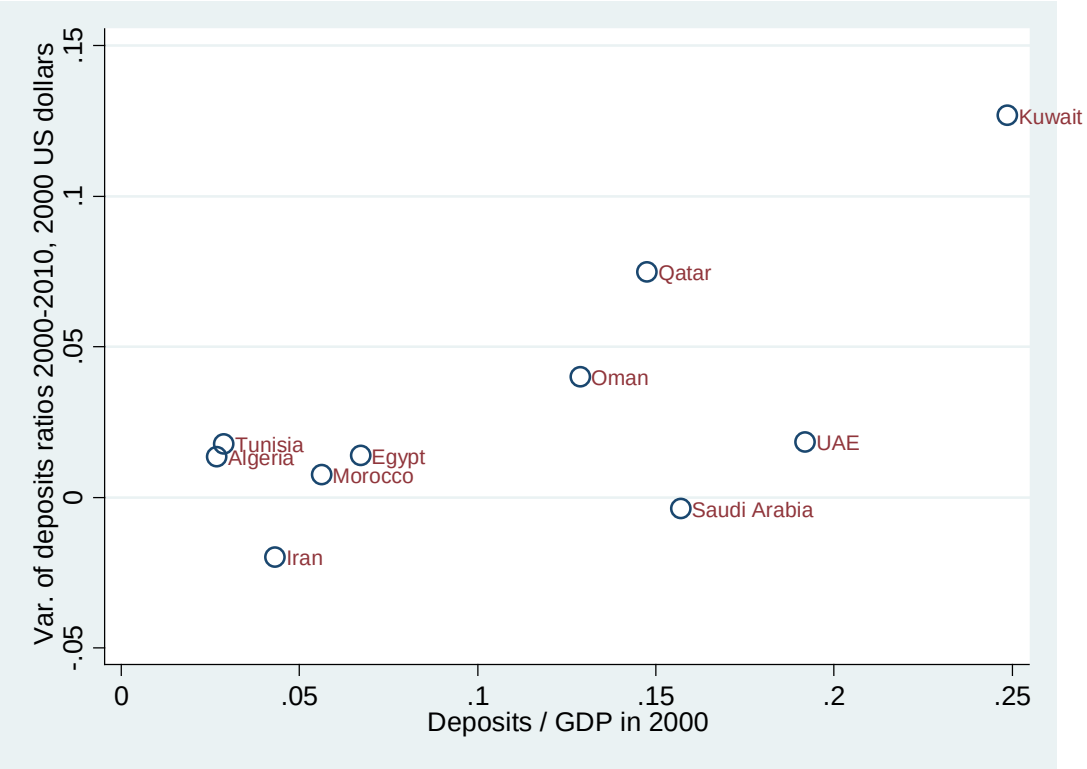


Figure A6a1 - Foreign deposits of Sub-Saharan Africa residents 1990-2000

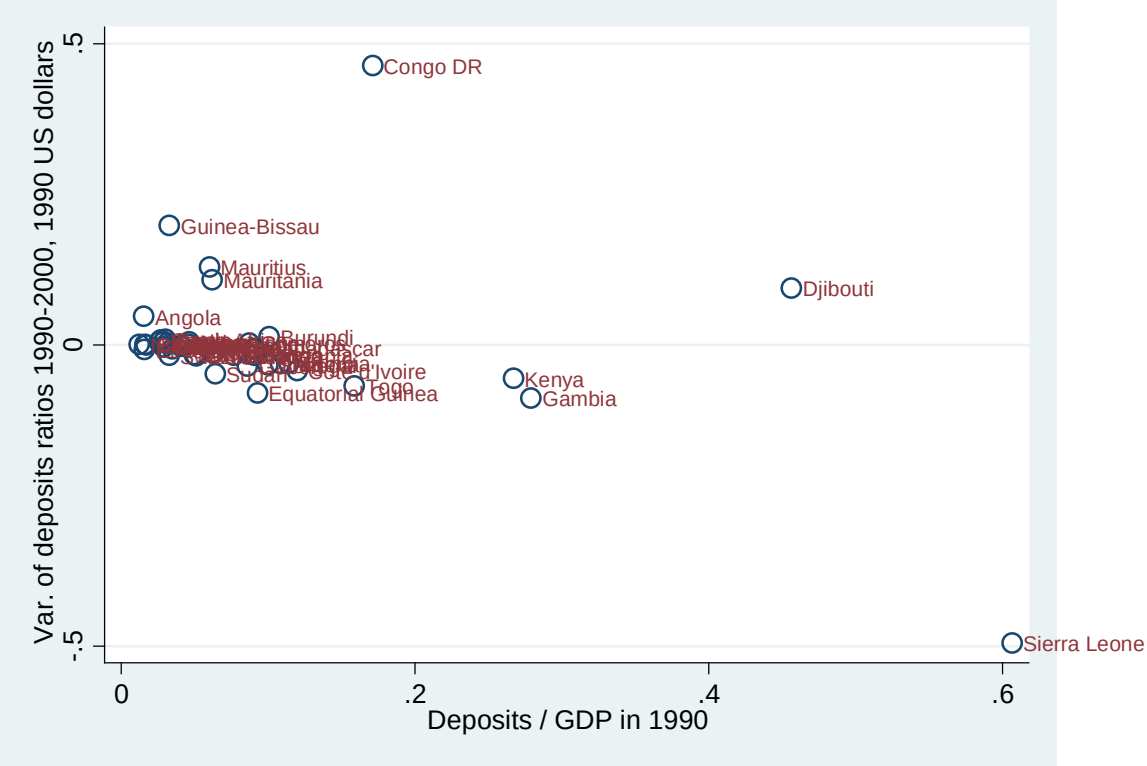


Figure A6a2 - Foreign deposits of Sub-Saharan Africa residents 1990-2000 (zoom)

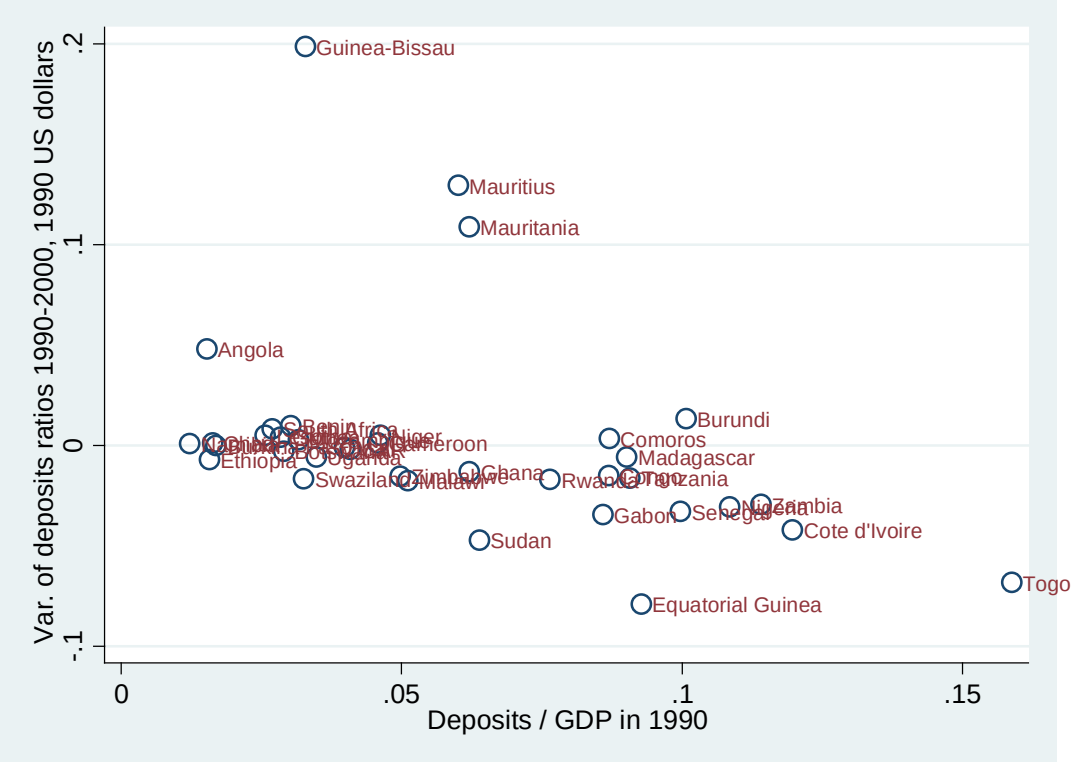
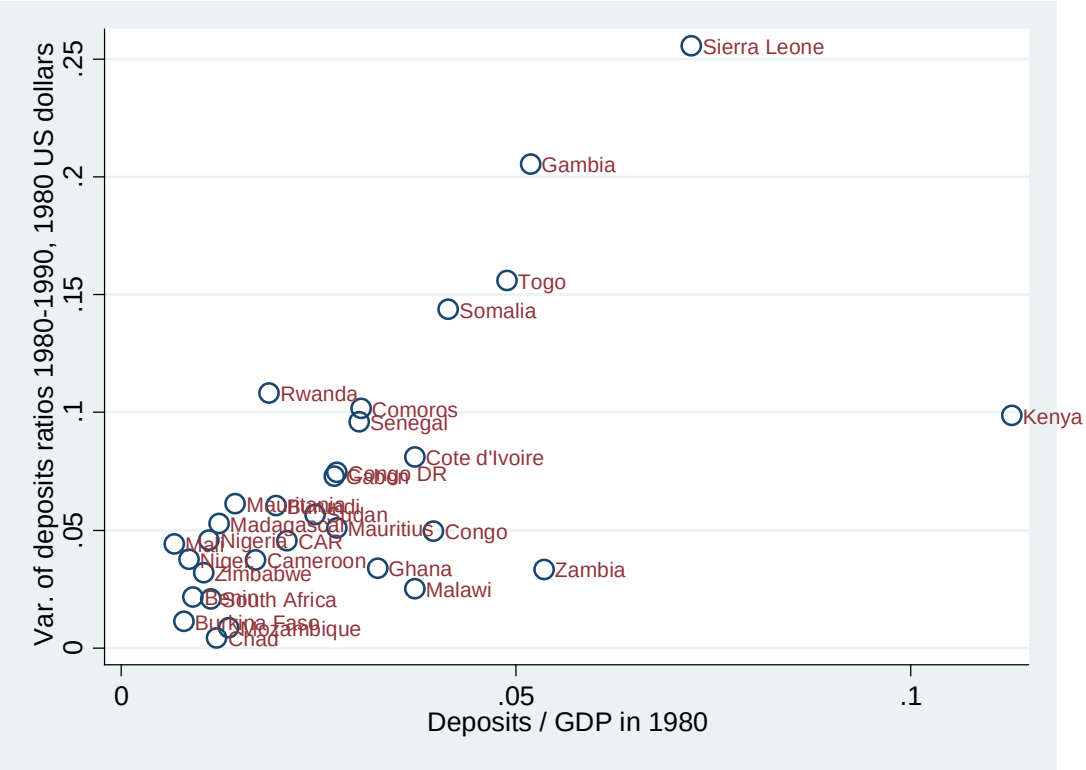


Figure A6b - Foreign deposits of Sub-Saharan Africa residents 1980-1990



Appendix Table A1

	Ratio to 2010 GNI			Mean of country ratios		
	(1)	(2)	(3)	(4)	(5)	(6)
	BIS Deposits	M2 Aggregate	BIS/ (M2+BIS)	BIS Deposits	M2 Aggregate	BIS/ (M2+BIS)
SSA						
Mean	0.060	0.545	0.099	0.094	0.395	0.163
Sd				0.179	0.254	0.123
N	38	38	38	38	38	38
Excl. S. Afr.						
Mean	0.067	0.366	0.154	0.096	0.380	0.166
Sd				0.182	0.241	0.123
N	37	37	37	37	37	37
MENA						
mean	0.072	0.614	0.093	0.107	0.947	0.099
Sd				0.087	0.555	0.060
N	13	13	13	13	13	13
Asia-Pacific						
mean	0.021	1.485	0.014	0.048	0.808	0.057
Sd				0.078	0.429	0.078
N	19	19	19	19	19	19
EECA						
mean	0.022	0.533	0.039	0.023	0.479	0.047
Sd				0.014	0.170	0.025
N	19	19	19	19	19	19
LAC						
mean	0.059	0.580	0.092	0.210	0.530	0.170
Sd				0.591	0.166	0.150
N	21	21	21	21	21	21
OECD						
mean	0.115	1.386	0.076	0.355	1.808	0.091
Sd				0.957	1.488	0.089
N	20	20	20	20	20	20

Coverage: Liberia not included (BIS deposits reach more than 14 times GDP). Countries counting less than 500,000 inhabitants in 2010 not included.

Notes: Columns (1)-(2) Ratio of total deposits to total GNI in 2010 dollars. Columns (4)-(5): Mean of individual countries' ratios to GDP.

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