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Robert Osei, Oliver Morrissey and Robert Lensink

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Abstract
This paper reports on trends and levels of capital inflows, and the volatility of such inflows, to a sample of 60 developing countries over the period from 1970 to 1997. The data cover aid and other development finance as the principal forms of official flows, FDI and other private flows, and debt (stock and flows). For each type of inflow to each country, three alternative measures of instability are calculated. To summarise the results, the countries are grouped into low income, lower middle and upper middle income. The measures of instability for each type of flow in each group and the evolution over time are discussed. The paper provides evidence that instability has increased in the 1990s (relative to the 1980s, but not to the 1970s), that official flows are less volatile than private flows, and the instability in FDI is lower than in other private flows. The paper also shows that the poorest countries have become increasingly reliant on aid and debt finance, attracting almost no private capital and little FDI. Only the richer developing countries attract significant volumes of FDI and private capital (but both are quite volatile).

Outline

1 INTRODUCTION

Foreign capital inflows are an essential source of investment finance for all countries, especially those on lower income levels (for which domestic savings rates tend to be low). Stable streams of inflows will support investment planning, whereas unstable flows may discourage investment and hence have a detrimental effect on growth (Lensink and Morrissey, 2000). Recently, some commentators have argued that increasingly volatile capital flows may lead to macroeconomic instability and contribute to financial crises (e.g. Gabriele *et al*, 2000). How volatile are capital inflows to developing countries and has this changed over time? The aim of this paper is to provide data on trends in the composition and volatility of capital inflows to developing countries since the 1970s. There are many different types of capital flow, and their importance to specific countries differs. This paper concentrates on four types - debt, official flows (aid), foreign direct investment (FDI) and other private flows – and three groups of countries – low, lower middle and upper middle income. We consider trends in the importance and volatility of each type of inflow.

The core issue of concern is the degree of year-on-year variability of inflows – are the flows steady (or stable), or are they relatively volatile (or unstable). Although some writers have offered a distinction between volatility and instability (Gabriele *et al* 2000), the literature tends to use the terms interchangeably and we follow that tradition. The measures of instability (or volatility) most commonly used in the literature are deviations around a trend so that usually the measure can be interpreted as the percentage of mean (trend) value. The main difference between measures is the way in which the trend is estimated (a simple time trend or a forecast equation) and whether the measure is standard deviation around a trend or of a detrended series. Bleaney *et al* (1995), for example, measure revenue instability as the standard deviation of year on year changes for a detrended series. Gabriele *et al* (2000) use the coefficient of variation for the data in levels form to measure instability and the standard deviation of annual percentage change to measure volatility. Pallage and Robe (2002) measure aid instability as the percentage (standard) deviation around a detrended series (by removing the growth component so they can focus on the cyclical component).

A number of recent studies have measured instability but none have as comprehensive a coverage as we offer. Pallage and Robe (2002) consider only aid flows; for the sample of 38 African countries over 1969-95, instability of net aid receipts was 25% compared to 32% for commitments, whereas for (25) other developing countries instability was 30% and 40% respectively. Instability of multilateral aid is greater than for bilateral aid (both net receipts and commitments), while aid instability is considerably greater than output instability (13% on average for both the African and other developing countries samples). They also find, significantly, that aid tends to be counter-cyclical and therefore does not play a consumption smoothing role. Volatile capital flows can both reflect and exacerbate economic instability. Lensink and Morrissey (2000) argue that volatility of aid receipts is likely to be greater for economies that are vulnerable to shocks, while the associated unpredictability of aid receipts can undermine investment and budgetary management.

Twenty-five countries were chosen for the instability and volatility analysis, comparing the 1980s and 1990s, in Gabriele *et al* (2000). In many countries the volatility of capital flows increased in the 1990s, while it decreased in only a few (the authors report estimates for each country but no overall averages). Most African countries show a

greater degree of volatility in private capital inflows than Asian or Latin American countries in their sample. For FDI, both mean flows and standard deviations have gone up for most countries. Instability in FDI flows is noticeably greater for the latter period in absolute terms. Instability in net short-term flows increases in the 1990s with respect to the previous decade in eight countries out of thirteen. Instability appeared to increase in the countries studied.

Gabriele *et al* (2000) also show that capital flows to developing countries have increased substantially in recent years. Capital inflows are increasingly concentrated in a small group of emerging markets, while most developing countries continue to face a severe scarcity of external resources. The composition has shifted in favour of private flows: these were about two-thirds of the total in the 1970s, fell to 54 per cent in the 1980s, but rose thereafter until reaching about 80 per cent in the 1990s. Aid to developing countries reached a peak in relative terms in 1986 (at 25 per cent of inflows) then declined, falling below 10 per cent of total inflows from 1993. The composition of private flows also changed - bank loans declined while both FDI (which is highly concentrated in a small number of countries) and portfolio inflows increased.

The volume of capital flows to sub-Saharan Africa (SSA) also increased in the 1990s, although estimates vary according to the source of data (Bhinda *et al*, 1999). There is a tendency for international organisations to underestimate the scale of capital flows given difficulties in collecting and assembling comparable data from national sources. Although only a small fraction of global FDI, FDI to SSA tripled between 1992 and 1995, growing fastest in some of the least developed economies. The IMF and World Bank report that portfolio equity inflows are also rising fastest in SSA among developing country regions, albeit from a very low base. The level of net inflows through bank loans has decreased in SSA, although net short-term flows have risen in some countries, such as Tanzania since 1996 (Bhinda *et al*, 1999).

We expand on the evidence from these studies by considering a variety of types of flows for a large number of developing countries since the 1970s (the largest and longest sample we could compile). Section 2 describes the three measures of volatility we employ in our analysis. Our concern is to quantify how variable each type of capital flow is to the three groups of developing countries. Thus, it is not important whether this is described as volatility or instability. Section 3 presents an overview of trends in capital flows to developing countries, identifying how the composition has changed over the past three decades. Section 4 then presents the results on instability, considering also the trends in instability and correlation with growth. Section 5 presents a summary of the findings.

2 MEASURES OF VOLATILITY

We compute and compare three different measures of instability. The first is the coefficient of variation (CoV) of the series, the standard deviation expressed as a percentage of the mean value (for the series over time). The second (Index I) is the standard deviation around a simple time trend. The third measure (Index II) is the standard deviation around a forecast trend. The forecast is based on adaptive expectations such that in principle it captures the trend value that would be predicted using past values as a guide. There is no strong reason to favour one index over the other. If one believes that a planner (government or investor) bases expectations on a simple time trend, index I is appropriate. If the planner uses past values to form a

forecast, index II is appropriate. If both give similar values and/or trends, we can judge how volatile flows appear to the country.

Index I

Following Cnossen and Morrissey (1997) we calculate this as the normalised standard deviation of the residuals from a time trend.[1] For a given capital flow y we estimate the trend equation as:

$$y_t = \alpha + \beta T + \varepsilon_t \tag{1}$$

where α and β are parameters, T is the time trend, and ε_t is the deviation of the actual series from the linear time trend. Given that the number of parameters to be estimated is two the minimum period average one can calculate for the index is three (which happens to maximise the degrees of freedom for the annual series in this case). The index is then calculated as (where $\bar{y}$ is the arithmetic mean of y):

$$\frac{100}{\bar{y}}\sqrt{\frac{1}{n-3}\sum_{t=1}^{n}\varepsilon_t^2} \tag{2}$$

Index II

This is calculated as normalised standard deviation of residuals from the forecast (expected) values. This is quite similar to the first index except that the deviations are from some expected (forecast) values (from an autoregressive model). It is calculated as (where $\mu_t = y - \hat{y}$ and $\hat{y}$ is estimated from a simple AR(p) model):

$$\frac{100}{\bar{y}}\sqrt{\frac{1}{n-p}\sum_{t=1}^{n}\mu_t^2} \tag{3}$$

Given that most of the series are non-stationary we estimate the model in first differences and then recalculate the forecast values in levels to make it comparable to index I. This we do by following these simple steps. For an I(1) series (which is true for majority of the series) we calculate an autoregressive process (of order 3) by estimating the equation:

$$\Delta y_t = \eta_0 + \eta_1 \Delta y_{t-1} + \eta_2 \Delta y_{t-2} + \kappa_t \tag{4}$$

Having obtained estimates for η_t's we can calculate the forecast values of y_t by rewriting the equation as

$$\hat{y}_t - y_{t-1} = \hat{\eta}_0 + \hat{\eta}_1(y_{t-1} - y_{t-2}) + \hat{\eta}_2(y_{t-2} - y_{t-3}) \tag{5}$$

Grouping terms we get the level forecast of y_t as

$$\hat{y}_t = \hat{\eta}_0 + (\hat{\eta}_1 + 1)y_{t-1} + (\hat{\eta}_2 - \hat{\eta}_1)y_{t-2} - \hat{\eta}_2 y_{t-3} \tag{6}$$

1 Although a quadratic trend is used in that study, our initial estimates suggest that a quadratic time trend does not improve the fit.

We now obtain the μ_t as the difference between the actual series and the level forecast values from equation (6).

3 DATA AND TRENDS IN COMPOSITION OF CAPITAL INFLOWS

The developing countries in our sample are classified into low, lower-middle, and upper-middle income countries (LIC, LMIC, and UMIC respectively). The LICs are economies in which per capita GNP in 1998 was at most $760 (there are 29 countries in this group). The LMICs (of which there are 19) and UMICs (12 countries) are those economies in which per capita GNP in 1998 was within the ranges $760 to $3,030 and $3,031 to $9,360 respectively. The tables in Appendix A list the countries under each group. In general the period under study is from 1970 to 1997. All the capital flows and external debt data are expressed as a per cent of GDP; given the wide variety of countries being considered, this is the most simple means to provide a measure of the 'real' value of the inflow. As our aim is to evaluate the importance and instability of the inflow from the perspective of the receiving country, this is quite appropriate.

The variables included in the study are net disbursements of Official Development Assistance (ODA), net disbursements of Official Development Finance (ODF), Foreign Direct Investment (FDI), Other Private Capital flows (OPC) and total External debt (Debt, measured as both stock and flows). Full definitions and sources are provided in Appendix A. There are thus two measures of aid flows, ODA which represents official concessional finance and ODF which also includes certain non-concessional official finance (thus, ODA is a sub-set of ODF). There are also two measures of private flows, FDI and OPC (mostly commercial bank lending, bonds, and portfolio equity investments). There are also two debt measures, the stock and the flow (change in the stock). Tables 1a-1c present the trends in each capital inflow to each group of developing countries (the figures are the ratio of the flow to GDP on average for the countries in each group), summarised in Figure 1.

Table 1a: Trends in Capital Inflows (ratios of GDP) – LICs

	Debt (stock)	Debt (flows)	FDI	OPC	ODA	ODF
1970 – 1975	23.56	4.49	0.97	1.06	6.35	6.58
1976 – 1980	37.88	7.98	1.04	2.09	8.28	9.18
1981 – 1985	63.57	5.94	0.47	0.98	8.89	9.97
1986 – 1990	99.16	9.15	0.51	0.07	12.00	12.89
1991 – 1995	123.63	3.75	0.82	0.03	14.50	14.83
1996 – 1997	108.34	-6.11	1.44	0.17	12.21	12.61
Entire period	*72.43*	*5.40*	*0.82*	*0.81*	*10.03*	*10.68*
St. Deviation	39.18	4.98	0.39	0.91	3.20	3.20
Minimum	21.55	-9.20	-0.10	-0.30	5.10	5.53
Maximum	143.16	15.22	1.55	2.67	18.97	19.01

Notes: Figures are the mean for all LICs of the average annual value of each capital flow for each period. Minimum and maximum thus refer to a year.

Table 1b: Trends in Capital Inflows (ratios of GDP) – LMICs

	Debt (stock)	Debt (flows)	FDI	OPC	ODA	ODF
1970 – 1975	27.58	3.88	1.20	1.35	3.23	3.56
1976 – 1980	41.91	8.21	1.13	2.35	4.49	5.23
1981 – 1985	63.89	6.39	0.84	1.44	4.03	5.12
1986 – 1990	75.84	3.61	1.32	0.54	4.18	5.04
1991 – 1995	61.90	1.75	1.93	0.15	3.40	4.21
1996 – 1997	52.28	0.35	2.62	1.29	2.09	2.80
Entire period	*54.09*	*4.46*	*1.38*	*1.18*	*3.72*	*4.46*
St. Deviation	17.72	3.58	0.57	0.94	0.89	1.00
Minimum	26.40	-2.37	0.57	-0.49	1.91	2.44
Maximum	79.47	12.99	3.20	3.64	5.20	5.98

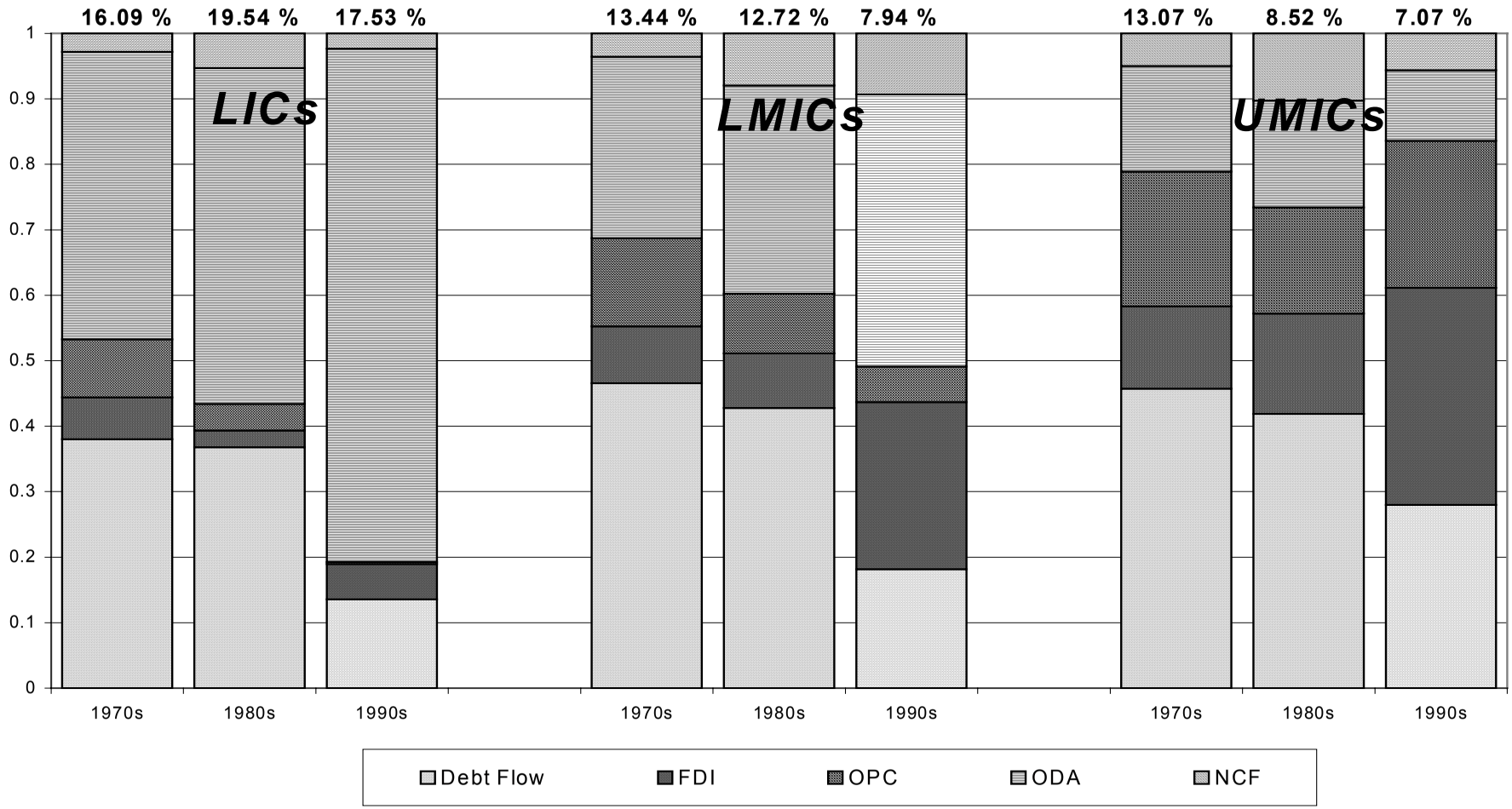
Notes: Figures are the mean for all LMICs of the average annual value of each capital flow for each period. Minimum and maximum thus refer to a year.

Table 1c: Trends in Capital Inflows (ratios of GDP) – UMICs

	Debt (stock)	Debt (flows)	FDI	OPC	ODA	ODF
1970 – 1975	22.60	5.32	1.70	2.23	2.42	3.25
1976 – 1980	32.69	6.27	1.56	3.15	1.62	2.00
1981 – 1985	46.16	3.82	1.29	1.87	1.49	2.89
1986 – 1990	56.35	3.14	1.34	0.45	1.22	2.27
1991 – 1995	47.32	1.87	1.88	1.17	0.77	1.10
1996 – 1997	43.74	1.32	3.79	3.42	0.52	0.86
Entire Period	*41.23*	*3.82*	*1.72*	*1.91*	*1.47*	*2.13*
St. Deviation	12.37	2.45	0.80	1.20	0.65	1.00
Minimum	19.25	-0.48	0.93	-0.10	0.51	0.90
Maximum	61.79	8.24	4.88	3.99	2.87	5.67

Notes: Figures are the mean for all UMICs of the average annual value of each capital flow for each period. Minimum and maximum thus refer to a year.

Figure 1 Trends in Capital Flows by Country Groups, 1970s to 1990s



Notes: The numbers at the top of the columns represent total average inflows (debt flows + FDI + OPC + ODA + NCF) as a per cent of GDP for each group of countries in a period. Non-concessional flows (NCF) = ODF – ODA.

The LICs are the only grouping for which total inflows have increased (relative to GDP) over the period; aid has become more important and debt flows less important (Figure 1). For the LICs (Table 1a), both net ODA and ODF flows have followed a similar trend (as would be expected give that non-aid ODF is quite small for the poorest countries, less than ten per cent of the total as can be seen from the difference between ODF and ODA). Net ODA averaged about 10 per cent of GDP over the entire period with a standard deviation of about 3.2 (implying a simple CoV of 32%). Overall it has shown a steady increase from about six per cent of GDP in 1970-75, peaking at almost 15% 1991–95 before decreasing slightly to about 12% in 1996–97. The trend is very similar for ODF and also when one looks at gross ODA which averaged about 11 per cent over the period with a standard deviation of about 3.6 per cent (see Appendix).

Compared to official flows, private capital flows for the LICs have remained at very low levels over the entire period. The entire period averages for both FDI and OPC were less than one per cent of GDP, with standard deviations of about 0.4 and 0.9 respectively. The implied simple CoVs support the common perception that FDI is less volatile than OPC. Looking at private capital flows over time one observes that in general the trend has been negative. For instance, FDI decreased from about one per cent over 1970-80 to about 0.5 per cent in the 1980s, although it then increased to reach a peak of 1.4 per cent in 1996–97. OPC, on the other hand, decreased fairly steadily from two per cent in the late 1970s to almost zero in the early 1990s. Total private capital flows have declined by about a third over the whole period, with OPC becoming less important relative to FDI.

Total external debt ratios for the LICs are quite high – the entire period average is about 72 and five per cent for the stock and flows respectively. In other words, debt flows have on average increased by over five per cent every year for the LICs. Looking at the stock of debt one observes that it has not always been high. Most of the increase occurred over the post-1980 period. It increased from a period average of about 24% over 1970–75 to well over 100% by the 1990s. Over the last two years of the sample the stock of debt has decreased, as shown by the negative average debt flows in 1996-97. Volatility of debt is high, as can be seen from the relatively high standard deviations.

Total flows to LMICs relative to GDP declined from 13% in the 1970s to eight per cent in the 1990s; aid has become relatively more important, OPC has declined, although FDI has become significant (Figure 1). Both net ODA and ODF flows (as a per cent of GDP) seem to have increased over the 1980s but subsequently declined in the 1990s (Table 1b). Average net ODA and ODF over the sample period were about 3.7 and 4.5 per cent respectively for the LMICs. Thus, non-aid official flows are clearly more important than for LICs (amounting to about 17% of ODF for LMICs). From a period average of about 3.2% in 1970–75, net ODA increased to four per cent in 1986–90 before declining to two per cent by 1996–97. Average gross ODA flows over the sample period were about 4.2% for the LMICs (Appendix Table A4a). The pattern for ODF is similar to ODA; increasing from about 3.6% in 1970–75 to over five per cent in the 1980s before decreasing to less than three per cent by 1996–97.

Private capital flows (as a per cent of GDP) have not changed much over the years. On average FDI and OPC were about 1.4 and 1.2 per cent respectively, and again OPC was considerably more volatile (as indicated by the higher standard deviation). Period average FDI more than doubled from 1.2% in 1970–75 to 2.6% in 1996–97, with a decline in the early 1980s. OPC increased in the late 1970s, then declined, quite

dramatically by the early 1980s, but ended the period in 1996-97 at a comparable level to the early 1970s (about 1.3% of GDP).

Total external debt of the LMICs averaged 54% of GDP over the entire period. There was a steady increase from almost 30% in the early 1970s to 75% by the late 1980s before declining to 52% in 1996–97. This trend is reinforced by looking at debt flows; although over the entire period the average increase was some 4.5%, this was heavily concentrated in the 1980s and the rate of increase fell dramatically in the 1990s. It is also evident that volatility is high for debt, especially for flows. Thus, whereas debt burdens were rising for the LICs, they have (at least recently) been falling for LMICs.

Total flows to UMICs fell by almost half relative to GDP over the period, with aid of declining importance and OPC and especially FDI of increasing importance (Figure 1). As would be expected, official flows to the UMICs have decreased over the years (Table 1c). Net ODA (as a per cent of GDP) decreased from 2.4% per cent to about 0.5% between the early 1970s and the late 1990s. Although significantly larger (the non-aid share is almost 30%), ODF also decreased from over three per cent to less than one per cent over the same period. To a large extent the decrease in official flows have been compensated for by an increase in private capital flows for this group of countries. The entire period averages for private capital flows are 1.7 and 1.9 per cent for FDI and OPC respectively. FDI more than doubled from 1.7% in the early 1970s to 3.8% in the late 1990s. Although much more variable (and with greater volatility than FDI), OPC also increased from about 2.2% in the early 1970s to 3.4% in the late 1990s, albeit with a large dip in the late 1980s.

Debt levels appear far more manageable for UMICS. External debt averaged about 41 per cent of GDP over the entire period and only over the 1986–90 period did it exceed 50 per cent. In general the trend has been an increasing one – from over 20% in the early 1970s to over 40% by the late 1990s. Debt flows exhibit this steady increase, averaging almost four per cent although it is evident that the rate of increase has declined steadily.

Overall, the trends confirm what would have been expected *a priori*. Official flows, especially aid, are most important for poorer countries and have become of increasing importance over time. Private capital flows to LICs have declined (relative to GDP) – although the decline in FDI has been reversed in the 1990s this was insufficient to off-set the collapse in other private capital inflows. For LMICs, private inflows have increased, although all of the increase is due to FDI (OPC has remained steady overall). Only UMICs have experienced an increase in OPC, although all of this was in the 1990s and the increase in FDI was greater. Furthermore, we can infer that LICS experienced a much poorer growth performance than richer developing countries. The average figures for debt flows are not dramatically different for the country groups, but debt burdens rose dramatically in LICs (by more than four times), increased by more than half in LMICs but almost doubled in UMICs. On a more positive note, debt burdens declined for all groups in the late 1990s.

4 TRENDS IN VOLATILITY OF CAPITAL INFLOWS

While the data discussed in the previous section identifies the trends of capital inflows over the past three decades, and we have seen that these are variable, we are here concerned with how volatile or unstable the flows have been. That is, we want measures that capture the year on year variability of the flow, and that summarise this volatility over the whole period (and allow for a decomposition for sub-periods). Three measures

of instability were proposed in Section 2. All indices are normalised so that the value can be interpreted as a percentage of the mean. The overall (1970-97 period) values for flows to each group of countries are given in Table 2 (the figures are instability of the average ratio of the flow to GDP for the countries in each group). Instability values for individual countries are in Appendix Tables A1a-A3c, and tend to be much higher than instability of average flows to the countries as a group. We highlight the main features of the individual country results in the discussion.

Table 2: Instability of Capital Flows (entire period, flows to all countries)

	Debt (stock)	**Debt (flows)**	**FDI**	**OPC**	**ODA**	**ODF**
			LICs			
CoV	54.09	94.37	47.68	113.14	31.89	29.98
Index I	14.94	91.21	48.52	93.51	14.47	13.39
Index II	11.14	96.39	44.59	69.54	17.85	16.82
			LMICs			
CoV	32.77	80.23	41.64	79.73	24.01	22.37
Index I	23.92	70.61	33.14	72.07	24.15	22.79
Index II	8.17	81.78	29.74	60.25	14.68	13.63
			UMICs			
CoV	30.00	64.13	46.24	62.99	44.02	46.56
Index I	19.87	48.33	44.36	60.82	14.50	35.87
Index II	8.77	59.88	38.80	46.36	13.36	22.60

Notes: Estimates based on instability of average flows to the countries in each group. Instability measures are defined in Section 2. Estimates for each individual country are presented in Appendix Tables A1a-A1c.

Official Flows (aid and ODF)

For the LICs aid (ODA) is slightly more volatile than ODF and for both CoV is much higher than either index, implying that much of the overall variation is due to trends. Surprisingly, perhaps, Index I is lower than Index II implying that the AR forecast picks up less of the variability (i.e. performs less accurately) than the simple time trend. In most cases in Table 2, however, Index I has a higher value than Index II, as would be expected if the AR 'forecast' is somewhat 'better' than a simple time trend. The distinction between them (for overall averages and trends) is not so important, and we interpret them as providing a range of instability. Thus, instability of aid flows to LICs is 14-18% (of the mean?). These official flows are considerably less volatile than private flows.

Instability measures for the 29 individual LICs (over the entire sample) are given in Appendix Table A1a. The modal value of ODA instability indices (I and II) is about 35% (seven countries are in the 30-40% range for both indices, a further six for one index). This is much higher than the period values in Table 2 because aid to individual countries will be more volatile than average aid to LICs. Nine countries had values lower than 30% (both indices) while six had values greater than 50% (both indices). Rwanda, Nigeria, Cote d'Ivoire, Nicaragua and Haiti are the five countries that exhibit the highest values for the instability indices for official flows. In general, in the LIC sample, instability of official flows seems to be higher for the African countries. Almost three-quarters of the countries with an index value greater than 50 per cent are African countries.

Overall instability of aid flows to LMICs is 24% for Index I and 15% for Index II (so a forecast value seems more reliable than a simple trend). The values for ODF are similar (Table 2). Thus, volatility of official flows is similar to that for LICs and is lower than volatility of private flows. Average instability in ODA for the 19 LMICs is about 50% (Table A1b). For most countries Index II is significantly lower than Index I implying that, in principle, much of the overall instability could be anticipated. The modal value of Index I is 44% (six countries are in the range 40-48%), with five countries below 30% and eight above 50%. The median value of Index II is 35% (seven countries in range 30-39%), with seven countries below 30% and four above 50%. Instability in ODA is highest (using Index II) for Dominican Republic, Costa Rica, Morocco and Jordan. The list of countries varies if one chooses Index I or ODF, although the broad pattern is similar.

Of the three groups of countries, instability for UMICs is lowest for ODA at 13-15% but highest for ODF at 23-36% (Table 2). Instability of ODF is much higher than of ODA, so it is non-aid flows that are most volatile (and note that non-aid official flows are more important for UMICs). Index II is considerably lower than Index I, implying that more than a third of instability can be captured by the forecast as compared to the trend estimate. Average instability for the 12 UMICs is 64% and 86% for ODA and ODF respectively for Index 1. The modal value for Index II is about 45% and 55% for ODA and ODF respectively. The five countries with the highest instability (Index II) in ODA are Chile, Venezuela, Trinidad & Tobago, Turkey and Malaysia – these are also the only countries with instability greater than 50%. The ranking differs for ODF, although Chile, Venezuela, Trinidad & Tobago, are the three with the highest instability. It is evident, more so than for other country groups, that although instability of aid to all UMICs is quite low, instability of flows to individual countries is very high. This also applies for the higher levels of instability observed for ODF.

Private Capital flows

Instability in private capital flows has been much higher than in official flows for all three groups of countries and FDI is less volatile than OPC (Table 2). Instability of total FDI to LICs was 45%, compared to 70% for OPC (Index II). Instability of total flows to LMICs was lower, 30% for FDI and 60% for OPC. Instability of flows to UMICs was greater for FDI at 39% but lower for OPC at 46%. In all cases, Index II gave lower instability than Index I, often considerably so (implying that the AR process is a better representation than a simple time trend). Levels of instability for individual countries are, however, much higher.

For individual LICs, modal instability (Index II) in FDI is about 130% (nine countries in range 100-160%); 13 countries have values less than 100% (eight less than 60%) and seven have values greater than 200% (Table A2a). Modal instability (Index II) in OPC is about 200% (nine countries are in the range 100-200% and five in the range 200-300%); only three countries have values less than 100% and six have values greater than 500% (Table A2a). The five countries with the highest instability for FDI (Index II) are all African, namely Mauritania, Sierra Leone, Congo DR, Sudan and Togo. The seven countries with Index I greater than 200% are all African. Looking at OPC, the six countries with Index II above 500% are Nigeria, Solomon Islands, Gambia, Haiti, Mauritania and Rwanda. About four-fifths of the countries with Index I greater than 200% are African.

For individual LMICs, modal instability (Index II) in FDI is about 70% (five countries in 50-90% range); four countries have values less than 50% and five have values greater than 100% (Table A2b). Algeria, Jordan, Peru, Bolivia and El Salvador are the five countries with the highest instability for FDI and the only ones with Index II above 100%. Modal instability (Index II) in OPC is about 115% (nine countries are in the range 100-200% but five of these are within 109-124%); four countries have values within 90-100% and four have values greater than 500% (Table A2b). Jamaica and Swaziland have very high negative values as on average there was an outflow of net OPC from these countries (respectively –0.05 and –0.18 per cent annual rates). The five countries with the highest (positive) Index II for OPC are El Salvador, Sri Lanka, Guatemala, Tunisia and Paraguay.

Average instability in FDI and OPC for the UMICs is respectively 109% and 272% using Index I. Modal instability for Index II is about 75% for FDI (five countries below this with five above but less than 200%), with only Venezuela and Botswana above 200%. Modal instability for OPC is about 100% (seven countries within 50-150%). Trinidad & Tobago (at a huge 1611%), Botswana, Barbados, Venezuela and Mauritius exhibit the highest values and are the only countries with instability exceeding 200%. In general, instability in private capital flows is lower for this group of countries than for the LICs, but much higher than for official flows.

External Debt – Stock and Flows

Volatility seems to be much higher in debt flows than it is in the stock of debt, as would be expected, debt flows are the most volatile capital inflows for all three groups of countries (Table 2). Instability of debt flows to LICs was 96% (Index II), compared to 82% for LMICs and 60% for UMICs. In all cases, Index II gave higher instability than Index I, and CoV was often quite similar. This suggests that net debt flows (or, more strictly, the annual change in the debt stock), follows an unpredictable and volatile path.

For individual LICs, instability in debt flows has a modal value around 120% (Index II), with seven countries below 100%, twelve within 100-150% and seven above 200%. The five countries with the highest level of instability are Nicaragua, Madagascar, Sierra Leone, Niger and Togo. Modal instability for debt flows of individual LMICs is about 120%, with six countries below 100% and six above 150%. The five countries with the highest instability are Swaziland, Egypt, Jamaica, Jordan and Paraguay. Among the UMICs the modal value is about 120%, with two countries below 100% and three above 150%. Barbados, Trinidad & Tobago and Venezuela had the highest levels of instability.

Trends in Instability

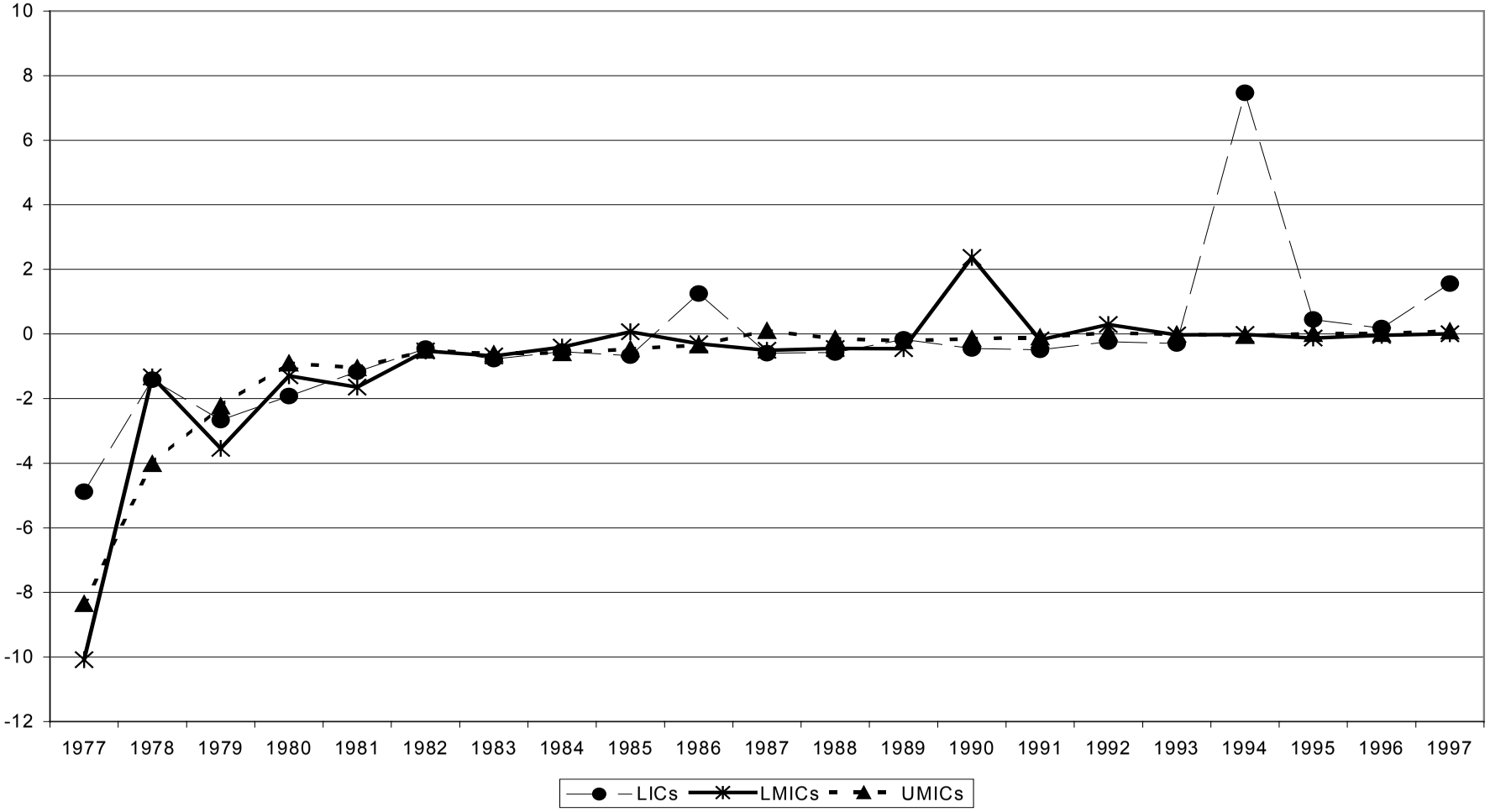
Our discussion on the trends in instability is based on the indices calculated for capital flows to all countries in each of the three country groups. The trends are based on the measure of annual instability calculated as the first difference of the recursive series (see Section 2). Table 3 presents the annual average change in instability for Index II for all flows over the whole period and three sub-periods, the 1970s, 1980s and 1990s. Although the values differ, the trends are broadly similar for Index I (Appendix Table A5). In general, instability has been declining over the whole period (the yearly average is negative in most cases). This is somewhat misleading as, for most flows, instability declined significantly in the 1970s but has increased since then; this is illustrated in Figures 2-4 for aid, FDI and OPC.

Table 3: Instability of Capital Flows (Index II, annual average trend)

	Debt (stock)	**Debt (Flows)**	**FDI**	**OPC**	**ODA**	**ODF**
			LICs			
1972 – 1980	-4.32	-25.22	-5.60	-8.72	-2.72	-2.67
1981 – 1989	0.44	2.32	0.68	0.97	-0.41	-0.39
1990 – 1997	-0.30	1.67	-1.24	1.97	1.02	0.91
Period	*-0.57*	*-0.85*	*-1.25*	*-0.50*	*-0.31*	*-0.33*
			LMICs			
1972 – 1980	-3.87	-24.67	-4.03	-11.26	-2.06	-2.01
1981 – 1989	-0.64	-1.17	-0.06	-1.13	-0.54	-0.64
1990 – 1997	-0.12	1.28	-0.69	0.96	0.28	0.32
Period	*-0.92*	*-2.61*	*-0.91*	*-1.81*	*-0.44*	*-0.46*
			UMICs			
1972 – 1980	-5.01	-8.64	-0.89	-1.89	-2.38	-3.18
1981 – 1989	-0.39	1.82	-0.62	1.11	-0.42	-0.49
1990 – 1997	-0.15	0.09	1.07	-0.03	-0.02	0.12
Period	*-0.99*	*-0.01*	*-0.58*	*-0.71*	*-0.93*	*-1.19*

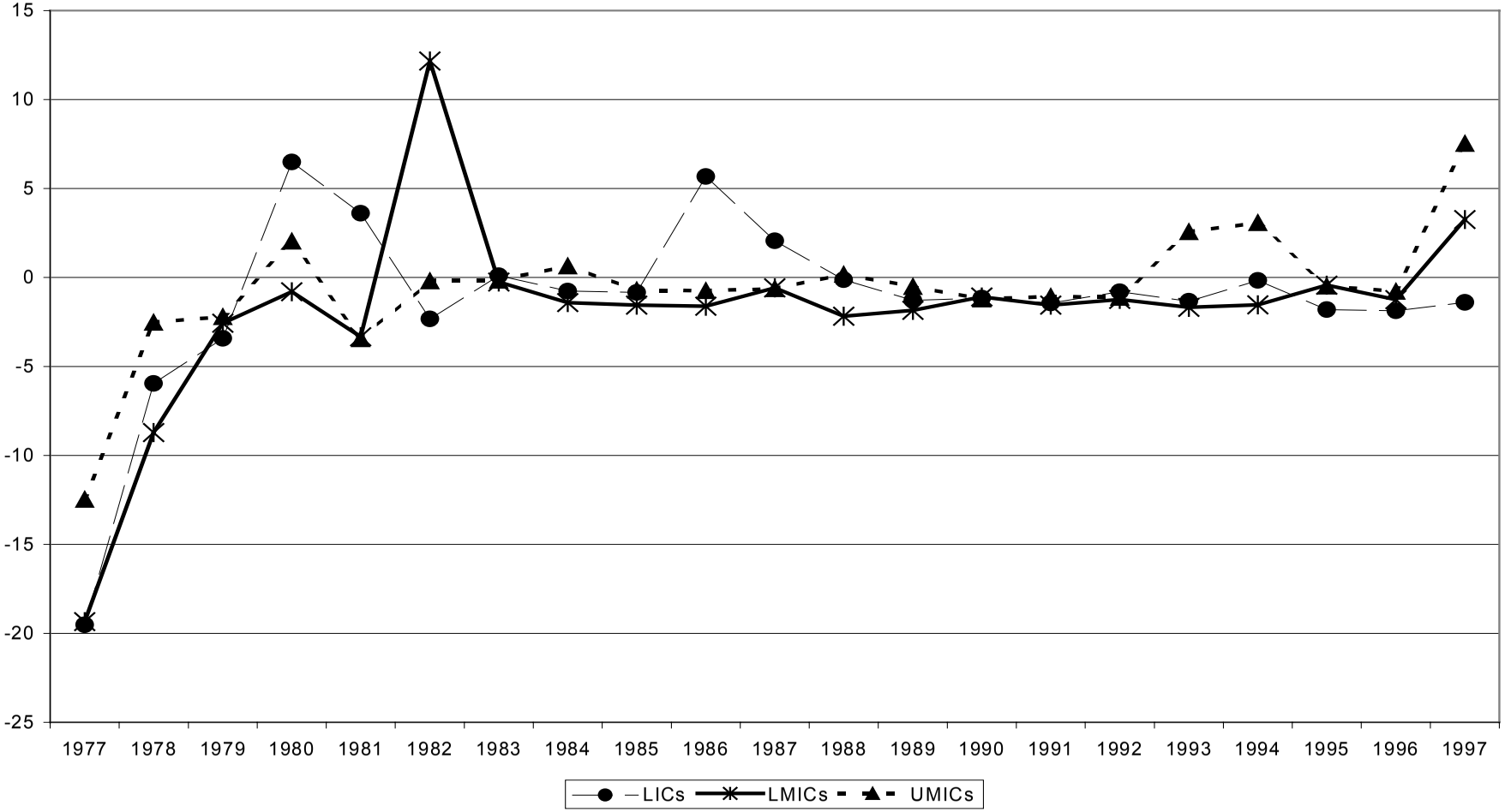
Notes: Estimates based on average flows to countries in each group. Annual instability measures are obtained as the first difference of the recursive estimates for Index II. Period is annual average over 1970-97. Trends for Index I are in Appendix Table A5.

Figure 2 Annual change in average instability (Index II) – ODA



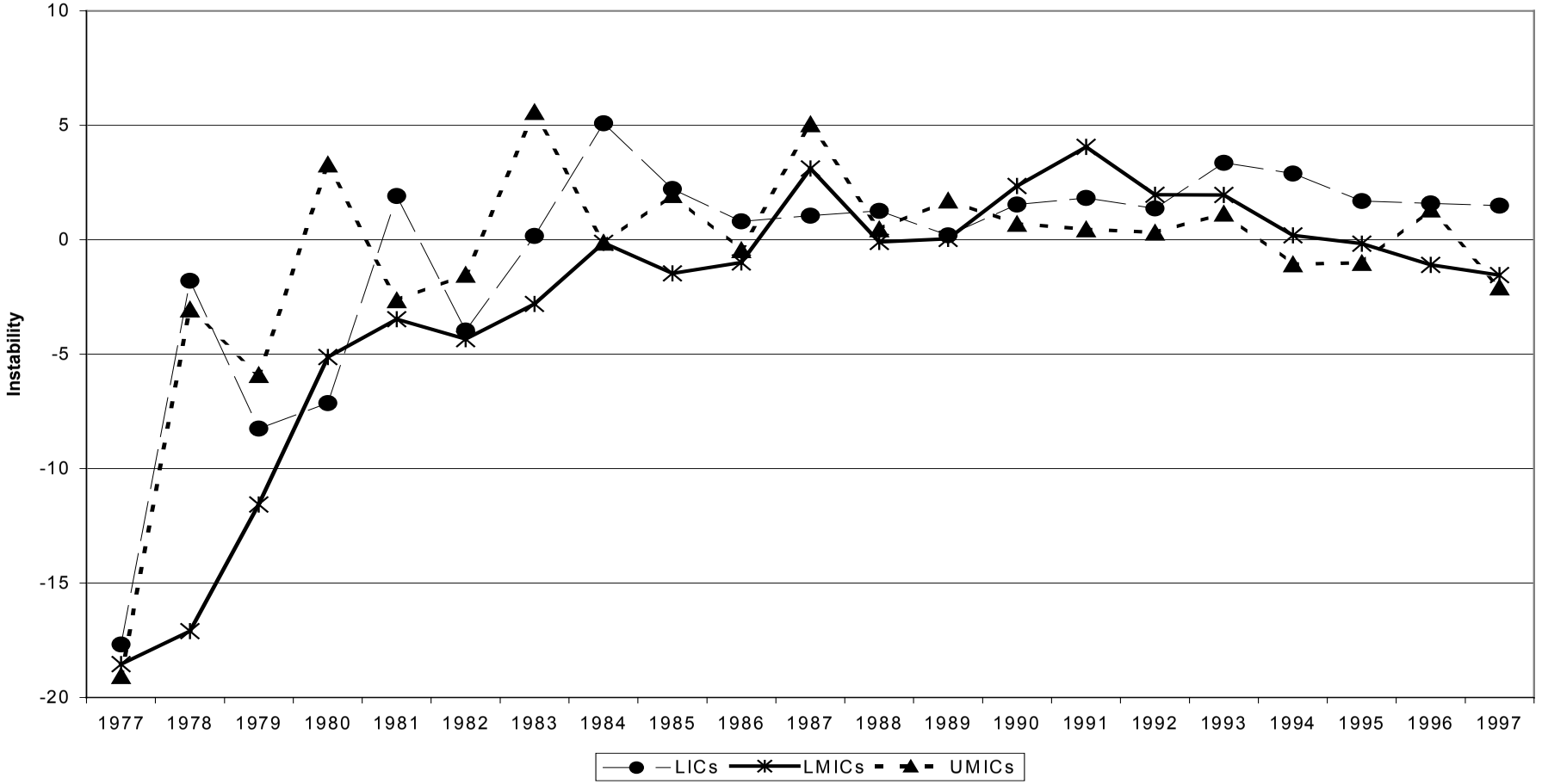
Notes: Compare with Table 3 for period values of instability (figure shows change not level).

Figure 3 Annual change in average instability (Index II) – FDI



Notes: As for Figure 2.

Figure 4 Annual change in average instability (Index II) – OPC



Notes: As for Figure 2.

The trends for instability of inflows to LICs are in the top panel of Table 3. Instability in aid fell in the 1970s but has increased significantly in the 1990s; the spike in 1994 is evident in Figure 2. Instability of OPC fell dramatically in the 1970s (implying that flows were very volatile in that period), but have increased since then (especially in the 1990s, see Figure 4). FDI has been variable, and is the only flow for which instability declined n the 1990s (Figure 3). The instability of external debt flows fell dramatically in the 1970s but has increased steadily since then, especially in the 1980s. Overall, instability has been increasing in the 1990s, especially for aid, OPC and debt flows.

The broad trends are similar for LMICs, except that for most flows the large reduction in instability in the 1970s was followed by a further slight reduction in the 1980s, then instability began to rise in the 1990s. The exception is FDI, instability of which continued to decline in the 1990s (Figure 3). As for LICs, instability has been rising in the 1990s (but only slightly, except for debt flows), except in the case of FDI. UMICs exhibit a similar pattern but the changes have been more moderate. Following moderate declines in instability of private and debt flows in the 1970s, there have been steady increases in the 1980s and 1990s (especially for OPC). Official flows saw declining instability until the 1990s, when instability remained almost unchanged. Only in the case of FDI has there been a significant increase in instability in the 1990s (Figure 3).

Volatility of Capital Inflows and Economic Performance

For all three groups of countries we observe that private capital and external debt flows have exhibited the highest volatility, while FDI and, especially, official flows have the lowest instability. Although there seems to have been a general decrease in volatility over the whole period, this occurred almost completely in the 1970s and the data suggest that instability in capital flows has increased in the 1990s. Furthermore, the rate of increase has been highest in the most volatile flows, OPC. Table 3 suggests that volatility was greatest (in the sense that trend changes were very high) but declining in the 1970s, and has increased in the 1990s. We now consider if instability for individual countries exhibits any correlation with growth.

Tables 4a-4c give, across the countries in each group, the correlation between instability of capital flows (measured using Index I), output growth (GDP growth rates) and the Commonwealth Vulnerability Index (CVI). The CVI quantifies a country's relative economic and ecological susceptibility to exogenous shocks. It has two components – the impact component and resilience. The impact component reflects the incidence and intensity of risk and threats to a country. It is proxied by the expected value of income volatility having controlled for economic exposure, remoteness and insularity, and susceptibility to environmental events and hazards. Resilience reflects the ability of a country to insulate itself from the risks and threats and to bounce back from external economic and environmental shocks. It is proxied by a country's 1995 GDP. A weighted combination of these two components forms the CVI. The data are obtained from Atkins *et al* (2000).

For the LICs, GDP growth is negatively correlated with volatility in all the variables except OPC, for which the coefficient is anyway very low (Table 4a). These correlation coefficients suggest that LICs with relatively low growth rates are those that have experienced relatively high volatility in financial flows. FDI volatility is strongly correlated with GDP growth with a (negative) coefficient of over 40 per cent, which may be because countries with poor growth are less attractive to FDI. There is also a high

negative correlation between growth and instability of debt flows (and debt instability measures are quite highly positively correlated with instability of other inflows, except FDI). Lower growth is associated with higher volatility of debt flows.

The correlation between CVI and volatility in financial flows (except for ODF) are in general positive but very small. This suggests that LICs that are relatively more vulnerable are those that have relatively high volatility in their financial flows, although this is only true at a moderately significant level (20%) for OPC. We note a positive, albeit low (18%), correlation between CVI and growth. This may seem counter-intuitive as one would expect countries that are vulnerable to have lower growth rates. However this positive correlation can be explained when one considers the components of the CVI in relation to GDP growth. First the impact component of CVI is measured as income volatility (the standard deviation of annual rates of growth of per capita GDP). The impact component could very well be positively correlated with GDP growth. The second component is resilience (1995 GDP) and there is no reason why one should expect this to be negatively correlated with real GDP growth.

Table 4a: Correlation between Instability, Vulnerability and Growth – LICs

	GDP Growth	**CVI**	**Debt (Stock)**	**Debt (flows)**
FDI	-0.4039	0.0035	-0.1228	0.0221
ODA	-0.0593	0.0025	0.5804	0.3056
ODF	-0.1463	-0.0252	0.6377	0.3482
OPC	0.0441	0.2048	0.3054	0.1404
Debt Stock	-0.1915	0.1237	----	-----
Debt flows	-0.4392	0.0074	----	------

Notes: Simple correlation coefficients. Instability measure is Index I for all flows, and CVI is the Commonwealth Vulnerability Index (see text). Correlation between CVI and GDP growth is 0.184.

Table 4b: Correlation between Instability, Vulnerability and Growth – LMICs

	GDP Growth	CVI	Debt (Stock)	Debt (flows)
FDI	-0.2713	-0.0635	-0.1461	0.2156
ODA	-0.1130	-0.1325	0.1491	0.0370
ODF	-0.0865	-0.0107	-0.0132	0.1525
OPC	0.4666	-0.1546	0.0286	-0.4174
Debt Stock	-0.3388	0.1883	------	-----
Debt Flows	-0.0781	0.6634	------	------

Notes: As for Table 4a. Correlation between CVI and GDP growth is 0.147.

Table 4c: Correlation between Instability, Vulnerability and Growth – UMICs

	GDP Growth	CVI	Debt (Stock)	Debt (flows)
FDI	0.1413	0.4740	-0.1907	0.3619
ODA	-0.4296	-0.6696	0.1972	-0.0696
ODF	-0.3183	-0.3133	0.1390	0.1868
OPC	-0.1175	0.2093	-0.1292	0.5972
Debt stock	0.1064	0.0197	------	------
Debt Flows	-0.2552	0.4841	------	------

Notes: As for Table 4a. Correlation between CVI and GDP growth is 0.498.

For LMICs, GDP growth is most strongly and positively correlated with OPC volatility (47%, Table 4b). This is consistent with a view that private capital is responsive, but very sensitive, to economic growth – it flows in to better performing countries, but can flow out if there are small changes in performance. We note a relatively high negative correlation between volatility of OPC and debt flows, implying that countries with high OPC instability are not the same countries that have volatile debt flows. Volatility in the other flows and debt exhibit a negative correlation with GDP growth, although this is very low except for FDI and debt stock. Countries with lower growth have higher instability in FDI and debt burdens. The correlations between CVI and volatility in both private and official capital flows are negative and fairly small, although volatility of debt flows is highly positively correlated with CVI; more vulnerable LMICs have more volatile debt flows. For this group of countries we note that CVI is negatively correlated with instability in financial flows but positively correlated with GDP growth.

Volatility in financial flows, with the exception of FDI, is negatively correlated with GDP growth for UMICs (Table 4c). The highest negative correlation is between ODA (and ODF) volatility and growth, perhaps because the best performing UMICs receive very low, albeit stable, official inflows. GDP growth also has a negative correlation with volatility in debt flows. As for other groups, growth is negatively correlated with OPC instability and positively with FDI instability; FDI and OPC appear to be directed at different sets of countries. There is quite a high positive correlation between CVI and growth, most likely for the reasons outlined above. There is a high negative correlation between CVI and volatility in official flows (although we note that such inflows are relatively minor to these countries). There is quite a high positive correlation between CVI and instability of FDI and debt flows. For this group of countries vulnerability is associated with volatility of capital inflows.

5 CONCLUSIONS: IS VOLATILITY A CAUSE FOR CONCERN?

This paper considers trends in the importance and volatility of four types of capital flows - debt, official flows (aid and ODF), foreign direct investment (FDI) and other private flows(OPC) – to three groups of countries – low (LIC), lower middle (LMIC) and upper middle (UMIC) income. Three measures of instability are proposed in Section 2. The coefficient of variation (CoV) is the standard deviation as a percentage of the mean over the period. This is a simple measure of total instability, but our ultimate concern is with what instability means to countries receiving capital inflows. Countries will have expectations about inflows, and may make macroeconomic plans according to such expectations, so we want a measure that tries to account for this. Two measures are provided. Index I measures instability as year on year deviations from a time trend, assuming that the expectation is that the inflows follows such a trend. Index II is the same except based on a forecast value (i.e. past information is 'accumulated' to derive the trend). Both indices are normalised so that the value can be interpreted as a percentage of the mean. In the summary below, rather than exploring the differences between the indices we report a rough average of the two indices as the measure of instability.

For the LICs in our sample, official flows have become relatively more important compared to private capital flows. Official inflows (aid) have increased from an average of six per cent of GDP in the early 1970s to an average of 12% in the late 1990s. While the FDI/GDP ratio has risen slightly (from about one to 1.4%), other private capital flows have fallen to negligible levels and debt/GDP ratios have risen from less than 25% to over 100%. The data seem to suggest that the high external debt ratios for LICs may be a

deterrent to private capital flows, as private inflows have slumped while debt burdens increased. The clear trend is for LICs to have become increasingly dependent on aid and debt finance (although both have declined in the late 1990s), with small but increasing FDI and negligible private capital inflows.

The LMICs exhibit an increasing reliance on official inflows and FDI, but a decline in private capital inflows (as a share of GDP). However, private flows are low: FDI only exceeded two per cent of GDP on average in the 1990s while private capital inflows declined significantly in the late 1980s and early 1990s, only recovering to over one per cent of GDP in the late 1990s. Thus, official flows are still more important than private capital. Although debt burdens increased significantly between the 1970s and late 1980s, they have subsequently been reduced and stood at an average of 52% of GDP in the late 1990s (compared to 28% in the early 1970s).

While official inflows have declined to less than one per cent of GDP on average for the UMICs and private inflows have increased, other flows have followed trends similar to the other groups. Both FDI and private capital flows declined in the 1980s but both recovered and have been more important than official flows in the 1990s. By the late 1990s, private capital inflows exceeded three per cent of GDP on average and FDI was almost four per cent of GDP on average. External debt burdens more than doubled in the 1980s (over 50% compared to 23% in the 1970s) but have been reduced to an average of below 45 per cent of GDP by the late 1990s.

All capital inflows exhibit instability over 1972-97, ranging from around 14% for aid in most cases to as high as 90% for debt flows to LICs. Instability in official flows is moderate for all three groups of countries on average (15-20%) and aid is more volatile than ODF except for flows to UMICs. Instability in private capital flows has been much higher than in official flows for all three groups of countries and FDI is less volatile than OPC. Instability of total FDI to LICs was 47%, compared to 82% for OPC. Instability of total flows to LMICs was lower, 32% for FDI and 66% for OPC. Instability of flows to UMICs was greater for FDI at 42% but lower for OPC at 54%. In all cases, Index II gave lower instability than Index I, often considerably so. In other words, deviations around a simple time trend tend to exaggerate volatility compared to volatility around a forecast trend.

Debt flows are the most volatile capital inflows for all three groups of countries. Instability of debt flows to LICs on average was 94%, compared to 76% for LMICs and 54% for UMICs. In all cases, Index II gave higher instability than Index I, and CoV was often quite similar. This suggests that net debt flows (or, more strictly, the annual change in the debt stock), follows an unpredictable and volatile path.

For most flows to all three groups of countries, instability fell considerably in the 1970s but has increased since then. Aid to LICs and debt flows to UMICS are the only cases where instability exhibited a trend increase over the entire (1972-97) period. In all other cases, the trend was for decreasing instability over the whole period, but the decrease was concentrated in the 1970s. In the case of LICs, instability has been increasing for all flows except FDI in the 1990s, especially for OPC and debt flows. The same pattern is observed for LMICs, where again FDI was the only flow for which instability declined in the 1990s. All flows to UMICs exhibit increasing instability in the 1990s (and the 1980s for non-official inflows), although in most cases the changes have been more moderate.

We find that LICs with relatively low growth rates have experienced relatively high volatility in financial flows. FDI volatility is strongly negatively correlated with GDP growth, possibly because countries with poor growth are less attractive to FDI. For LMICs, GDP growth is most strongly and positively correlated with OPC volatility. This is consistent with a view that private capital is responsive, but very sensitive, to economic growth. Countries with lower growth have higher instability in FDI and debt burdens. As for other groups, growth in UMICs is negatively correlated with OPC instability and positively with FDI instability; FDI and OPC appear to be directed at different sets of countries.

Overall, the composition of capital flows to developing countries has indeed changed, although starting from the 1970s there have been two phases: increasing debt burdens and declining private (FDI and other capital) flows in the 1980s, with a reduction in debt burdens and increasing capital inflows in the 1990s. These phases can be seen for all three groups of countries although the decline in the 1980s was most pronounced for LICs (spiralling debt and almost disappearing private inflows), and they have shown the least recovery. By the 1990s, poorer developing countries are reliant on aid for almost 80 per cent of capital inflows (debt financing contributes almost 15%); only the richer developing countries are attracting private capital inflows and FDI.

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Appendix: Data Description and Sources

The 29 low income countries (LICs, Table A1a) had a 1998 per capita GNP of no more than $760. The 19 lower-middle income countries (LMICs, Table A1b) had a 1998 per capita GNP in the range $760 to $3,030. The 12 upper-middle income countries (UMICs, Table A1c) had a 1998 per capita GNP in the range $3,031 to $9,360. All capital inflows are measured in $US and expressed as a per cent of GDP (the implicit deflator) measured in $US. Pallage and Robe (2002) show that their measures of aid instability are robust to the use of purchasing power parity measures of GDP. There is no reason to assume that alternative deflators would have significant effects on our measures of instability.

The data on the aid variables are from the *Geographical Distribution of Financial Flows 1999* (DAC, CD-ROM); FDI, private flows and debt data are from *World Development Indicators 2000* (World Bank, CD-ROM). Variables defined as:

Official Development Assistance (ODA), net and gross disbursements. ODA disbursements include grants and loans by the official sector at concessional financial terms with the promotion of economic development and welfare as the principal objective. It includes technical co-operation but excludes grants, loans or credits for military purposes. For a definition see DAC (1999: 131).

Official Development Finance (ODF), net disbursements. ODF disbursements include ODA plus non-concessional resources from multilateral and bilateral sources (including refinancing loans). For a definition see DAC (1999: 131).

Foreign Direct Investment (FDI), net inflows of investment with the aim of acquiring a lasting management interest in an economy other than that of the investor. Includes equity capital and reinvestment of earnings.

Other Private Capital (OPC) consists of commercial bank lending, bonds, other private credit, non-debt flows, portfolio equity investments and FDI. We subtract FDI from the total private capital flows to get OPC.

Total external debt (stock) is defined as all debt owed to non-residents that is repayable in foreign currency, goods or services. It includes long term debt (public, public guaranteed and private non-guaranteed long term debt and the use of IMF credit) and short term debt (consisting of all debt having an original maturity of one year or less and interest in arrears of long term debt). We obtain the external debt flows as the first difference of the stock of debt.

Most empirical studies have used a measure of the total amount of instability for the variable over a given sample period for each country (e.g. Pallage and Robe, 2002). We note a couple of drawbacks with the 'single number' instability measure. First, this single instability measure means one cannot exploit the annual variability in the series. Second, the averaging of positive (when actual flows exceed the trend) and negative (when actual flows falls short of the trend) instability may mask the trend in instability. Furthermore, there is no reason why negative and positive instability would have the same economic effects (although we do not relate instability of inflows to economic performance in this paper). We therefore estimated 'annual instability' based on an abstraction from the normalised deviations from a linear trend (or forecast value), although we do not report the results.

To do this we first calculate the indices recursively starting with the first three years. The difference between successive recursive indices can be considered as the additional instability that results from increasing the sample period by one observation unit. Therefore the first difference of the recursive averages will be a good approximation of

the index for each year (starting from year 4 in our case). This index will be a measure of the annual total instability as we use fluctuations of the observed values from a trend. Regarding its interpretation, a negative (positive) instability value does not mean that the variable in itself was lower (higher) than some expected value. It merely suggests that instability has reduced (increased) in that year compared to previous years.

A second method of obtaining annual series is to estimate a rolling series. For the start period one estimates a normalised standard deviation for the *n* series starting from say year *t*; for the second period one estimates the standard deviation for the *n* series starting from year *t+1* and so on. A potential problem with this approach is that observations for years that have a very high standard deviation could dominate the indices for overlapping years. Nevertheless, this provides an annual series to compare with the first approach. This is useful as we have no other benchmark for comparison.

Given that we estimate instability in the various capital flows for each country it is important that we determine the time series properties of the data. This is done using the augmented Dickey Fuller test (details on request). Our results show that of the 29 LICs in our sample, external debt to GDP is stationary for 9 of them; FDI, OPC, ODA and ODF are stationary for 16, 17, 13, and 9 respectively. For the LMICs we find that 1, 8, 9, 8, and 6 of the total of 19 countries are stationary in external debt, FDI, OPC, ODA and ODF respectively. Finally, of the 12 UMICs, 2, 4, 6, 5, and 3 are stationary in external debt, FDI, OPC, ODA, and ODF respectively. This suggests that less then 40 per cent of all the series are stationary. However we proceed with the estimation of the instability indices on the assumption that the series are integrated of order one. By so doing we sacrifice efficiency for consistency.

Table A1a: Instability in Official Flows – LICs

	ODA			ODF		
Country	**CoV**	**Index I**	**Index II**	**CoV**	**Index I**	**Index II**
Benin	41.44	24.93	24.59	43.67	28.08	25.68
Burkina Faso	33.07	20.66	17.59	32.21	20.20	17.32
Cameroon	41.09	40.56	36.40	39.25	39.01	36.47
Central African Rep.	25.74	22.47	26.57	26.17	22.80	26.18
Chad	40.78	23.80	24.57	40.56	23.73	24.52
Congo, Dem. Rep.	56.91	53.13	42.94	74.62	72.45	70.73
Congo, Rep.	56.21	53.93	55.78	52.68	50.54	55.73
Cote d'Ivoire	95.77	78.27	71.94	69.68	57.18	54.20
Gambia	60.20	55.47	44.07	61.04	57.05	45.37
Ghana	61.81	35.17	31.49	62.64	36.01	22.83
Haiti	78.60	65.30	64.52	78.66	65.22	64.46
Honduras	51.30	28.37	33.12	44.74	32.35	34.70
India	36.78	24.07	24.53	29.04	25.71	28.06
Indonesia	78.23	57.89	19.18	62.58	55.10	33.39
Kenya	51.06	38.80	38.09	37.41	33.42	33.34
Madagascar	62.96	38.34	43.05	63.51	41.48	49.85
Malawi	53.40	34.57	33.18	48.75	32.26	32.22
Mali	33.64	26.84	24.65	33.50	26.25	23.59
Mauritania	40.22	36.71	36.56	43.87	41.13	37.32
Nicaragua	115.33	76.21	75.79	122.62	84.25	80.07
Niger	39.43	25.92	28.68	37.02	27.37	29.55
Nigeria	82.44	80.18	57.52	117.89	114.77	70.64
Pakistan	42.84	30.45	34.27	37.39	32.13	33.91
Rwanda	96.56	83.95	89.49	96.33	83.84	89.36
Senegal	34.19	25.54	28.12	34.77	28.75	27.41
Sierra Leone	89.15	50.82	33.57	84.25	49.41	34.21
Solomon Islands	39.31	31.13	32.40	38.16	29.98	29.97
Sudan	51.90	50.69	42.00	54.45	54.29	42.40
Togo	32.99	27.25	26.74	36.38	34.64	29.20

Table A1b: Instability in Official Flows – LMICs

		ODA				ODF		
Country		**CoV**	**Index I**	**Index II**		**CoV**	**Index I**	**Index II**
Algeria		80.81	70.09	26.89		114.74	109.28	73.14
Bolivia		41.27	15.67	18.83		39.53	21.89	20.29
Colombia		106.70	79.97	33.74		83.26	50.93	29.01
Costa Rica		83.15	84.56	55.80		72.09	73.45	45.17
Dominican Rep.		58.99	58.38	57.64		68.54	69.78	71.93
Ecuador		40.78	40.68	30.56		60.83	56.86	52.35
Egypt, Arab Rep.		68.29	67.36	47.02		63.36	62.71	49.31
El Salvador		67.70	59.56	28.79		62.78	52.96	28.57
Guatemala		49.84	44.00	30.65		35.77	32.18	27.27
Jamaica		63.20	60.80	31.10		75.38	75.05	47.66
Jordan		58.55	51.89	51.07		53.55	49.99	44.93
Morocco		47.71	48.41	54.88		52.35	53.33	42.14
Paraguay		40.91	34.35	27.19		38.20	26.92	26.97
Peru		39.73	38.01	38.89		56.49	45.09	44.80
Philippines		47.15	44.60	39.43		46.34	43.81	40.83
Sri Lanka		47.17	46.39	31.55		46.76	46.12	30.63
Swaziland		40.95	39.66	29.27		53.36	51.23	33.42
Thailand		33.98	32.76	22.89		49.88	49.70	38.93
Tunisia		55.30	26.45	18.67		37.99	29.77	26.48

Table A1c: Instability in Official Flows – UMICs

	ODA			ODF		
Country	**CoV**	**Index I**	**Index II**	**CoV**	**Index I**	**Index II**
Barbados	82.20	42.33	39.43	68.98	59.26	56.21
Botswana	54.70	14.14	10.00	94.22	70.32	35.46
Brazil	104.94	80.31	47.01	70.58	62.56	56.21
Chile	136.84	136.06	152.99	152.89	152.09	149.32
Gabon	65.23	60.86	45.84	89.88	84.54	85.47
Malaysia	69.20	56.62	51.54	65.32	45.41	50.45
Mauritius	45.30	33.74	29.54	57.32	49.52	34.24
Mexico	54.05	54.28	48.21	93.05	94.78	103.42
Panama	44.46	39.83	36.27	58.72	52.72	51.12
Trinidad&Tobago	83.67	84.94	76.54	89.82	76.79	72.40
Turkey	81.58	76.24	68.60	84.86	76.56	57.87
Venezuela	90.30	90.92	77.84	219.41	211.14	149.63

Table A2a: Instability in Private Flows – LICs

	FDI			OPC		
Country	**CoV**	**Index I**	**Index II**	**CoV**	**Index I**	**Index II**
Benin	135.99	138.12	110.69	309.93	313.25	341.76
Burkina Faso	158.65	148.96	128.61	389.57	391.50	401.68
Cameroon	152.25	149.41	148.88	150.46	138.32	140.02
Central African Rep.	149.58	140.96	160.22	326.97	304.94	193.35
Chad	115.66	117.82	130.18	228.32	203.36	173.55
Congo, Dem. Rep.	987.04	989.89	992.31	169.39	119.90	66.01
Congo, Rep.	178.25	146.88	45.05	205.97	205.17	236.53
Cote d'Ivoire	104.42	106.34	97.43	150.64	124.22	105.06
Gambia, The	105.80	105.06	121.38	616.49	604.72	634.38
Ghana	136.89	138.09	133.01	265.94	232.80	255.82
Haiti	81.33	47.36	49.90	476.33	482.80	585.76
Honduras	66.10	51.67	50.08	127.11	124.29	134.49
India	163.82	131.26	57.09	97.85	63.93	72.28
Indonesia	82.13	74.98	41.42	83.18	82.32	72.24
Kenya	94.04	89.38	89.28	238.68	212.00	214.40
Madagascar	114.87	116.86	81.69	339.29	330.53	303.81
Malawi	159.82	105.46	93.22	594.05	543.79	362.85
Mali	240.58	226.91	238.08	238.37	224.17	265.55
Mauritania	2529.11	2553.47	3279.19	495.72	503.04	579.52
Nicaragua	172.15	159.34	54.01	270.44	227.46	221.22
Niger	225.20	223.82	267.44	427.29	411.29	423.16
Nigeria	91.36	78.35	80.25	2395.25	2345.29	2283.09
Pakistan	89.97	46.71	35.11	155.10	131.27	119.64
Rwanda	68.30	65.81	42.86	597.13	580.25	578.94
Senegal	148.79	151.60	166.51	227.16	182.38	176.57
Sierra Leone	2215.42	2229.77	2847.11	457.91	436.43	473.76
Solomon Islands	97.70	95.78	108.12	777.89	785.19	728.05
Sudan	504.25	484.21	570.55	188.45	169.32	150.80
Togo	291.36	294.21	339.81	250.75	237.63	142.55

Table A2b: Instability in Private Flows – LMICs

	FDI			OPC		
Country	**CoV**	**Index I**	**Index II**	**CoV**	**Index I**	**Index II**
Algeria	411.79	412.33	272.49	151.11	121.23	116.47
Bolivia	217.23	177.36	116.59	184.49	172.45	118.12
Colombia	101.14	75.05	69.58	111.80	104.39	94.30
Costa Rica	41.92	36.19	27.02	155.63	112.27	98.44
Dominican Rep.	61.94	62.66	42.07	198.63	143.23	141.10
Ecuador	114.24	113.69	47.24	121.57	112.47	111.30
Egypt, Arab Rep.	91.71	90.42	90.97	133.90	135.44	97.64
El Salvador	90.40	83.60	100.66	660.62	620.38	637.56
Guatemala	67.26	66.04	80.83	273.85	259.88	252.18
Jamaica	145.21	147.12	64.97	-9834.30	-10010.98	-11643.70
Jordan	153.62	155.31	172.26	190.27	193.44	157.78
Morocco	114.58	90.19	77.17	115.47	109.34	101.32
Paraguay	75.46	69.65	42.60	222.58	197.72	188.95
Peru	188.88	160.16	140.41	120.78	122.78	123.26
Philippines	109.74	76.98	87.94	121.16	122.97	109.32
Sri Lanka	102.72	79.89	80.74	307.65	313.22	290.69
Swaziland	89.82	85.87	85.25	-1088.87	-1101.50	-1343.45
Thailand	69.87	55.21	54.05	88.57	79.50	98.11
Tunisia	59.25	60.10	55.57	226.32	229.76	227.85

Table A2c: Instability in Private Flows – UMICs

	FDI			OPC		
Country	**CoV**	**Index I**	**Index II**	**CoV**	**Index I**	**Index II**
Barbados	137.70	109.32	75.14	261.34	262.60	280.89
Botswana	214.62	218.45	225.67	409.60	405.17	428.84
Brazil	56.02	55.38	43.54	73.16	64.36	54.29
Chile	165.19	100.30	117.34	69.78	70.72	58.47
Gabon	172.57	135.38	148.02	204.52	171.23	150.32
Malaysia	50.00	42.85	35.60	148.46	150.85	130.74
Mauritius	84.47	73.14	61.17	232.49	210.93	212.31
Mexico	66.46	49.26	45.44	82.82	83.60	69.94
Panama	167.32	154.10	139.46	127.33	110.45	113.68
Trinidad&Tobago	84.08	85.61	60.75	1499.48	1388.51	1611.43
Turkey	68.63	55.47	44.53	123.31	100.95	105.58
Venezuela	290.67	228.33	239.76	244.00	240.09	216.92

Table A3a: Instability in External Debt – LICs

		External Debt (stock)				External Debt (flows)		
Country		**CoV**	**Index I**	**Index II**		**CoV**	**Index I**	**Index II**
Benin		54.90	23.86	21.75		115.11	117.22	128.69
Burkina Faso		59.66	17.09	13.87		109.33	111.61	136.40
Cameroon		62.87	29.44	22.13		92.65	94.37	107.45
Central African Rep.		55.62	20.90	21.20		98.33	96.75	102.12
Chad		57.97	29.09	18.34		126.80	124.82	121.33
Congo, Dem. Rep.		77.58	25.77	18.28		124.43	126.79	132.75
Congo, Rep.		58.98	22.84	20.00		138.09	137.98	172.18
Cote d'Ivoire		53.86	17.00	15.53		187.68	179.96	199.78
Gambia, The		59.79	31.70	17.13		101.44	101.74	114.36
Ghana		47.01	14.48	12.21		93.81	92.09	109.14
Haiti		43.61	26.39	20.46		124.63	124.39	124.41
Honduras		47.36	12.38	11.62		82.17	80.43	97.81
India		38.58	22.36	10.30		90.54	92.33	91.65
Indonesia		29.60	21.66	12.92		58.33	60.92	66.90
Kenya		41.95	24.02	26.64		130.18	119.94	142.59
Madagascar		58.61	31.97	24.57		283.02	288.90	335.61
Malawi		39.48	23.56	26.09		86.77	88.32	111.46
Mali		38.99	20.18	17.62		105.26	107.52	119.72
Mauritania		51.13	14.29	11.44		90.34	86.64	93.97
Nicaragua		102.22	71.55	46.80		584.91	578.30	526.81
Niger		59.35	21.69	18.90		214.55	213.98	270.50
Nigeria		82.29	43.70	32.64		212.96	216.96	217.76
Pakistan		15.14	15.43	8.12		64.12	58.22	55.18
Rwanda		100.83	59.39	64.86		65.20	64.32	70.62
Senegal		47.62	28.73	17.32		145.85	140.20	161.20
Sierra Leone		65.32	29.40	22.20		227.64	229.73	279.74
Solomon Islands		65.13	33.59	30.66		187.49	191.17	200.49
Sudan		77.33	37.92	33.88		84.57	80.24	81.04
Togo		47.68	35.35	24.29		232.14	227.73	246.87

Table A3b: Instability in External Debt – LMICs

	External Debt (stock)			External Debt (flow)		
Country	**CoV**	**Index I**	**Index II**	**CoV**	**Index I**	**Index II**
Algeria	34.03	23.39	18.49	156.10	139.52	120.20
Bolivia	32.32	32.81	13.27	151.67	140.65	156.93
Colombia	23.05	20.49	9.18	67.84	69.08	76.56
Costa Rica	51.37	51.76	25.44	161.47	135.00	140.15
Dominican Rep.	44.61	37.07	23.33	100.13	88.73	92.79
Ecuador	49.05	26.65	14.73	105.81	103.29	102.02
Egypt, Arab Rep.	43.58	14.17	19.33	191.46	172.67	195.90
El Salvador	34.59	93.54	11.09	107.30	104.65	110.12
Guatemala	48.16	31.60	19.01	100.30	100.96	120.93
Jamaica	39.44	33.03	19.32	199.35	192.30	188.64
Jordan	68.08	39.27	26.87	164.67	167.14	179.12
Morocco	45.00	35.81	15.32	123.74	114.17	123.89
Paraguay	52.64	49.94	20.81	179.80	172.35	177.58
Peru	29.60	28.61	27.85	97.81	98.63	113.50
Philippines	34.30	28.42	10.17	86.64	82.59	83.93
Sri Lanka	36.87	20.68	12.91	79.37	80.35	77.51
Swaziland	45.13	45.83	29.50	242.77	245.21	291.57
Thailand	43.32	17.06	12.42	59.12	54.62	61.30
Tunisia	26.52	15.22	9.87	94.21	94.17	99.90

Table A3c: Instability in External Debt – UMICs

	External debt (stock)			External debt (flows)		
Country	**CoV**	**Index I**	**Index II**	**CoV**	**Index I**	**Index II**
Barbados	51.49	35.98	26.97	271.36	270.64	303.33
Botswana	46.16	31.59	20.92	193.66	168.07	138.89
Brazil	31.04	30.31	15.61	72.29	53.17	53.89
Chile	43.76	44.22	21.24	119.98	115.95	120.96
Gabon	38.23	27.75	21.64	144.17	137.87	119.02
Malaysia	46.21	39.21	16.92	119.80	121.72	111.65
Mauritius	47.31	35.38	17.07	107.44	108.03	121.14
Mexico	42.29	38.16	22.91	112.25	101.97	115.95
Panama	32.93	25.56	10.74	103.25	76.88	93.56
Trinidad&Tobago	63.33	29.45	21.31	231.84	231.38	263.99
Turkey	40.16	18.98	16.69	92.95	93.70	118.63
Venezuela	47.86	30.02	19.93	208.88	193.23	190.74

Table A4a: Trends in Gross ODA to GDP Ratio

	LICs	LMICs	UMICs
1970 – 1975	6.83	3.56	2.63
1976 – 1980	8.73	4.71	1.86
1981 – 1985	9.42	4.33	1.63
1986 – 1990	12.97	4.73	1.42
1991 – 1995	16.08	4.61	1.08
1996 – 1997	13.45	2.74	0.89
Entire period	*10.85*	*4.24*	*1.70*
St. Deviation	3.64	0.97	0.63
Minimum	5.37	2.53	0.87
Maximum	20.84	7.27	3.21

Table A4b: Instability in Gross ODA across countries

OVERALL	LICs	LMICs	UMICs
CoV	33.51	22.97	36.88
Index 1	15.28	23.27	15.24
Index 2	15.72	20.54	13.87
TRENDS (annual average)			
1972 – 1980	-1.02	-5.05	-1.05
1981 – 1989	0.08	-0.68	-0.29
1990 – 1997	0.75	1.07	-0.05
Period	*-0.06*	*-1.52*	*-0.45*

Notes: Estimates based on average flows to countries in each group. Trends based on annual instability measures obtained as the first difference of the recursive estimates for Index I. Period is annual average over 1970-97.

Table A5: Instability of Capital Flows using index I (annual average trend)

	Debt (stock)	Debt (flows)	FDI	OPC	ODA	ODF
			LICs			
1972 – 1980	-5.14	-15.75	-2.26	-38.09	0.09	-0.87
1981 – 1989	-1.04	1.19	1.99	1.02	0.004	-0.20
1990 – 1997	0.25	3.21	-0.49	1.90	0.76	0.76
Period	*-1.81*	*-2.53*	*-0.16*	*-11.21*	*0.27*	*-0.11*
			LMICs			
1972 – 1980	-3.41	-24.13	-4.52	-29.25	-7.43	-8.07
1981 – 1989	-0.05	-0.18	1.05	-0.57	-0.81	-0.79
1990 – 1997	-0.10	1.18	-0.80	1.65	0.57	0.27
Period	*-1.04*	*-5.95*	*-1.33*	*-9.04*	*-2.49*	*-2.78*
			UMICs			
1972 – 1980	-3.43	-1.06	-4.43	-5.69	-0.81	-3.89
1981 – 1989	0.43	1.98	0.54	1.39	-0.26	-0.95
1990 – 1997	-0.26	0.53	0.49	1.02	0.05	0.04
Period	*-0.92*	*0.68*	*-1.07*	*-1.00*	*-0.34*	*-1.57*

Notes: Estimates based on average flows to countries in each group. Annual instability measures are obtained as the first difference of the recursive estimates for Index I. Period is annual average over 1970-97.

Table A6: Instability of Capital Flows using CoV (entire period, all countries)

	Debt (stock)	Debt (flows)	FDI	OPC	ODA	ODF
			LICs			
1970 –1979	26.84	44.87	26.84	52.25	19.45	20.85
1980 – 1989	28.36	63.84	61.79	121.71	15.50	13.00
1990 – 1997	10.33	272.00	39.23	629.59	17.18	16.42
			LMICs			
1970 –1979	25.32	55.33	22.93	55.56	24.89	26.69
1980 – 1989	17.81	61.02	35.92	49.12	6.01	6.76
1990 – 1997	12.64	140.94	27.24	164.44	37.62	27.87
	UMICs					
1970 –1979	22.24	20.66	30.69	32.66	23.88	46.00
1980 – 1989	20.06	72.31	25.35	77.66	14.39	14.45
1990 – 1997	5.61	72.56	48.37	82.54	32.24	36.37

Notes: Estimates based on average flows to the countries in each group. Instability measures are defined in Section 2.

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