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Debt sustainability and the ongoing financial crisis: The case of IDA-only African countries

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DEBT SUSTAINABILITY AND THE ONGOING FINANCIAL CRISIS:

THE CASE OF IDA-ONLY AFRICAN COUNTRIES

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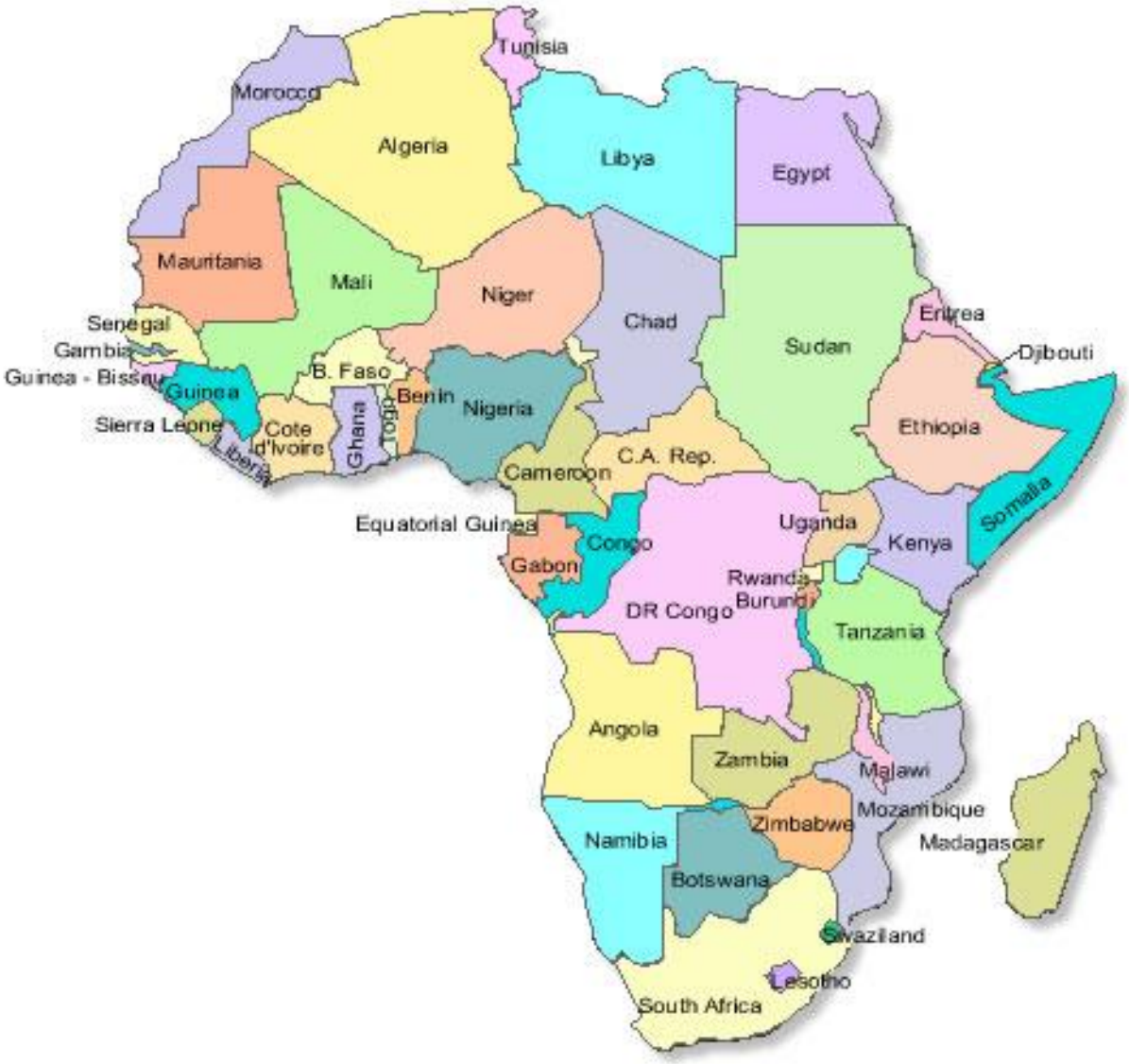
Abstract

The ongoing financial crisis has raised concerns in many circles about a potential future wave of sovereign defaults spreading among developing countries and, therefore, the need for additional rounds of debt relief in poor indebted countries. This paper addresses this issue for a group of 31 IDA-only African countries, which are in a fragile debt situation. Using the most recent debt sustainability analyses undertaken for these countries by the World Bank and the IMF, this paper studies the potential adverse effect of the ongoing financial crisis on the countries' debt burden indicators, as a function of the depth and length of the crisis. The latter is measured by the fall and the duration of such fall in exports revenues, and by the terms at which each country can obtain financing to muddle through the crisis period. The analysis underscores the importance of concessional financing for these countries, especially if the crisis proves to be a protracted one.

[1] The views expressed in this paper are those of the authors and do not represent those of the World Bank or its Board of Directors. We are extremely grateful to Paulina Granados for her excellent and efficient assistance, without which this project could have not been possible.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1. Introduction

The ongoing financial crisis appears atypical when compared with previous crises that have affected the developing countries in recent decades. In particular, it originated in the developed world, in sharp contrast to the Debt Crisis of the early 1980s, the Tequila Crisis of 1994 and the Asian Crisis of 1997-98, just to name a few. Also, it is one of four of the past 122 recessions that include a credit crunch, a housing price bust, and an equity price bust (Claessens, Kose, Terrones (2008)), which implies a more protracted recovery. And finally, it occurred at a time when developing countries had, on average, stronger fundamentals compared with previous crisis episodes as a result of having pursued sound monetary and fiscal policies in recent years.

As a result of the above the effects of the crisis were not felt initially in the developing world, except for a few countries mainly in Eastern Europe and Central Asia whose banking systems were directly or indirectly (through their headquarters) exposed to the same toxic assets as banks in Europe and the US, or because of a period of rapid expansion and a real estate bubble in their domestic markets. Thus, developing countries in general were not severely affected during the first (i.e., financial) phase of the crisis, except for a short lived liquidity squeeze that was resolved by aggressive interventions by Central Banks around the world. However, developing countries have been affected by the sharp fall in export volumes and commodity prices during the second phase of the crisis, which resulted from the fall in aggregate demand in the developed world. Indeed, global trade in 2009 has been forecasted to fall by two digits by different entities (see figures 1-3). In addition, private capital flows toward the developing countries fell from its peak in 2007, especially debt flows (see figure 4). Finally, some developing and low income countries have been affected by a significant fall in remittances since last year, which is predicted to deepen in 2009 as a result of the increased unemployment in the developed world[2], while ODA flows are expected to decline due to the recession in the developed countries. In sum, developing countries in general have been affected mainly by a sharp drop in exports, private and official capital flows, and remittances, but to a much lesser degree by the financial dimensions of the crisis.

The purpose of this paper is to analyze the potential deterioration on the low income countries' debt burden indicators used by the Bank and the Fund when assessing a country's debt sustainability prospects, due to the fall in exports caused by the ongoing crisis. The analysis uses the joint Bank-Fund Debt Sustainability Framework for Low Income Countries (DSF), by which key macro variables (exports, GDP, Government Revenues, etc.) are projected over a twenty year horizon. The behavior of countries' debt burden indicators affects their risk ratings (low, moderate, high risk, or in debt distress) and conditions their access to conditional sources of finance. The five debt burden indicators are: (1) PV of debt to exports ratio; (2) PV of debt to GDP ratio; (3) PV of debt to government revenues ratio; (4) Debt service to exports ratio; and (5) Debt service to government revenues ratio.

[2] It should be noted that some countries have experienced an increase in remittances as a result of the repatriation of capital from the host countries. This is a once and for all phenomenon due to the closure of family business due to the recession.

The paper is organized as follows. Section 2 describes the simulation exercises in detail and provides relevant methodological information. Section 3 analyses the results both for a typical low income country and the group of 31 LICs. Section 4 summarizes and concludes.

Figure 1: IMF forecasts for world trade volumes in 2009
Source: IMF World Economic Outlook

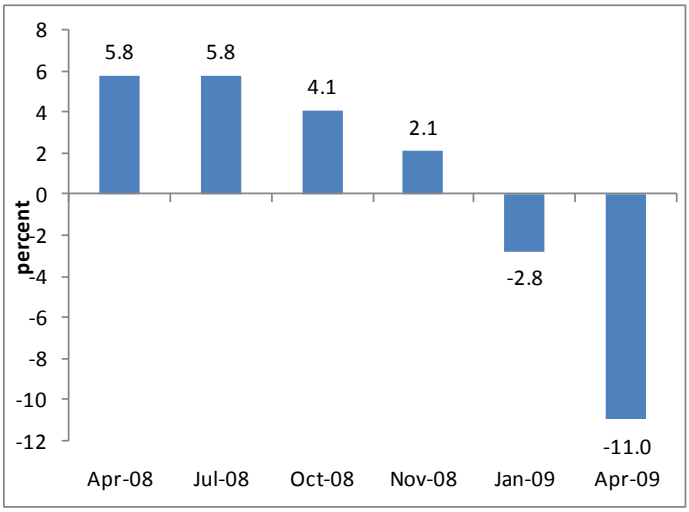


Figure 2: Goods exports, nominal, Qtr to Qtr percentage change, SAAR
Source: Thomson/Data-stream

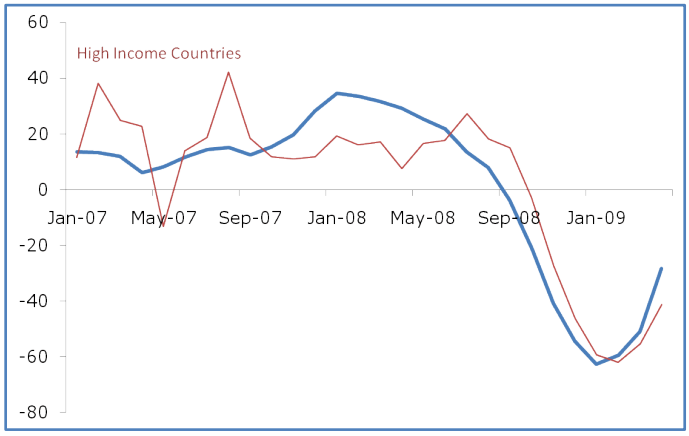


Figure 3: Commodity Prices (Index, 2000 = 100)
Source: DECPG Commodities Group

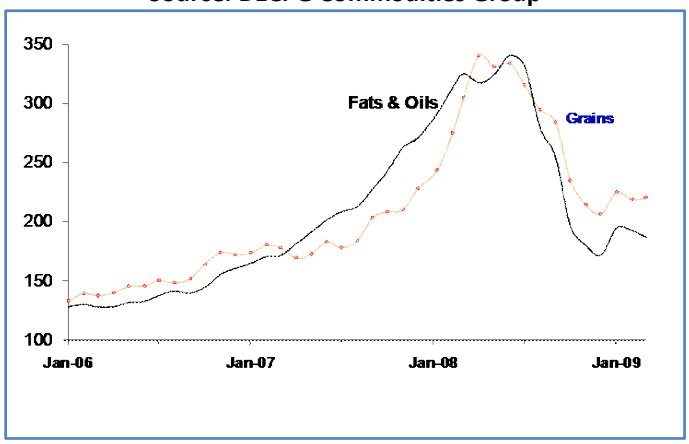


Figure 4: Private Capital Flows to Developing Countries
Source: DECPG/GDF 2009

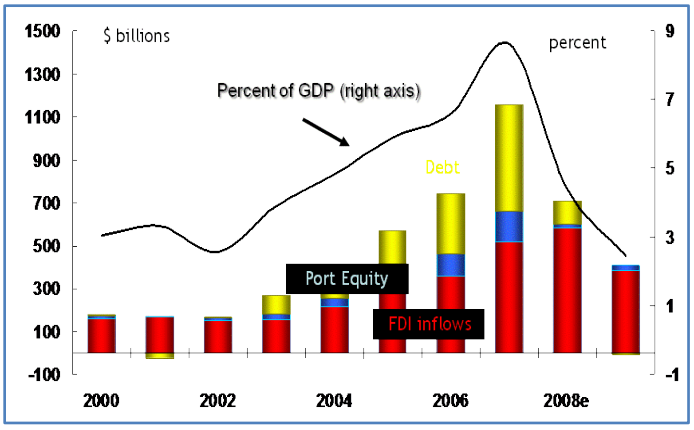
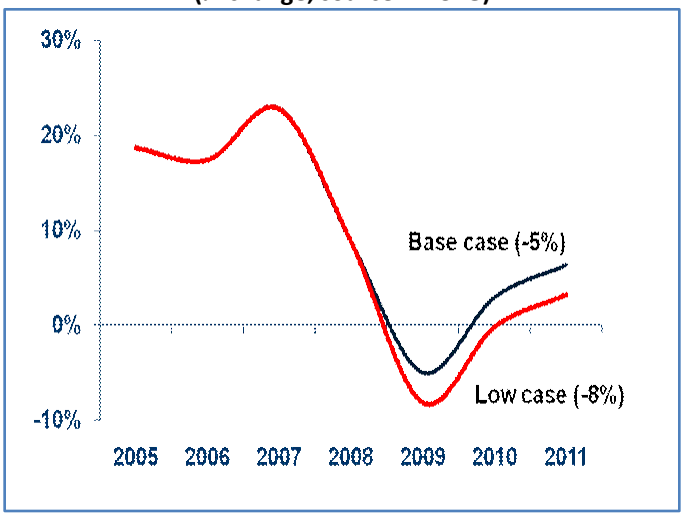


Figure 5: Remittance Flows to Developing Countries
(% change; source: DECPG)



2. Methodological Issues

a. Sample: number of countries and DSA dates

The sample comprises 31 IDA-only African countries for which a DSA is available[3]. For all but 11 of these the latest DSA date is such that actual data ends in 2007 (projected data starts in 2008). For three of the remaining –DRC, Guinea and Zambia– the latest DSA date implies that projected data starts in 2007, while for the remaining 8 –Angola, Benin, Cameroon, CAR, Ghana, Guinea-Bissau, Kenya and Senegal– actual data ends in 2008 (projected data starts in 2009). The simulations run in this paper are built so that the crisis hits all countries in 2009, and debt burden indicators are projected –and compared vis-à-vis each template's baseline– starting that year until 2027.

Although the effects of the crisis through exports for most LICs began to be felt more intensively in 2009, the different DSAs dates imply that the baseline scenario against which our projections are compared could be considered "too optimistic" for all but a few (8) of the countries in our sample. Consequently, for these 23 countries the actual deterioration of the debt burden indicators (compared to the policy-dependent thresholds) could be greater than projected in our simulation exercises. This is so because the shocks –described in greater detail below– are proportional to the baseline, while the thresholds are constant.

b. Shocks: Depth, length, and transmission to the rest of the economy

The simulations comprise three shocks consisting of a fall in exports of a different size vis-à-vis the baseline in year 2009, each one taking between 2 to 8 years to recover and return to the baseline, as shown in the table below:

Table 1: Description of export shocks: depth and duration

Deviation vis-à-vis the baseline in year 1 (percentage points)	Number of years until exports return to baseline	Recovery per year (in percentage points of deviation from baseline
10 percent	2 / 4 / 6 / 8	5.0 / 2.5 / 1.67 / 1.25
20 percent	2 / 4 / 6 / 8	10.0 / 5.0 / 3.33 / 2.5
30 percent	2 / 4 / 6 / 8	15.0 / 7.5 / 5.0 / 3.75

Based on the information above, the 12 different shocks are ranked according to their "severity", using to measure the latter the accumulated deviation (or loss) in exports vis-à-vis the baseline. Thus, for instance, a 30 percent shock lasting for 2 years implies a cumulative loss in exports of 45 percent (30 percent the first year and 15 percent the second), similar to a 10 percent shock lasting 8 years. The ranking of shocks from the least to the most severe is listed below (last column).

[3] Angola, Benin, Burkina Faso, Burundi, Cape Verde, Cameroon, Central African Republic, Chad, Comoros, Democratic Republic of Congo, Republic of Congo, Cote D'Ivoire, Eritrea, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Mauritania, Mozambique, Niger, Rwanda, Sao Tome and Prince, Senegal, Sudan, Tanzania, Togo, Uganda and Zambia.

Table 2: Ranking of shocks

Shock type (*)	Shock in exports in percentage points from baseline	Number of years until return to baseline	Severity Index (cumulative loss vis-à-vis the baseline)
902	10	2	15
904	10	4	25
802	20	2	30
906	10	6	35
908	10	8	45
702	30	2	45
804	20	4	50
806	20	6	70
704	30	4	75
808	20	8	90
706	30	6	105
708	30	8	135

Source: Authors' calculations. (*) The index comprises two numbers: the first (90, 80 and 70) indicates the level of exports after the shock in percent of the baseline, while the second (2, 4, 6 and 8) indicates the number of years until exports return to the baseline.

The effects of the twelve shocks above on countries' debt burden indicators are analyzed considering two alternatives: (i) that the fall in exports is somehow compensated by an increase in domestic absorption, so that it does not adversely affect aggregate output (i.e., unemployment is unaffected), as assumed in some of the stress test built in the DSA template; and (ii) that the fall in exports is not compensated and, therefore, has an effect on aggregate output and therefore unemployment. The former alternative could occur, for instance, if the government buys all the production that firms are unable to export, to keep resources fully employed, and/or if firms built up their inventories (which could be more easily done in the case of nonperishable commodities such as diamonds, copper, etc.). The latter alternative –with transmission to GDP– is more realistic and will differ from the former in proportion to the share of exports in total GDP. Note that the difference between (i) and (ii) is that some debt burden indicators, those expressed in percentage of GDP and government revenues, will deteriorate even further[4].

c. The adjustment to the shock: financial conditions

Needless to say, countries could adjust to the crisis by severely constraining aggregate expenditures (i.e., imports) and, therefore, avoiding an increase in indebtedness. This solution, by not allowing a smoothing to the shock, imposes a greater burden on the population. In order to avoid a sharp adjustment in consumption and investment it is desirable to allow for an increase in indebtedness, to the extent that the latter does not lead to a more severe adjustment later on, which would be the case if the country falls in distress and eventually defaults on its debt. To assess the space to borrow (or conversely, the increase in a country's probability of debt distress) under each of the twelve shocks above, we project the debt burden indicators assuming that

[4] In DSA templates government revenues are projected as a proportion to GDP.

there is no reduction in absorption, that is, that the country borrows US$ 1 for every US$ 1 not received from exports (i.e., there is a 1:1 substitution of new debt for lower exports). However, the deterioration in the debt burden indicators depends on the financial conditions under which the new debt is contracted. For the simulations the following 4 financial conditions are analyzed, listed from the least to the most severe:

Table 3: Financial Conditions

Financial Conditions Index	Interest rate (%)	Maturity (years)	Grace period (years)
FC10	0.75	40	10
FC20	2.25	10	5
FC30	5.25	10	0
FC40	10.25	5	0

d. Debt burden comparators

In order to assess how much the debt sustainability situation in a country (or for the whole group of 31 LICs) deteriorates vis-à-vis the baseline scenario under the different shocks and financial conditions, we compute three measures based on the behavior of the debt burden indicators. These are:

i. Number of breaching episodes = number of years in the projection period (2009-27) in which the debt burden indicator crosses the corresponding threshold. Each year is counted once so that a country could have up to 19 episodes. For the whole sample the sum of breaching episodes is used.

ii. Average deviation from the threshold = for each country-episode the deviation from the threshold (in percentage points) is measured. The sum of deviations is then divided by the number of episodes. For the group of LICs the sum of averages across countries is used.

iii. Maximum distance from the threshold = for each country the maximum distance from the threshold, in percentage points, over the entire projection period is taken (one observation per country). For the whole sample again the sum of maximum over all countries is used.

It should be noted that the three measures above are complementary. While (i) provides an indication of how protracted the effect of the shock is, (ii) and (iii) provide an indication of the deterioration in the probability of debt distress.

3. Results

a. Debt burden indicators in a typical sample country

The effects of the different shocks and financial conditions on a typical sample country's debt burden indicators are illustrated in Annex 1. For presentational purposes in the analysis we use the figures of a 20 percent drop in exports and the simulations with transmission to GDP (i.e., with

adverse effects on unemployment). The results for other cases are qualitatively identical and are available upon request from the authors. Below we discuss also the results using averages for all 12 export shocks for different financial conditions.[5]

One (expected) result is that, for given financial conditions, debt burden indicators deteriorate monotonically with the duration (severity) of the export shock. This is due to the fact that a longer lasting (deeper) shock requires incurring in additional borrowing to smooth out the effects of the crisis on domestic absorption, which deteriorates monotonically both solvency and liquidity indicators (see figures on the right side in Annex 1 across all panels).

Also, less stringent financial conditions imply a smoother adjustment of debt burden indicators; i.e., debt burden indicators deteriorate less initially under less stringent financial conditions, but also return to the original (baseline) level more slowly than under tougher financial conditions. This implies that when debt burden indicators breach their corresponding thresholds, they tend to stay above such value for a longer period under less stringent financial conditions. This is shown in table 4 below by the number of episodes which (almost) monotonically decrease with the tightening of financial conditions. This is so because the repayment period is shorter under the more stringent financial conditions in our simulation exercises. However, the underlying relationship is not perfectly monotonic because the higher interest rate –as well as the behavior of the corresponding debt burden indicator under the baseline scenario– also influences the number of times the corresponding threshold is crossed.

Table 4
Average number of episodes across all 12 shocks in exports under different financial conditions

Indicator	Number of episodes in baseline	FC10 [1] (0.75/40/10)	FC20 [1] (2.25/10/5)	FC30 [1] (5.25/10/0)	FC40 [1] (10.25/5/0)
PV debt to GDP	**5**	18	17	11	9
PV debt to X	0	12	13	6	4
PV debt to R	0		8	5	3
DS to X	0		10	7	5
DS to R	0			7	5

Notes: 1 Numbers in brackets specify interest rate, maturity and grace period, respectively.

It should also be noted that PV calculations are a non-linear transformation of debt flows, whose behavior is better captured by debt-service indicators. The latter is also a factor that explains why debt burden indicators based on PV of debt do not show a monotonic deterioration with the tightening of financial conditions. Such monotonic relationship is however observed in the case of both debt-service based indicators (debt-service to exports and debt-service to government revenues; see Annex 1, panels D and E).

[5] Recall that for each country there are 48 possible scenarios (12 shocks varying in depth and duration times 4 different financial conditions) that need to be analyzed.

As indicated, in addition to higher interest rates, tighter financial conditions in our simulations convey a shorter repayment period and a faster return to the original (baseline) level for all debt burden indicators. That is, debt burden indicators return to the baseline level faster, assuming countries manage to "survive" the shorter albeit harder period caused by the tighter financial conditions. The deterioration of the debt burden indicators shown in table 4, although significant (i.e., in the baseline scenario only one indicator breaches the threshold in 5 occasions over the 19 years projection), does not provide a clear or complete picture of the possibility of a country falling into debt distress. The latter is better captured by the distance –in percentage points– from the threshold when the latter is breached. The results from the simulations are shown in Annex 1 (for a 20 percent export shock) and summarized in tables 5 and 6 below (for all export shocks).

Table 5
Average-deviation (in percentage points) from threshold: mean across all 12 export shocks, under different financial conditions

Indicator	Percentage points above threshold in baseline	FC10 [1] (0.75/40/10)	FC20 [1] (2.25/10/5)	FC30 [1] (5.25/10/0)	FC40 [1] (10.25/5/0)
PV debt to GDP	1.8	21	29	29	25
PV debt to X	0	16	31	17	11
PV debt to R	0		27	31	13
DS to X	0		3	5	8
DS to R	0			6	12

Notes: 1 Numbers in brackets specify interest rate, maturity and grace period, respectively.

Table 6
Maximum deviation (in percentage points) from threshold: mean across all 12 export shocks under different financial conditions

Indicator	Percentage points above threshold in baseline	FC10 [1] (0.75/40/10)	FC20 [1] (2.25/10/5)	FC30 [1] (5.25/10/0)	FC40 [1] (10.25/5/0)
PV debt to GDP	4.3	29	48	49	43
PV debt to X	0	22	47	31	19
PV debt to R	0		46	44	19
DS to X	0		3	8	14
DS to R	0			8	21

Notes: 1 Numbers in brackets specify interest rate, maturity and grace period, respectively.

It is clear from tables 5 and 6 that on average the probability of debt distress increases significantly –more than 10 times for the only indicator that breaches the threshold under the baseline scenario– and almost monotonically with the tightening of financial conditions (monotonically for the case of the debt-service to exports and debt-service to revenues indicators). In other words, the possibility of a country not being able to meet its financial obligations in subsequent years after the shock –assessed by the average or maximum deviation in percentage points from the different thresholds– is, on average across all shocks, significantly higher than in the baseline scenario.

The same conclusion emerges when looking at the different figures in Annex 1 which show that debt burden indicators deteriorate initially much more under the more stringent financial conditions, although they tend to stay at higher levels for shorter periods. But, as indicated by panels D and E in Annex 1, the initial deterioration could be large enough to imply that countries would not be able to survive under the tighter financial conditions and, therefore, be forced into default; i.e., they would not make to the later stages of the crisis. The same conclusion does not appear as neat in the case of the PV indicators because of the non linearity aspect referred above. But for an assessment of the effects of the different shocks in the short-run, liquidity indicators appear more relevant than PV indicators, as the former are aimed at assessing the possibility of a country not being able to meet its financial obligations in each year after the shock occurs.

Before closing it should noted that the severity of shocks, assessed (ex-post) by the deterioration in the different debt burden indicators, does not always result in exactly the same ordering as indicated in table 2 above (see panels A through E in Annex 1)[6]. This is so because of the non linear transformation in the PV calculations, the pattern of the indicators under the baseline and the interaction between the severity of the shock (depth and length) with the cost at which the country obtains financing.

b. Debt burden indicators for the sample group

In order to analyze the behavior of the debt burden indicators for the 31 countries as a group, we concentrate in the aggregate measures described above and compare them vis-à-vis the same aggregate under the baseline scenario. The figures in Annex 2 show the pattern of these aggregate indicators for the different exports shocks and financial conditions. The same results are presented averaged across the different export shocks in tables 7 through 9 below. Similar to the case above for a typical country, for presentational purposes in the analysis below we focus on the case with transmission to GDP (i.e., when the drop in exports causes unemployment). Other results are available upon request from the authors. It should be noted that, similar to the case above, the severity of shocks assessed (ex-post) by the deterioration in the different debt burden indicators does not follow exactly the same ordering as shown in table 2 above.

Overall, as expected, debt burden indicators deteriorate with a deepening of the crisis, given the financial conditions. Also, for a given exports shock the indicators deteriorate, although not monotonically, with a tightening of financial conditions (see figures in Annex 2). Most important, the deterioration is quite significant in many cases –especially when the crisis deepens under tighter financial conditions for the liquidity indicators– where the corresponding indicators reach values that are several times larger than in the baseline scenario.

The probability of debt distress in the short run, assessed by the debt service to exports and debt service to revenues ratios, deteriorates almost monotonically and significantly with the tightening of financial conditions. Indeed, in some cases the distance (maximum or average) from the

[6] This is assessed by comparing figures in the left column in each panel in Annex 1.

threshold reaches values that are several multiples (up to 20 times) of the value under the baseline (see Tables 8 and 9; see also the last two charts in Annex2, panels B and C).

Finally, before closing it is important to analyze the difference in results when the drop in exports causes unemployment with that in which it does not, i.e., the cases with transmission and without transmission to GDP (in the latter case it is assumed that somehow the production is kept constant by firms increasing their inventories and/or the government buying and storing the products that are not exported). As shown in table 10 below, which shows the maximum difference in each indicator over the entire set of possible scenarios (48), the difference between the case with transmission versus w/o transmission are not very large, i.e., in only a few cases the difference is larger than 10 percent while the max is about 20 percent. Despite this, we believe it is more relevant (realistic) to analyze –as we did– the case with transmission to GDP.

Table 7: Average number of episodes across all 12 shocks in exports under different financial conditions for the entire sample

Indicator	**Number of episodes in baseline** [1]	FC10 [2] (0.75/40/10)	FC20 [2] (2.25/10/5)	FC30 [2] (5.25/10/0)	FC40 [2] (10.25/5/0)
PV debt to GDP	113	166	184	162	147
PV debt to X	145	192	214	196	185
PV debt to R	78	102	114	105	97
DS to X	26	32	50	91	121
DS to R	27	32	47	74	88

Notes: (1) The number in each cell corresponds to the sum over all countries. In columns 3-6 this sum is averaged for the different shocks. (2) Numbers in brackets specify interest rate, maturity and grace period, respectively.

Table 8: Average-deviation from threshold: mean across all 12 export shocks, under different financial conditions

Indicator	**Percentage points above threshold in baseline** [1]	FC10 [2] (0.75/40/10)	FC20 [2] (2.25/10/5)	FC30 [2] (5.25/10/0)	FC40 [2] (10.25/5/0)
PV debt to GDP	242	317	368	381	378
PV debt to X	1488	1901	2061	2114	2118
PV debt to R	1245	1522	1704	1799	1806
DS to X	20	34	36	63	144
DS to R	46	50	50	93	205

Notes: (1) The number in each cell corresponds to the sum of each country's average deviation from the threshold. In columns 3-6 this sum is averaged for the different shocks. (2) Numbers in brackets specify interest rate, maturity and grace period, respectively.

Table 9: Maximum deviation from threshold: mean across all 12 export shocks under different financial conditions

Indicator	Percentage points above threshold in baseline [1]	FC10 [2] (0.75/40/10)	FC20 [2] (2.25/10/5)	FC30 [2] (5.25/10/0)	FC40 [2] (10.25/5/0)
PV debt to GDP	508	653	730	766	774
PV debt to X	2522	3469	3704	3801	3847
PV debt to R	2462	2936	3183	3311	3347
DS to X	34	66	72	115	251
DS to R	107	116	122	183	365

Notes: (1) The number in each cell corresponds to the sum of each country's maximum deviation from the threshold. In columns 3-6 this sum is averaged for the different shocks. (2) Numbers in brackets specify interest rate, maturity and grace period, respectively.

Table 10: Maximum difference in aggregate indicators between the case with and without transmission to GDP for the entire sample[1]

Indicator	Number of Episodes	Average deviation from threshold	Maximum deviation from threshold
PV debt to GDP	4.0%	14.4%	20.7%
PV debt to X	0.0%	0.0%	0.0%
PV debt to R	7.8%	15.7%	14.8%
DS to X	0.0%	0.0%	0.0%
DS to R	8.3%	20.3%	17.6%

Note: (1) the numbers show the percentage in which the indicators, calculated when there is transmission to GDP of the export shock, exceed the same indicators calculated when there is no transmission to GDP. The number in each cell is the maximum difference over all 48 possible combinations of different export shocks and financial conditions.

c. Risk assessments under different exports shocks and financial conditions

Finally, we analyze the potential deterioration of countries' risk assessments for the different combinations of exports shocks and financial conditions. This is done by looking at the number of times that each country's indicator breaches its corresponding threshold (which is country specific) during the projection period (i.e., by looking at number of "episodes"). The same is done for the baseline scenario for comparison. It should be noted that this analysis does not consider the distance from the threshold (each episode counts irrespective of the magnitude by which the indicator is above the threshold), as is done in standard DSA exercises. Countries are classified as low, moderate (medium) or high risk of debt distress according to the following criteria[7]:

- ***"Low"*** risk of debt distress: if the threshold is breached less than five times during the projection period
- ***"Moderate"*** (medium) risk of debt distress: if the threshold is breached between five and ten times during the projection period (ten and five inclusive)
- ***"High"*** risk of debt distress: if the threshold is breached more than ten times during the projection period

[7] It should be stressed that although using the same "names" for the risk categories, their meanings are completely different than the definitions in the DSF.

It should be noted that the risk assessment is done for each indicator individually, as opposed to looking at the joint behavior of the five indicators for each country (as it is done in the DSF). Because of this we use more lenient criteria than in actual IMF-WB DSA analyses (i.e., in standard DSAs a country is assessed to be low risk if all five indicators are well below the country specific thresholds). The results are presented in table 11 below.

The table shows that country risks assessments change significantly vis-à-vis the baseline scenario, especially for the long lasting shocks and the tighter financial conditions[8]. For instance, a drop in exports of 30 percent recovering in 8 years (X708x), with financial conditions given by 10.25 interest rate, 5 years maturity and 0 years grace period (FC40), causes the number of countries rated in **moderate** (medium) risk of debt distress to increase to 10 (from 2 in the baseline) using the PV of debt to GDP ratio, to 13 (from 3 in the baseline) using the PV of debt to exports ratio, to 7 (from 2 in the baseline) using the PV of debt to revenue ratio, to 21 (from cero in the baseline) using the Debt service to exports ratio, and to 15 (from 1 in the baseline) using the debt service to revenues ratio.

The deterioration appears less striking when looking at the increase in the high risk of debt distress cases –i.e., for the same exports shock and financial conditions, only the Debt service to exports ratio deteriorates significantly, up to 5 cases (compared to 1 case under the baseline). This occurs in part because the tighter financial conditions assume a shorter repayment period, so the number of "episodes" as defined here increases less with tighter financial conditions.

Consequently, the increase in the high-risk of debt distress cases is more notorious under less stringent financial conditions (i.e., with longer repayment periods). For instance, for the same exports shock (30 percent drop, 8 years recovery period), the increase in the number of countries classified as high-risk of debt distress increases vis-à-vis the baseline more significantly in the case of 2.25 percent interest rate, with 10 years maturity and 5 years grace period (FC20) – from 4 to 13, 8 to 16, 3 to 9, 1 to 5 and 1 to 5, respectively using the five different debt burden indicators.

Overall, the results from the simulations as summarized in the table below highlight the importance of concessional financing for LICs, especially under a more severe (deep and protracted) crisis, although the latter may not be enough remedy in some cases where the risk ratings would deteriorate significantly even under the mildest financial conditions.

[8] In the table we highlight the number of cases that are significantly larger than in the baseline –i.e., when the number of countries is two times or more than in the baseline for high risk of debt distress, and when the number of countries is more than two times than in the baseline for moderate (medium) risk of debt distress.

Table 11: Risk ratings (whole sample) according to number of episodes by which countries exceed their respective thresholds across different export shocks and financial conditions

	Indicator	PV debt to GDP			PV debt to X			PV debt to R			DS to X			DS to R		
		low risk	medium risk	high risk	low risk	medium risk	high risk	low risk	medium risk	high risk	low risk	medium risk	high risk	low risk	medium risk	high risk
Baseline scenario		**25**	**2**	**4**	**20**	**3**	**8**	**26**	**2**	**3**	**30**	**0**	**1**	**29**	**1**	**1**
X708x	FC10	16	3	12	11	6	14	21	4	6	30	0	1	29	1	1
	FC20	13	5	13	8	7	16	19	3	9	23	3	5	24	2	5
	FC30	14	6	11	8	11	12	20	5	6	14	8	9	17	9	5
	FC40	16	10	5	9	13	9	21	7	3	5	21	5	13	15	3
X706x	FC10	18	2	11	13	5	13	22	3	6	30	0	1	29	1	1
	FC20	15	3	13	11	6	14	21	3	7	25	1	5	25	3	3
	FC30	15	7	9	11	8	12	21	7	3	17	7	7	21	5	5
	FC40	16	11	4	13	10	8	21	7	3	13	15	3	19	11	1
X808x	FC10	19	2	10	13	6	12	23	2	6	30	0	1	29	1	1
	FC20	16	3	12	12	5	14	21	4	6	26	3	2	26	4	1
	FC30	16	6	9	11	10	10	21	6	4	20	6	5	22	4	5
	FC40	17	10	4	14	9	8	21	7	3	14	14	3	20	10	1
X704x	FC10	19	4	8	17	6	8	23	3	5	30	0	1	29	1	1
	FC20	16	4	11	13	6	12	21	4	6	28	2	1	27	3	1
	FC30	16	10	5	13	10	8	21	7	3	19	7	5	22	6	3
	FC40	19	8	4	17	6	8	23	5	3	20	10	1	23	7	1
X806x	FC10	20	3	8	18	5	8	23	4	4	30	0	1	29	1	1
	FC20	17	3	11	13	6	12	22	3	6	28	2	1	29	1	1
	FC30	18	6	7	15	8	8	22	6	3	23	5	3	23	5	3
	FC40	19	8	4	16	7	8	22	6	3	18	12	1	23	7	1
X804x	FC10	21	2	8	20	3	8	23	5	3	30	0	1	29	1	1
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	FC30	20	6	5	19	4	8	23	5	3	26	4	1	26	4	1
	FC40	20	7	4	20	3	8	23	5	3	24	6	1	25	5	1
X702x	FC10	21	4	6	20	3	8	23	5	3	30	0	1	28	1	1
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	FC30	19	8	4	20	3	8	23	5	3	27	3	1	23	5	2
	FC40	20	7	4	20	3	8	24	4	3	27	3	1	24	5	2
X908x	FC10	21	4	6	20	3	8	23	5	3	30	0	1	29	1	1
	FC20	19	4	8	18	4	9	23	4	4	30	0	1	29	1	1
	FC30	19	6	6	18	5	8	23	5	3	28	1	2	26	4	1
	FC40	20	7	4	19	4	8	23	5	3	24	6	1	24	6	1
X906x	FC10	21	4	6	20	3	8	24	4	3	30	0	1	29	1	1
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	FC30	21	5	5	20	3	8	23	5	3	28	2	1	27	3	1
	FC40	21	6	4	20	3	8	24	4	3	27	3	1	26	4	1
X802x	FC10	22	4	5	20	3	8	25	3	3	30	0	1	29	1	1
	FC20	21	4	6	20	3	8	23	5	3	30	0	1	29	1	1
	FC30	21	6	4	20	3	8	23	5	3	30	0	1	27	3	1
	FC40	22	5	4	20	3	8	26	2	3	29	1	1	26	4	1
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	FC30	21	6	4	20	3	8	24	4	3	30	0	1	27	3	1
	FC40	21	6	4	20	3	8	25	3	3	29	1	1	27	3	1
X902x	FC10	22	4	5	20	3	8	26	2	3	30	0	1	29	1	1
	FC20	22	4	5	20	3	8	25	3	3	30	0	1	29	1	1
	FC30	22	5	4	20	3	8	26	2	3	30	0	1	29	1	1
	FC40	23	4	4	20	3	8	26	2	3	30	0	1	29	1	1

4. Conclusions

This paper analyzes the possible impact of the ongoing global financial crisis on 31 IDA-only African countries, in particular, on their debt sustainability situation. It does so by looking at the effect of the crisis on the countries' five debt burden indicators –PV of debt over GDP; PV of debt over exports; PV of debt over government revenues; debt service over exports, and debt service over government revenues. The analysis is done for 12 possible (hypothetical) alternative shocks in exports, varying on depth and length, and assumes that the countries borrow under four alternative financial conditions to smooth out the effect of the crisis, so that domestic absorption is not adversely affected. Then, starting in 2009 the five debt burden indicators are projected for 19 years, and we analyze whether they breach the country specific thresholds established under the joint IMF-WB DSF. We focus the analysis on for how long each debt burden indicator breaches the thresholds (how protracted the crisis is) and for how much on average or its maximum difference (as an assessment of the increase in probability of debt distress). The analysis is done indicator by indicator for the entire sample (as opposed to the joint behavior of them in each country) for the case when the drop in exports causes a slowdown in GDP.

The conclusions of the analysis show that, as expected, debt burden indicators deteriorate significantly for all countries with the severity –length and/or depth– of the crisis, given the financial conditions under which a country finances its reduced exports proceeds. However, a tightening of financial conditions leads to a significant deterioration of liquidity or debt service indicators, but not so much on solvency or PV of-debt indicators. This is so because the nonlinearities associated with PV calculations. More important, a tightening of financial conditions causes a significant deterioration in countries' probability of debt distress, assessed by the distance from the threshold, although not so much in the length of the period (or number of episodes) during which a country's threshold is breached.

The results from the simulations in this paper highlight the importance of concessional financing for LICs, especially under a more severe (deep and protracted) crisis, although the latter may not be enough remedy in some cases, where the risk ratings would deteriorate significantly even under the mildest financial conditions if the crisis proves to be a protracted one.

5. References

(Incomplete)

Claessens, S., M.A. Kose, M. E. Terrones (2008), "What Happens During Recessions, Crunches and Busts?" IMF Working Paper Series, WP/08/274, December.

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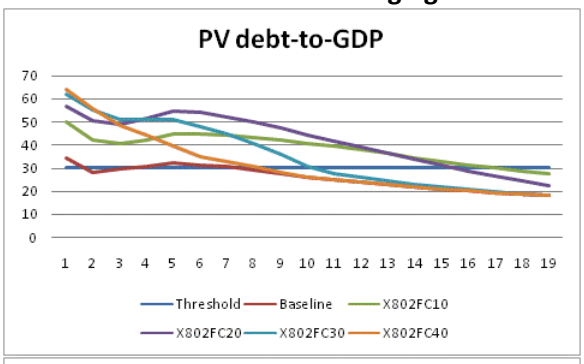
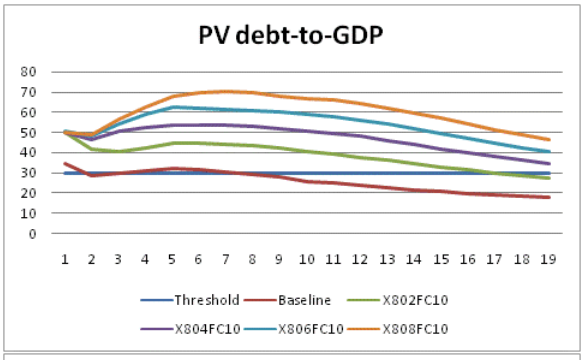
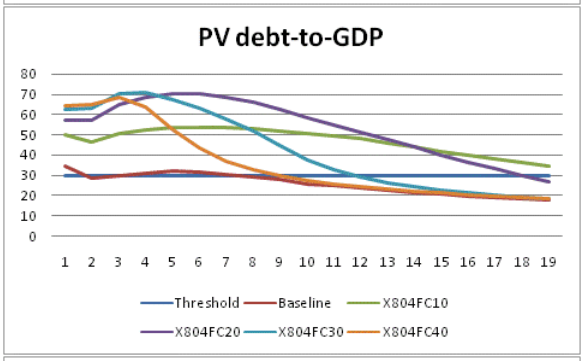
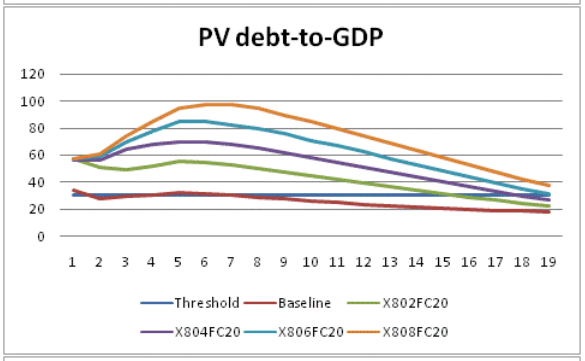
ANNEX 1: Debt Burden Indicators for a Typical LIC

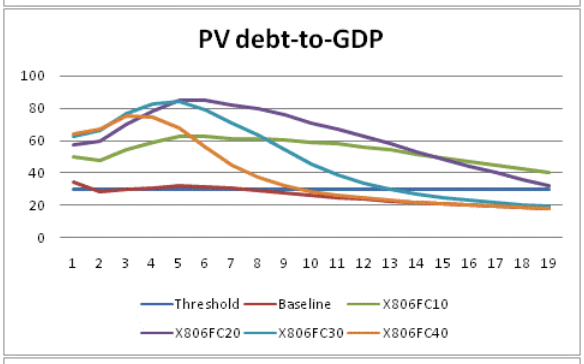
(A) PV of Debt to GDP ratio (20% export shock)
Changing duration and financial conditions

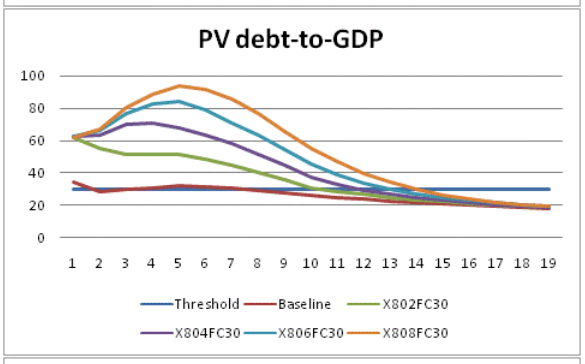


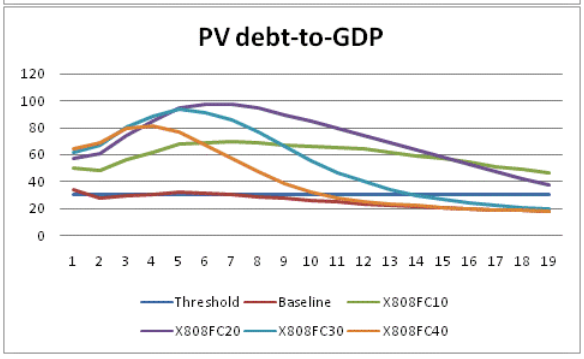


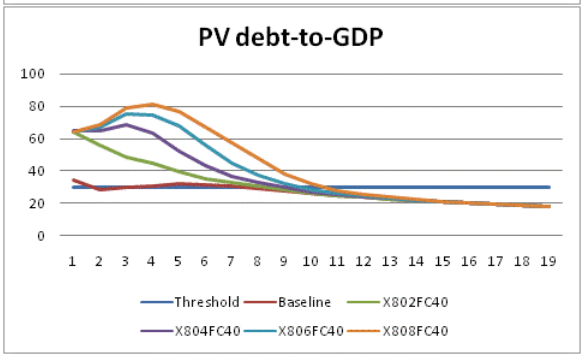




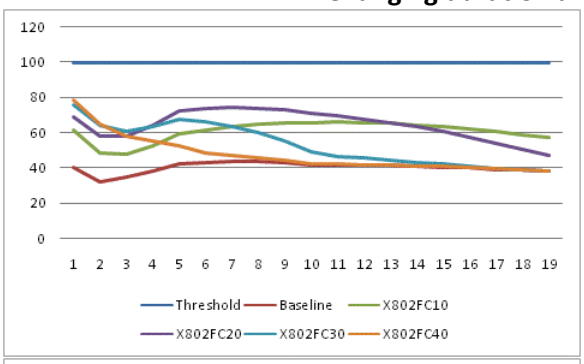


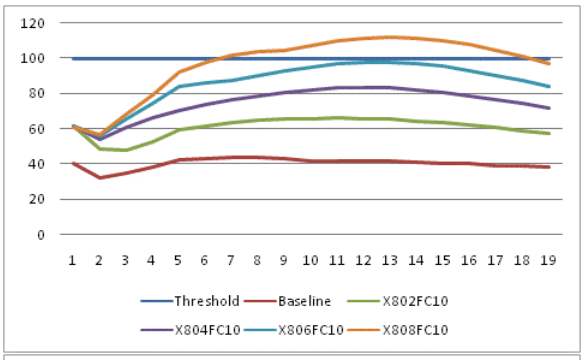


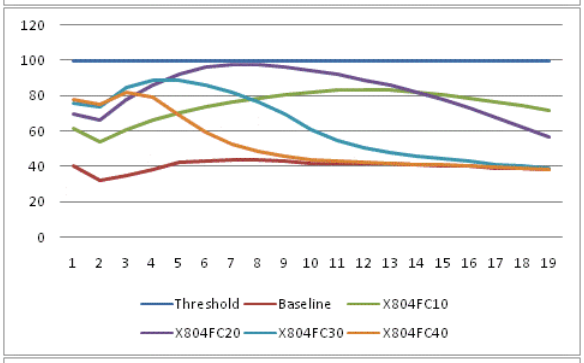


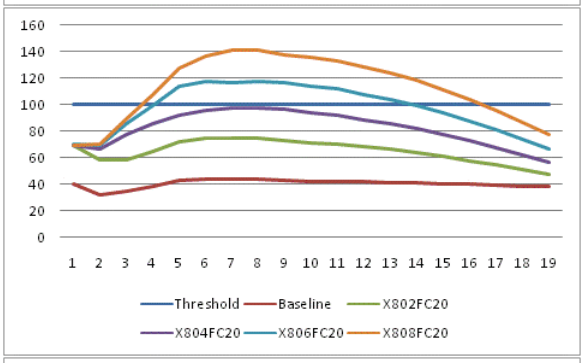


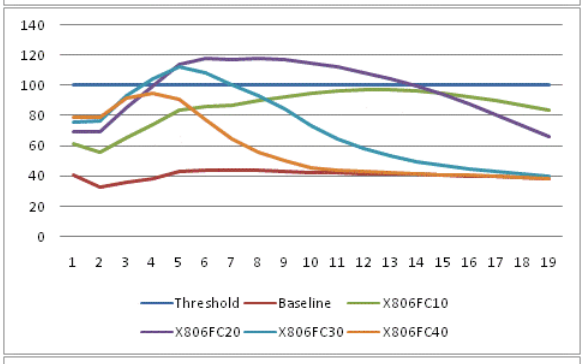
(B) PV of Debt to Exports ratio (20% export shock)
Changing duration and financial conditions

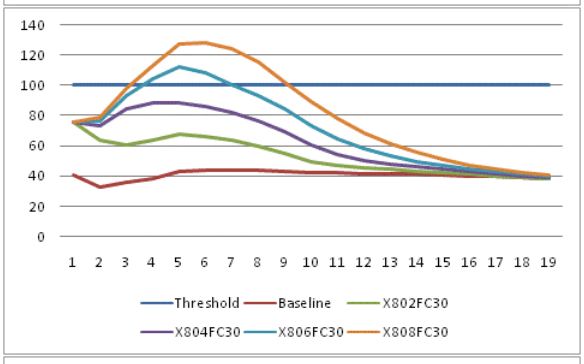


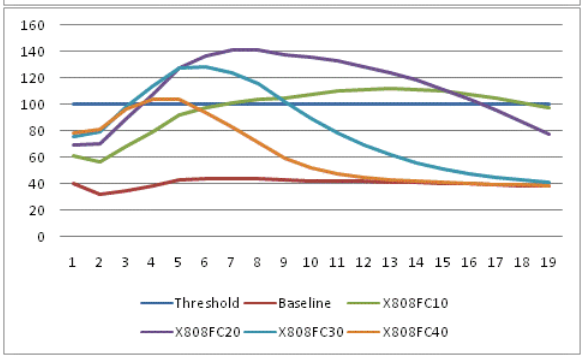


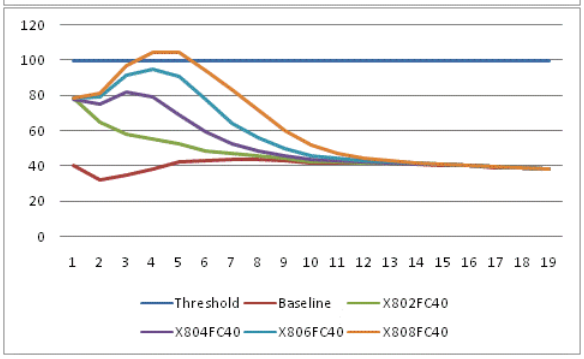




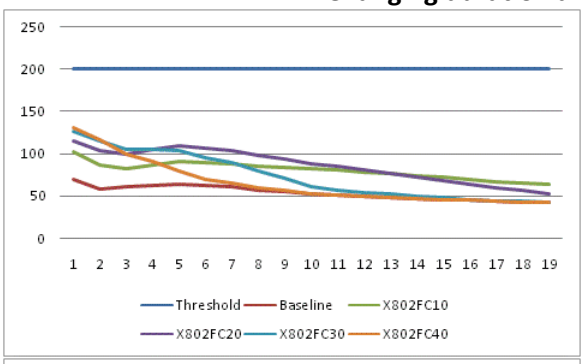


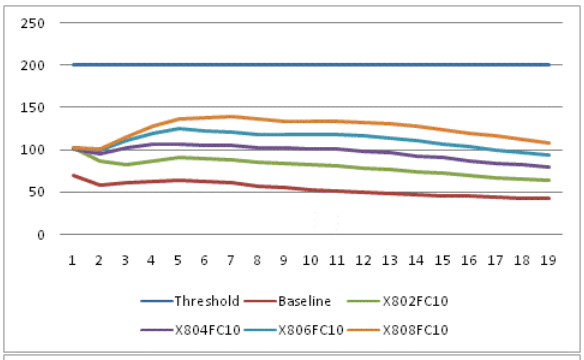


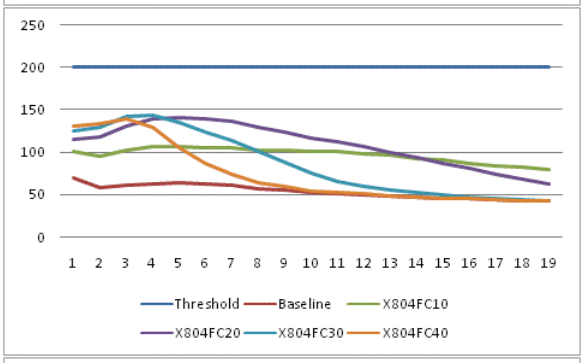


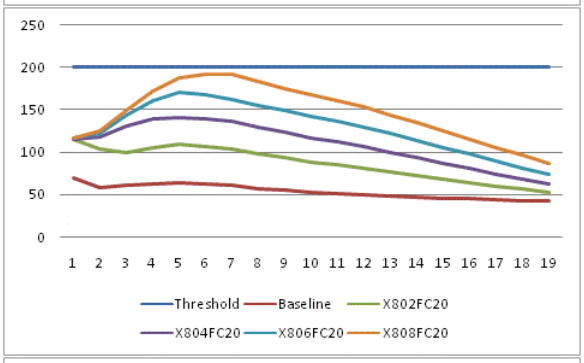


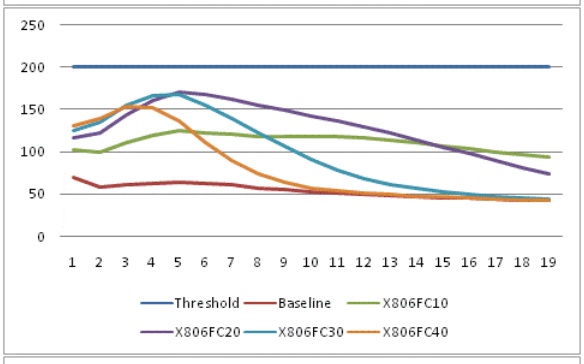
(C) PV of Debt to Revenues ratio (20% export shock)
Changing duration and financial conditions

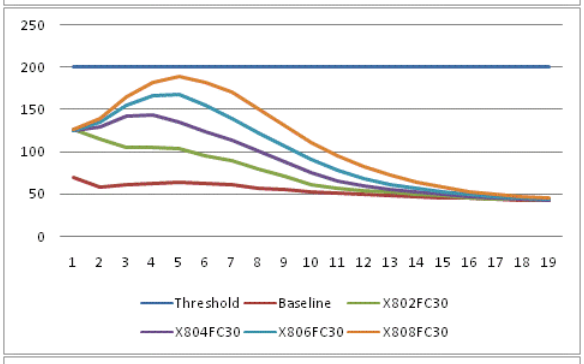


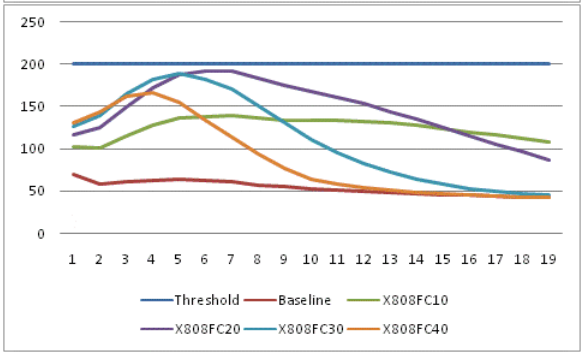


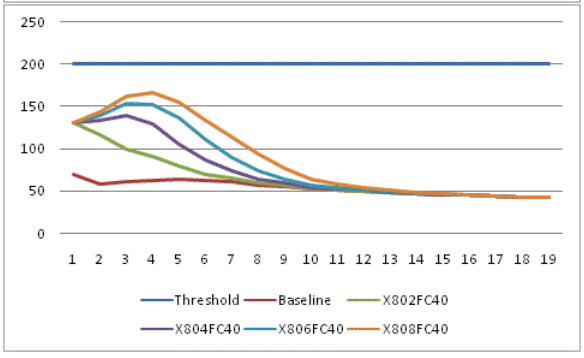




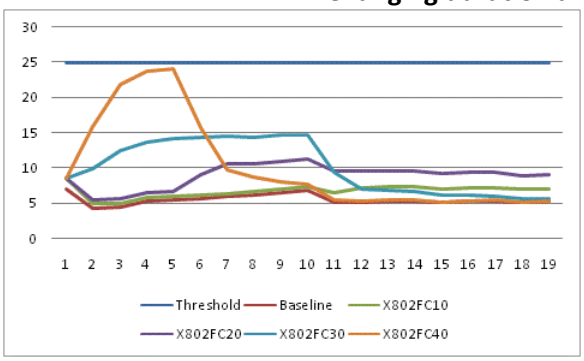


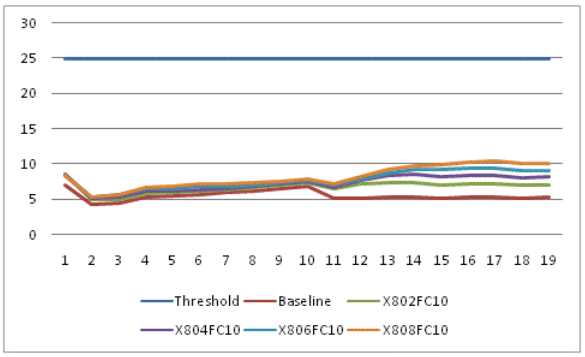


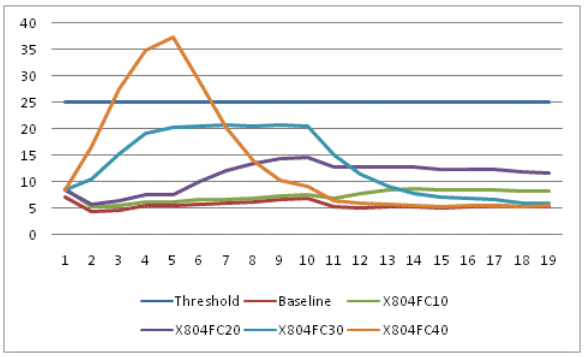


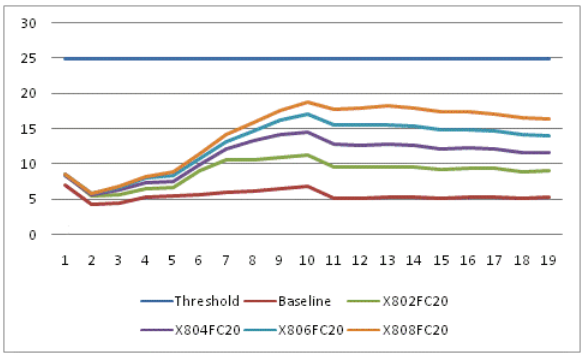


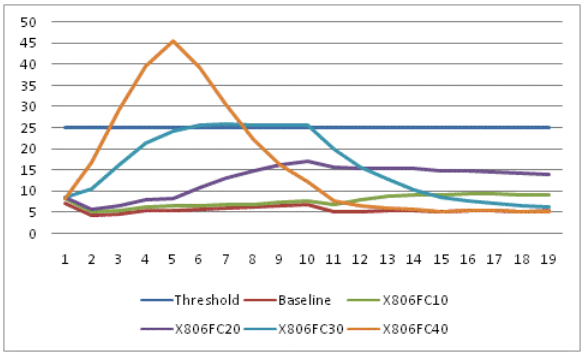
(D) Debt Service to Revenues ratio (20% export shock)
Changing duration and financial conditions

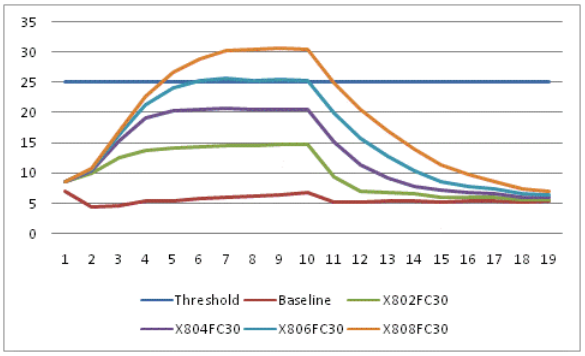


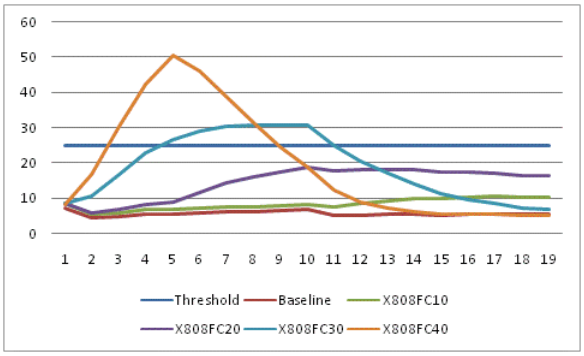


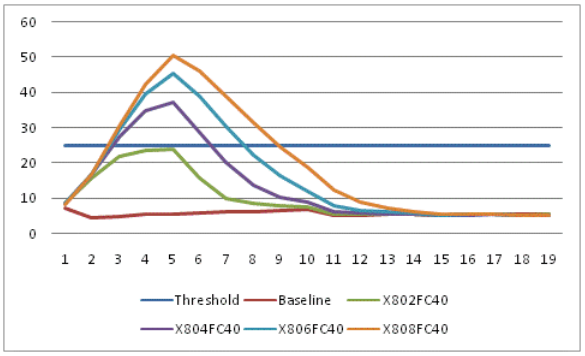




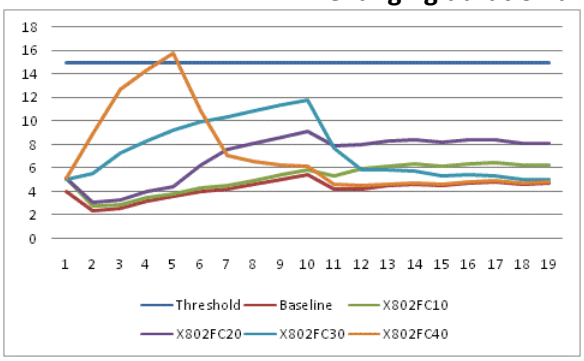


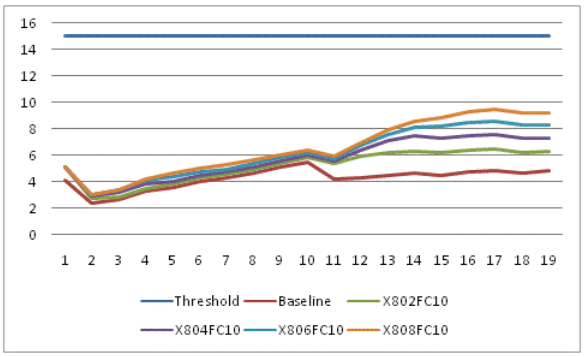


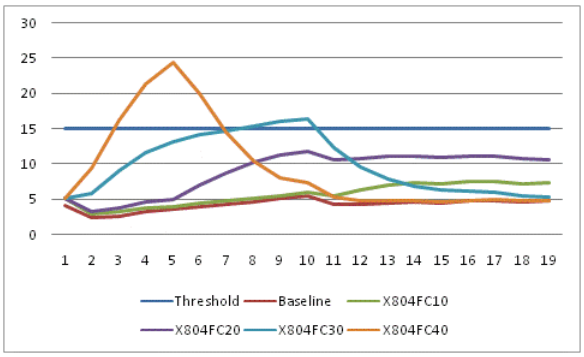


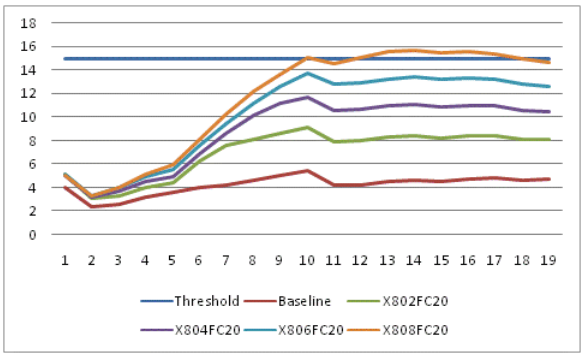


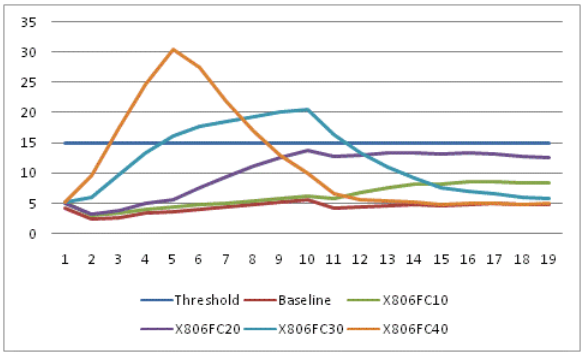
(E) Debt Service to Exports ratio (20% export shock)
Changing duration and financial conditions

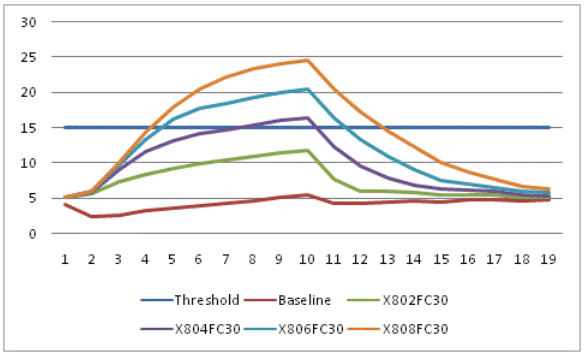


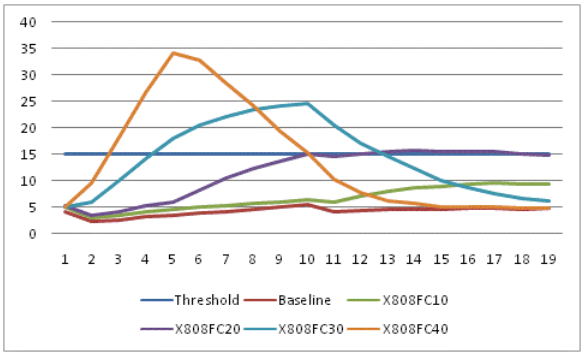


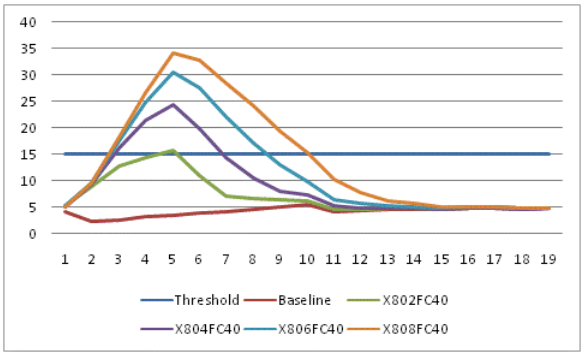






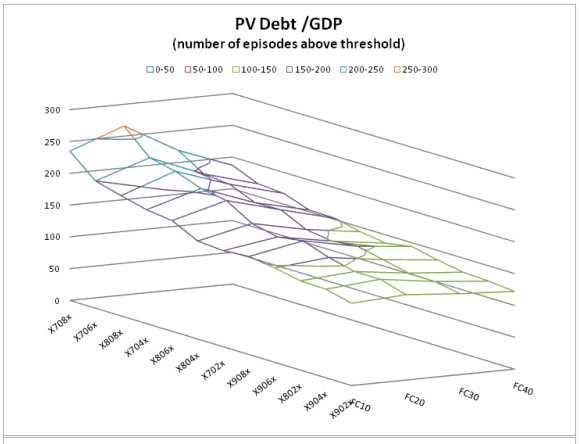


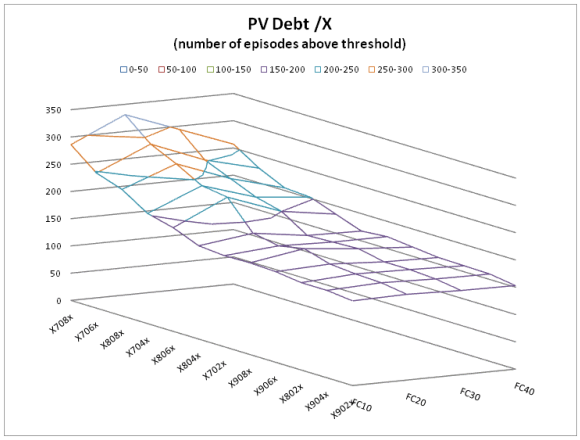


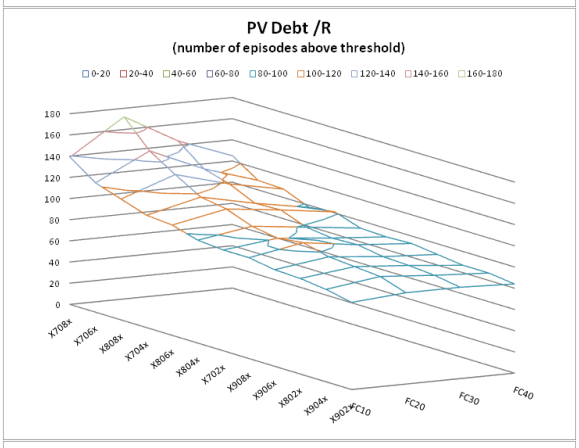


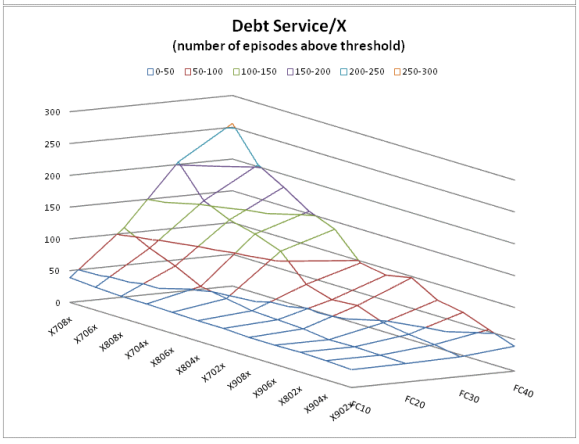
ANNEX 2: Debt Burden Indicators for the Whole Sample

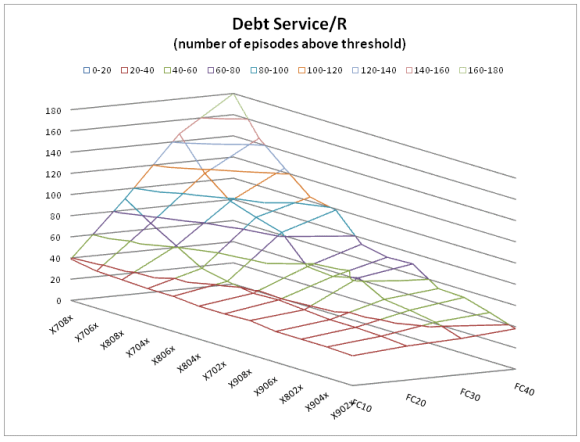
(A) Number of episodes above threshold
Changing export shocks and financial conditions



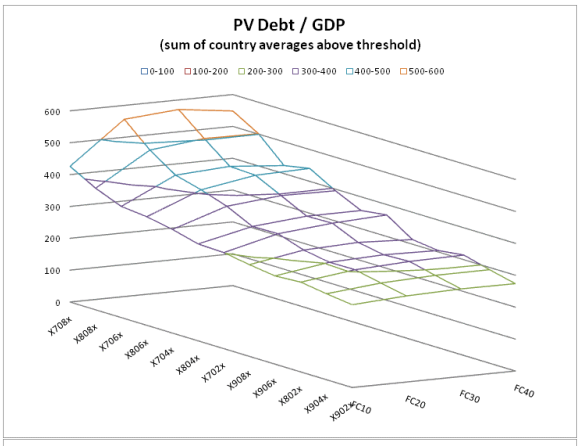


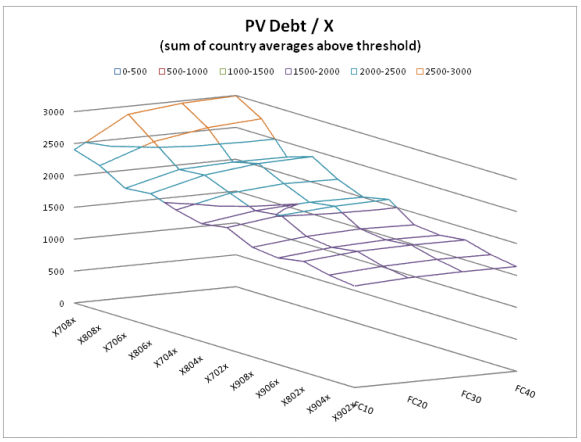


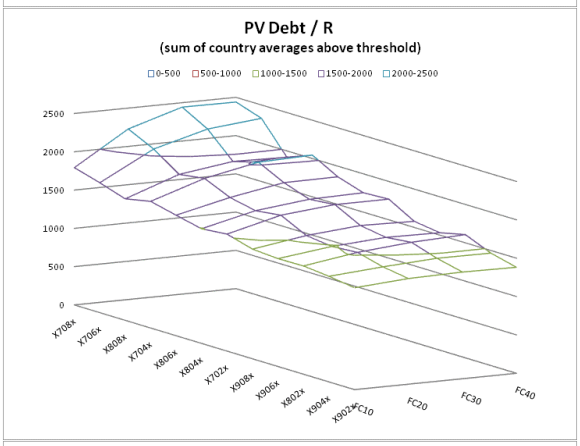


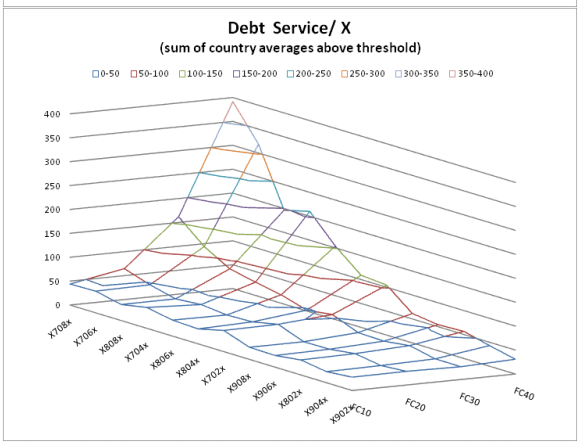


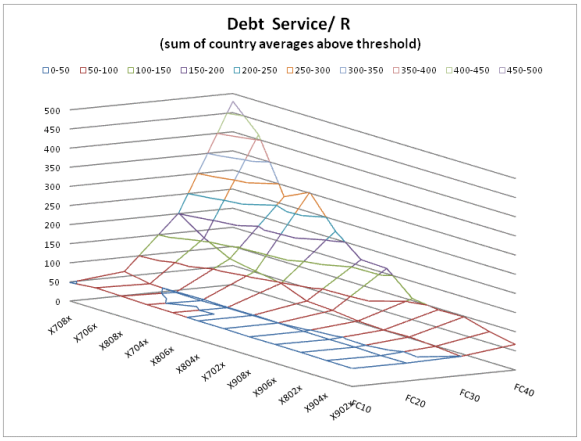
(B) Sum of country averages above threshold
Changing export shocks and financial conditions











(C) Sum of country maximum above threshold
Changing export shocks and financial conditions