

IMF Working Paper

Regaining Debt Sustainability After Banking Crises

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Regaining Debt Sustainability After Banking Crises**Prepared by Emanuele Baldacci, Sanjeev Gupta and Carlos Mulas-Granados***

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Abstract**This Working Paper should not be reported as representing the views of the IMF.**

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Most countries around the world have piled up large public debts in the aftermath of the recent financial crisis. As the economies recover from the recession, the challenge for governments is to regain fiscal stability by unwinding the exceptional fiscal stimulus and reducing public debt through fiscal consolidation. The unprecedented simultaneous increase in public debt levels worldwide, however, makes this effort particularly demanding. This paper focuses on the factors that explain successful public debt consolidations after 100 episodes banking crises during 1980-2008 using survival analysis. We find that expansionary policies during banking crises raise the probability of successful post-crisis debt consolidation as they reduce the crisis length and its negative implications on growth. Fiscal adjustment in the aftermath of the crisis is more likely to succeed when based on a combination of expenditure savings and tax increases. Cuts in transfers and public consumption are key to debt reduction. Other reforms to boost growth are also helpful, but their impact is less important than fiscal consolidations savings. These results are robust to alternative definitions of success.

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I. INTRODUCTION

Most countries around the world have accumulated large public debts in the aftermath of the global financial crisis as a result of the exceptional fiscal stimulus, the depth of the recession, and financial sector support measures. Debt is expected to reach about 120 percent of GDP in advanced G-20 countries by 2014, 40 percentage points of GDP above the pre-crisis level (IMF, 2009d). Public debt has also increased in some emerging market economies as a result of the recession, although in general the latter group of countries has not been hit equally hard by the financial crisis. Nonetheless, emerging economies tend to have a lower debt tolerance and are still exposed to spillover risks from solvency risks in advanced sovereigns.

This evidence is consistent with the literature on systemic banking crises. Recent studies have shown that these crises have large fiscal consequences (Freydl, 1999; IMF, 2009a; 2009b; 2009d). For example, Rogoff and Reinhart (2009) found that government debt rose by 86 percent in the three years following a banking crisis in a sample of episodes, while Laeven and Valencia (2008) estimated that fiscal costs (net of recoveries) associated to these crises was slightly less than 15 percent of GDP. More recently, Baldacci, Gupta and Mulas-Granados (2009) reported that during the average crisis episode in the last three decades the peak-to-rough increase in the public debt-to-GDP ratio was about 40 percentage points.

This increase in public debt raises solvency risks, constrains the capacity to use fiscal policy countercyclically and increases borrowing costs (IMF, 2009d). Ultimately, higher public debt may reduce output growth and productivity. As the economies recover from the recession, therefore, the challenge for governments is to regain fiscal stability by unwinding the exceptional fiscal stimulus and reducing public debt through fiscal consolidation. The unprecedented simultaneous increase in public debt levels worldwide, however, makes this effort particularly demanding.

While successful fiscal consolidations have been documented (Alesina and Ardagna, 2009), there is evidence that public debt is easier to accumulate than to eliminate after a financial crisis. In the sample of banking crises used by Baldacci, Gupta and Mulas-Granados (2009), 88 percent of the countries had not been able to cut their debt to pre-crisis levels 16 years after the end of the crisis.

In view of this evidence, the questions that motivate this study are the following:

- What are the factors that explain the success of public debt consolidations after banking crises?
- Why are some countries faster than others in reaching the pre-crisis debt levels?

We apply survival analysis techniques to a sample of 100 banking crisis episodes occurred between 1980 and 2008 in 99 countries. We first investigate these episodes using non-parametric methods to explain different patterns of post-crisis debt trends in various countries. We then carry out a parametric analysis to assess the factors affecting the probability of reaching pre-crisis levels of public debt. We use fiscal, monetary and other economic variables as determinants of success and we also focus on the role fiscal policy composition during and after the crisis (Alesina and Ardagna, 1998; Baldacci, Gupta and Mulas-Granados, 2009).

We use three different definitions of success which are characterized by three different thresholds for the reduction in public debt after the crisis episode compared to its pre-crisis level:

- A full reduction of public debt to its pre-crisis debt level;
- A reduction by half in the distance between the debt value in the first year after the banking crisis and the pre-crisis debt level; and
- A 10% reduction in this distance.

We complement this analysis with various robustness tests of our results. We investigate the impact of alternative definitions of success and use alternative cyclically adjusted fiscal indicators. Returning to pre-crisis levels may prove insufficiently ambitious for countries that had high debt levels before the onset of the crisis. Consistent with the literature on fiscal sustainability we derive alternative targets for the ratio of public debt to GDP to measure success, independently on the debt level before the crisis, using 60 percent of GDP and 80 percent of GDP thresholds (Cottarelli and Viñals, 2009).

The remainder of this paper is organized as follows: Section 2 reviews the relevant literature. Section 3 describes the dataset. Section 4 presents non-parametric survival analysis results and Section 5 reports the finding of the parametric analysis to explain the likelihood of successful debt consolidations. Section 6 discusses the robustness of these results. And the concluding Section 7 summarizes the findings and discusses their policy implications.

II. LITERATURE REVIEW

The success of fiscal adjustments strategies in bringing down public debt to sustainable level¹ is influenced by the size of the fiscal consolidation. Giavazzi and Pagano (1996), and Giavazzi, Jappelli, and Pagano (2000) find that size and persistence of the consolidation are the most important factors in guaranteeing success.² When initial debt levels are high, as in the post-crisis environment of most advanced and some emerging market economies, a credible sustained reduction in fiscal deficits can spur economic growth, which turns help achieve faster debt reduction (IMF, 2009e).

This reflects the potential distortions associated with high level of taxation to finance elevated debt levels, the wealth effect enjoyed by consumers expecting a decline in the future tax burden associated with debt reduction (Alesina and Ardagna, 2008), and the beneficial effect on capital accumulation of lower interest rates (Baldacci and Kumar, 2009). The latter depending both from lower inflationary pressures, reduced credit risk premia, and more effective use of credit in the economy when debt is lower.

The composition of the adjustment is also relevant. Alesina and Perotti (1995; 1996), McDermott and Wescott (1996), Alesina, Perotti, and Tavares (1998), Alesina, Ardagna, Perotti, and Schiantarelli (1999), and Alesina and Ardagna (2009) show that expenditure reductions increase the likelihood of reducing public debt, in particular when these cuts are concentrated on public transfers (e.g., pensions and other entitlements) and government wages. They also find that the composition of consolidations is more important than their size to succeed in reducing the stock of public debt and to generate expansionary effects on output in many episodes.

The positive impact of more persistent fiscal adjustment durations on the reduction of public debt has been stressed by Von Hagen, Hallett and Straucht (2001), Maroto and Mulas-Granados (2002), and Gupta, et al. (2003). More persistent adjustment efforts signal the authorities commitment to debt consolidation and more difficult to be reversed by following governments. Many authors (for example, Perotti (1999), Von Hagen, Hallett and Straucht (2001) and Lambertini and Tavares (2001)) have also emphasized the role that positive initial fiscal conditions, positive initial economic growth, relaxed monetary conditions and devaluations have for the likelihood of success during fiscal adjustment episodes.

Decisions regarding the timing, the duration, the size and the composition of adjustments are usually subject to institutional and political constraints. Among them, the influence of the cabinet's ideology on fiscal policy (Perotti and Kontopoulos, 2002; Mulas-Granados,

¹ For a definition of fiscal sustainability see Willcox (1989); Bohn (1995), Cuddington (1997); Chalk and Hemming (2000); IMF (2002); and Cassimon et al. (2008).

² Note that in all these studies success is defined as a reduction of the debt-to-GDP ratio in the aftermath of the adjustment episode.

2003); the influence of the electoral system and the budget process (Persson and Tabellini, 1999; Hallerberg and Von Hagen, 1997; Von Hagen, Hallett and Straucht, 2001), as well as the proximity of elections (Alesina, Cohen and Roubini, 1992; Maroto and Mulas-Granados, 2002; Buti and Van den Noord, 2003) are important factors. More stable governments and stronger fiscal institutions are more likely to remove the deficit bias in fiscal policy and can help achieve lower debt (IMF, 2009e). In contrast, high fragmentation in decision-making can have negative implications on the budget, make fiscal adjustment more difficult and eventually could lead to higher debt (Roubini and Sachs, 1989; Grilli, Masciandaro and Tabellini, 1991; Mulas-Granados, 2003).

While the above literature has concentrated on fiscal policy effectiveness across countries and periods, the concrete aspects of regaining debt sustainability after banking crises have been rarely studied. On the one hand it could be expected that most of the factors identified in the literature on effective fiscal consolidations are at work also in the aftermath of financial crises. However, unwinding the large debt accumulation taking place during banking crises could require specific fiscal responses. Previous work has shown that policy response to financial crises is critical to reducing crisis length and to support post-crisis growth (Baldacci, Gupta and Mulas-Granados, 2009). We expect these factors to play a role in addition to the post-crisis fiscal adjustment strategy in regaining debt sustainability in the aftermath of these shocks.

The following sections explore this hypothesis using survival analysis. This type of analysis has been rarely applied to the study of public finances,³ and was first used empirically in the field of labour economics. Nevertheless, this approach is appropriate to assess the in-and-out episodes of debt accumulation that typically occur around banking crisis episodes.

³ Among the few works that have applied survival analysis to the study of various aspects of public finances are: Gupta et al (2005); Von Hagen, Hallett and Strauch (2001); Maroto and Mulas-Granados (2008).

III. DESCRIPTIVE ANALYSIS

We use the sample of banking crises from Baldacci, Gupta and Mulas-Granados (2009), based on the information collected by Laeven and Valencia (2008). Both papers define these episodes as moments in which a country's corporate and financial sectors experience a large number of defaults and financial institutions and corporations face great difficulties repaying contracts on time. Using this mixture of objective data and subjective assessments, Laeven and Valencia (2008) identify 124 systemic banking crises over the period 1970-2007. We dropped 24 of them due to insufficient fiscal data to perform our analysis. Using data from WEO and GFS, we create a sample of 100 banking crisis episodes where data on budget indicators and public debt are available with a sufficient degree of detail.

Based on these data, we generate a dummy variable called "*Failure*", which takes value zero every year after an episode of banking crisis in which public debt level (as a percent of GDP) is above its pre-crisis debt level. This variable takes value of one when debt is at least equal to the pre-crisis debt level. Using the dates in which a failure event occurs, we create a new variable called "*Duration*" that represents the time between two consecutive failures, that is, debt consolidation period.

As mentioned above in the baseline case we use three different thresholds to measure success in debt reduction after banking crises:

- Complete success (when the country reaches pre-crisis debt levels);
- Partial success (when the country reaches 50 percent of the required debt reduction to return to its pre-crisis debt level);
- Minor success (when the country only reaches 10 percent of debt reduction).

We use two different reference points to calculate success in cutting the accumulated debt. First, we take as the reference point the level of debt in the last year of the banking crisis. Alternatively, we use as a reference the year in which the debt level reached its peak during the episode (which typically occurs during the banking crisis, and not at the end of the episode). Accordingly, we generate *Failure* and *Duration* variables for the three definitions of success and these two reference points for debt reduction.

3.1. Analysis for the whole sample

In Table 1 we present basic statistics for the *Failure* and *Duration* variables. The total number of observations (net of missing data points) is 972,⁴ distributed in 100 episodes of banking crises. The minimum duration of a debt-recovery episode is 1 year and the maximum is 24 years. This implies that some countries never reached any pre-crisis debt threshold during the sample period (not even using the least demanding definition of success).

Under the “crisis-to-threshold” criterion, the average duration of a completely successful debt-recovery episode (reaching a complete return to pre-crisis debt) is 9.72 years. This translates into a low probability of success for fiscal consolidations. As we relax the conditions, the duration shortens. For example, the average duration of partially successful episodes (50 percent threshold) is 7.92 years and the average duration of minimally successful episodes (10 percent threshold) is 5.92 years.

Under the “peak-to-threshold” criterion, average duration and probabilities of success are similar to the ones described above. The main difference is that the average length of the fiscal consolidation periods are slightly shorter and the probabilities of success are, consequently, higher. This is due to the fact that in some cases the debt-to-GDP ratio peaked in the middle of the banking crisis and started to decrease before the episode had actually ended and GDP growth resumed.

Table 1. Failure and Duration of debt-recovery episodes. Descriptive statistics.

CRISIS-TO-THRESHOLD	Duration		Failure	
	Mean	Std. Dev.	Mean	Std. Dev.
100% threshold	9.72	5.692	0.066	0.249
50% threshold	7.92	4.959	0.097	0.296
10% threshold	6.68	4.598	0.128	0.335
PEAK-TO-THRESHOLD				
100% threshold	9.25	6.022	0.072	0.259
50% threshold	7.24	5.193	0.109	0.312
10% threshold	5.82	4.731	0.151	0.358

Figure 1 shows the duration of debt-recovery episodes following a banking crisis. If we focus on the share of debt-recovery episodes that lasted less than 10 years, we observe

⁴ Under the Peak-to-Threshold definition the number of observations is 925.

that this part of the distribution accumulates half of episodes under the 100 percent threshold definition, 62.5 percent of the episodes under the 50 percent threshold, and 77.5 percent of episodes under the 10 percent threshold.

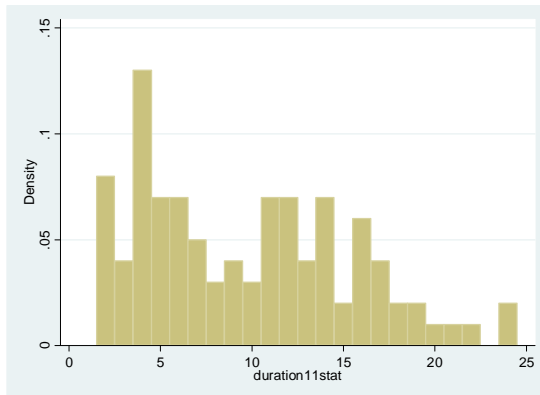
It is also worth noting that all histograms show a series of spikes in the observations for duration lengths between 10 and 15 years. This is likely to reflect the fact that there are a number of crises with persistent debt effects but also truncated duration. The latter are cases in which debt never reached the threshold but are considered "successful" because the sample period ends.

The most important conclusion of this descriptive analysis is that the crisis-to-threshold criterion yields a wider distribution of duration observations than the peak-to-threshold definition. Thus, crisis-to-threshold will make a better dependent variable in the preferred specification, with peak-to-threshold ones used as a robustness check. As expected, defining failure and duration with the peak-to-threshold criteria skews the distribution towards shorter duration, reflecting episodes in which debt falls during the crisis, before growth resumes.

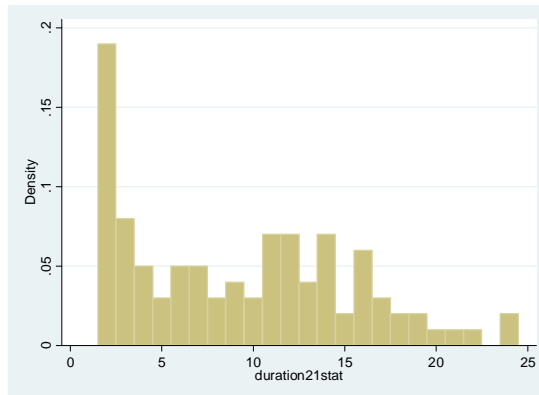
Figure 1. Distribution of debt-recovery episodes after banking crises

a) Completely successful episodes (100 percent threshold)

Crisis-to-threshold.

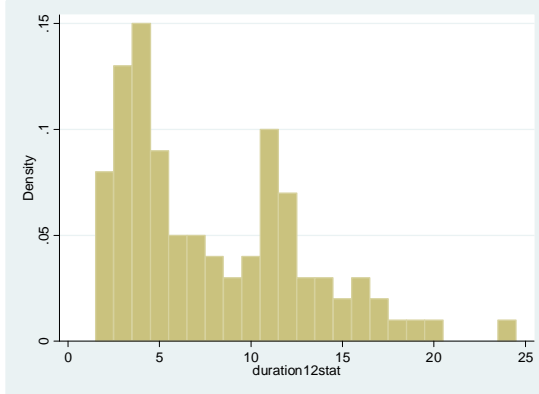


Peak-to-threshold.

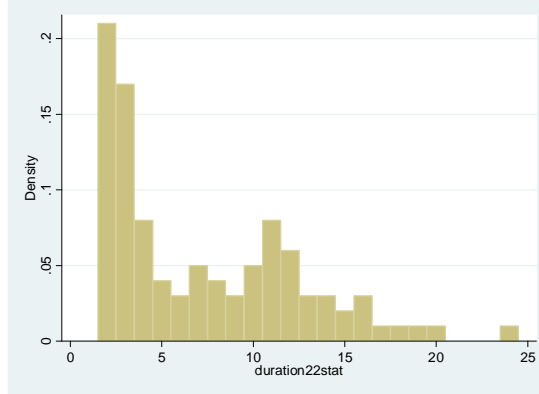


b) Partially successful episodes (50 percent threshold)

Crisis-to-threshold.

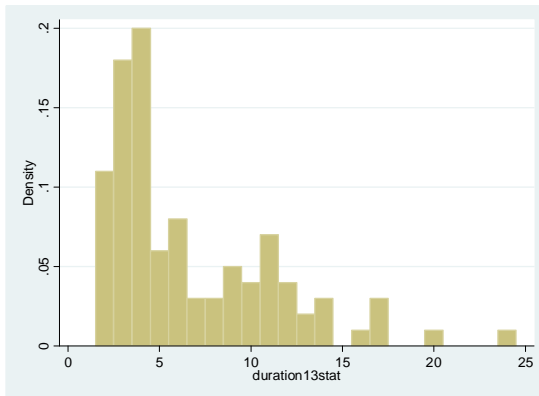


Peak-to-threshold.

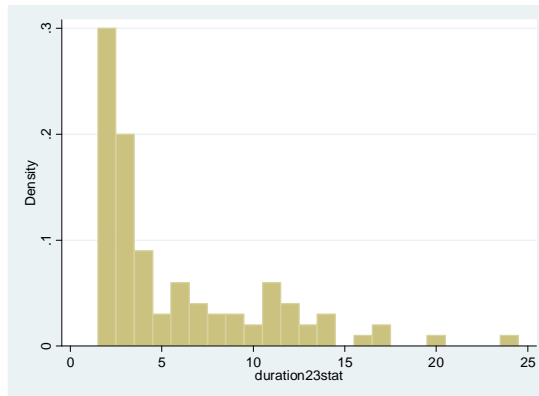


c) Minimally successful episodes (10 percent threshold)

Crisis-to-threshold.



Peak-to-threshold.



3.2. Analysis by country-groups

The history of banking crises is full of contagion effects (which typically have a regional component) and reputation asymmetries (normally linked to the degree of economic development). As a consequence, it is likely that the duration of debt-recovery episodes in the aftermath of banking crises may also be subject to regional differences or income-related heterogeneities. More importantly, as discussed in the previous section, public debt dynamics may present different patterns depending on the initial fiscal conditions, the size of the fiscal deterioration, and the budget composition during and after the banking crisis.

We assess the statistical relevance of these asymmetric dynamics using a non-parametric analysis and the causal relationship using parametric methods. Table 2 reports the descriptive statistics of the *Failure* and *Duration* variables under different groups on the

basis of fiscal conditions, per capita income levels and region. We only report descriptive statistics under the crisis-to-threshold criterion.⁵ We observe the following:

- *Crisis frequency*: Fiscal consolidation length in countries that suffer multiple episodes is on average about a year shorter than in countries that experience only a single crisis. Single crisis countries also have greater duration variance. This implies that the probability of successful debt consolidation is lower in the latter group.
- *Initial fiscal conditions*: Higher initial debt (pre-crisis public debt higher than the median in the sample) implies significantly shorter duration, approximately 3 to 4 years shorter, and a higher probability of success. This could reflect the fact that developed countries tend to have higher public debt accumulation before the crisis and better *institutional* capacity to implement fiscal consolidation in its aftermath. Also higher debt levels may make the need for fiscal consolidation more stringent and force governments to take actions to avoid widening credit risk premia.
- *Fiscal response*: Countries in which the budget balance deteriorates more than the median in the sample during the crisis unwind their accumulated debt faster as the active fiscal response helps economic recovery and subsequent debt reduction. In relation to budget composition, spending increases (a positive average annual change in total expenditures during the crisis period) reduce the average duration by almost one year and increase the likelihood of successful post-crisis adjustment.
- *Per capita income*: OECD countries experience a shorter duration of high debt periods than non-OECD countries. These countries may have better institutional capacity to respond effectively to the increase in public debt during the banking crisis while ensuring debt-sustainable when economic conditions stabilize. Interestingly, among developing countries, as income rises to middle-income levels, fiscal consolidation duration falls and the likelihood of success increase.⁶

⁵ Descriptive statistics under the peak-to-threshold criterion are similar to those reported in the text and available from the authors upon request.

⁶ It may be that these emerging markets being more connected to the global economy have a greater incentive to maintain fiscal discipline and enhance stability, and reap the benefits of such economic relationships. However, the majority of the episodes labeled as "upper-middle income" episodes are crises in Latin American countries (Argentina, Brazil, Chile, Venezuela) and multiple-crisis countries (Turkey, Uruguay). Rather than an income effect, it may be due to region-specific policies or duration truncation.

Table 2. Failure and Duration of debt-recovery episodes. Descriptive statistics by country-groups.

SINGLE CRISIS	Duration		Failure		MULTIPLE CRISES	Duration		Failure	
	Mean	Std. Dev.	Mean	Std. Dev.		Mean	Std. Dev.	Mean	Std. Dev.
100% threshold	9.985	5.988	0.070	0.255	100% threshold	9.181	5.083	0.059	0.236
50% threshold	8.089	5.285	0.099	0.299	50% threshold	7.575	4.279	0.092	0.289
10% threshold	6.880	4.906	0.130	0.336	10% threshold	6.272	3.979	0.125	0.332

HIGH INITIAL DEBT	Duration		Failure		LOW INITIAL DEBT	Duration		Failure	
	Mean	Std. Dev.	Mean	Std. Dev.		Mean	Std. Dev.	Mean	Std. Dev.
100% threshold	8.530	5.481	0.100	0.300	100% threshold	11.010	5.682	0.043	0.203
50% threshold	6.653	4.465	0.140	0.348	50% threshold	9.260	5.122	0.069	0.254
10% threshold	5.562	3.631	0.165	0.372	10% threshold	7.803	5.169	0.104	0.306

Note: “High Initial Debt” is defined as having an average debt-to-GDP ratio above the median pre-crisis debt for the whole sample. The opposite applies for “Low Initial Debt”

ACTIVE RESPONSE	Duration		Failure		CAUTIOUS RESPONSE	Duration		Failure	
	Mean	Std. Dev.	Mean	Std. Dev.		Mean	Std. Dev.	Mean	Std. Dev.
100% threshold	8.979	5.501	0.063	0.244	100% threshold	10.400	5.890	0.071	0.257
50% threshold	7.346	4.828	0.097	0.296	50% threshold	8.421	5.095	0.100	0.300
10% threshold	6.489	4.601	0.122	0.328	10% threshold	6.760	4.622	0.139	0.346

Note: “Active Response” is defined as having a significant fiscal deterioration, i.e: maintaining an average budget balance during the crisis episode above the median crisis balance for the whole sample. The opposite applies for “Cautious Response”

REV-BASED RESPONSE	Duration		Failure		EXP-BASED RESPONSE	Duration		Failure	
	Mean	Std. Dev.	Mean	Std. Dev.		Mean	Std. Dev.	Mean	Std. Dev.
100% threshold	10.036	5.660	0.059	0.237	100% threshold	9.239	4.420	0.076	0.265
50% threshold	8.145	4.555	0.089	0.285	50% threshold	7.869	4.883	0.107	0.310
10% threshold	7.036	4.345	0.116	0.320	10% threshold	6.891	4.581	0.145	0.353

Note: “Exp-based Response” is defined as having an average crisis expenditure change above zero. “Revenue-based Response” is defined as having an average crisis revenue change above zero

	Duration		Failure			Duration		Failure	
OECD COUNTRIES	Mean	Std. Dev.	Mean	Std. Dev.	NON-OECD	Mean	Std. Dev.	Mean	Std. Dev.
100% threshold	11.545	6.154	0.023	0.152	100% threshold	9.494	5.628	0.073	0.260
50% threshold	9.181	4.665	0.049	0.218	50% threshold	7.704	4.997	0.104	0.305
10% threshold	8.272	4.818	0.065	0.249	10% threshold	6.483	4.560	0.138	0.345

	Duration		Failure			Duration		Failure	
UMIC COUNTRIES	Mean	Std. Dev.	Mean	Std. Dev.	NON-UMIC	Mean	Std. Dev.	Mean	Std. Dev.
100% threshold	7.727	4.579	0.094	0.292	100% threshold	10.803	5.518	0.062	0.242
50% threshold	6.000	3.422	0.143	0.352	50% threshold	8.903	4.853	0.088	0.284
10% threshold	5.318	3.271	0.162	0.370	10% threshold	7.593	4.690	0.123	0.328

	Duration		Failure			Duration		Failure	
LAC COUNTRIES	Mean	Std. Dev.	Mean	Std. Dev.	NON-LAC	Mean	Std. Dev.	Mean	Std. Dev.
100% threshold	8.178	5.773	0.082	0.276	100% threshold	10.256	5.992	0.070	0.255
50% threshold	6.892	4.323	0.124	0.330	50% threshold	8.598	5.798	0.097	0.296
10% threshold	5.571	3.665	0.166	0.373	10% threshold	7.570	5.216	0.130	0.337

	Duration		Failure			Duration		Failure	
ECA COUNTRIES	Mean	Std. Dev.	Mean	Std. Dev.	NON-ECA	Mean	Std. Dev.	Mean	Std. Dev.
100% threshold	8.909	4.763	0.071	0.258	100% threshold	10.110	6.189	0.073	0.261
50% threshold	7.363	5.162	0.098	0.300	50% threshold	8.505	5.630	0.106	0.308
10% threshold	5.090	3.645	0.196	0.402	10% threshold	7.666	5.220	0.134	0.341

	Duration		Failure			Duration		Failure	
DECADE 1980s	Mean	Std. Dev.	Mean	Std. Dev.	DECADES 1990-2000s	Mean	Std. Dev.	Mean	Std. Dev.
100% threshold	10.606	6.632	0.018	0.135	100% threshold	8.690	5.832	0.076	0.266
50% threshold	8.727	5.512	0.024	0.155	50% threshold	7.220	4.965	0.115	0.320
10% threshold	7.484	5.190	0.058	0.235	10% threshold	5.880	4.515	0.149	0.357

- *Region*: Regional differences exist; Latin American and Eastern European countries tend to exhibit shorter durations of the fiscal consolidation and higher probabilities of success.
- *Sub-periods*: Duration decreases over time and the probability of success increases. On average, post-crisis adjustment following debt explosions in the 1990s and 2000s crises lasted approximately one year less than in the 1980s crisis episodes.

IV. NON-PARAMETRIC SURVIVAL ANALYSIS

In this section we use a duration model. If we define T as the discrete random variable that measures the time between the beginning of a fiscal consolidation and its end due to successfully achieving the target debt level, the observations consist of a series of data (t_1, t_2, \dots, t_n) which correspond to the observed durations of each consolidation period in the sample. The probability distribution of the duration variable can be specified by the cumulative distribution function:

$$F(t) = Pr(T < t) \quad (1)$$

which indicates the probability that the random variable T is smaller than a certain value t . The corresponding probability function is then:

$$P(t) = Pr(T = t) \quad (2)$$

In duration models, two main functions are used to characterize the probability distribution of the duration variable:

- (a) The survivor function is defined as:

$$S(t) = Pr(T \geq t) = 1 - F(t) \quad (3)$$

and it gives the probability that the duration of the fiscal consolidation is greater than or equal to t .

- (b) The hazard function is defined as:

$$h(t) = Pr(T = t / T \geq t) \quad (4)$$

and it provides, for each duration, the probability of successfully ending a consolidation episode, conditioned to the duration of the consolidation.

There is a relation between both functions given by the following expression:

$$S(t) = \tilde{\mathbf{O}}_{s=|t} (1 - h(s)) \quad (5)$$

One of the advantages of the hazard function is that it allows us to characterize the dependence path of duration. Formally, there exists a positive duration dependence in t^* if $dh(t)/dt > 0$, in the moment $t=t^*$. This positive correlation implies that the probability that a fiscal consolidation ends in t , given that it has reached t , depends positively on the length of this consolidation period. Thus, the longer the period, the higher the conditional probability of entering into a fiscal expansion. Similarly, there exists negative duration dependence if $dh(t)/dt < 0$ in $t=t^*$. In this case, the longer the fiscal adjustment period, the lower the conditional probability of fiscal expansion.

The non-parametric analysis is used to estimate the unconditional hazard function which registers all the observations for which there is a change, that is, the relative frequency of observations with $T=t$. For this analysis of duration, the Kaplan-Meier estimate is widely used (Kaplan and Meier, 1958). The hazard function is calculated as follows:

$$\hat{h}(t) = \frac{d_t}{n_t} \quad (6)$$

where d_t represents the number of failures registered in moment t , and n_t is the surviving population in moment t , before the change takes place. From the hazard function, it is possible to obtain the cumulative hazard function with a estimation procedure proposed by Nelson (1972) and Aalen (1978). It is given by the following expression:

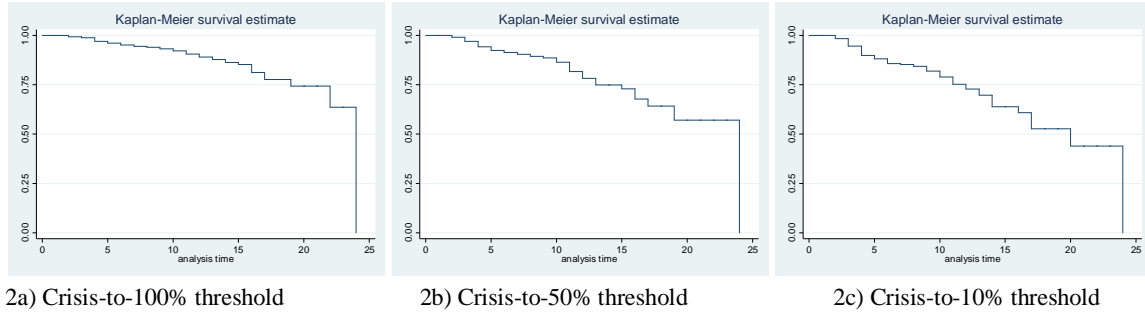
$$\hat{H}(s) = \hat{\mathbf{a}}_{s=1}^t \hat{h}(s) \quad (7)$$

The Kaplan-Meier survivor function for duration t is calculated as the product of one minus the existing risk until period t :

$$\hat{S}(t) = \tilde{\mathbf{O}}_{j|t_j \in t} \left(\frac{n_j - d_j}{n_j} \right) \quad (8)$$

We will estimate the Kaplan-Meier survivor function for the whole sample and for the three thresholds. Figure 2 shows the corresponding estimations.

Figure 2. Estimated Kaplan-Meier survivor function. Whole sample.

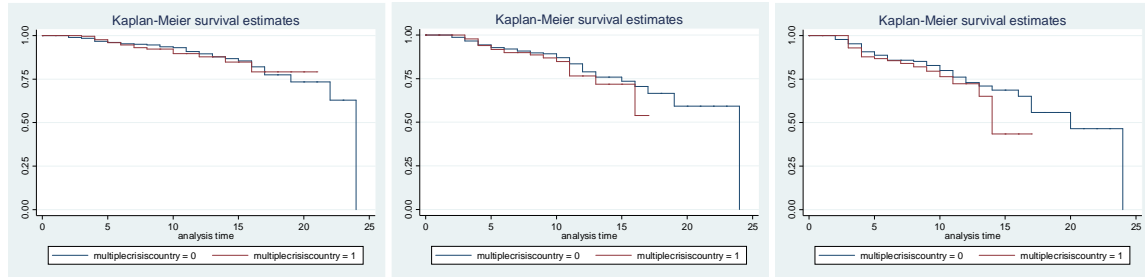


In all cases, after 24 years of adjustment (the maximum duration registered in our sample) at least 40 percent of the fiscal consolidation episodes were still ongoing. This varies with the threshold used for the debt target adopted to measure success. The probability of success improves as we move towards less demanding thresholds. Focusing on the median duration, we see that after 12.5 years of adjustment, 90 percent of full debt-recovery episodes are still ongoing (i.e. not successful), while this percentage decreases to 80 percent for partial debt-recovery episodes, and to 65 percent for minimal debt-recovery ones. For longer durations (15 years onwards), the probability of ongoing fiscal consolidation decreases rapidly (especially under the weaker definitions).

We replicate the Kaplan-Meier estimations by groups of countries. In order to test whether there is homogeneity in our sample, and whether or not we can expect equal survivor functions by different groups, we also perform the Cox regression-based test for equality of survival curves. This analysis is important because it shows which groupings can have a significant explanatory power in the parametric analysis.

- *Crisis frequency*: survivor functions in multiple crisis countries are shorter than in single crisis countries. However, both curves run in parallel. In both cases, after 12.5 years of adjustment 75 percent of debt-recovery episodes are still ongoing. The Cox regression-based test for the equality of survival curves shows that we cannot reject that equality of survival curves exists.

Figure 3. Estimated Kaplan-Meier survivor function. By crisis frequency



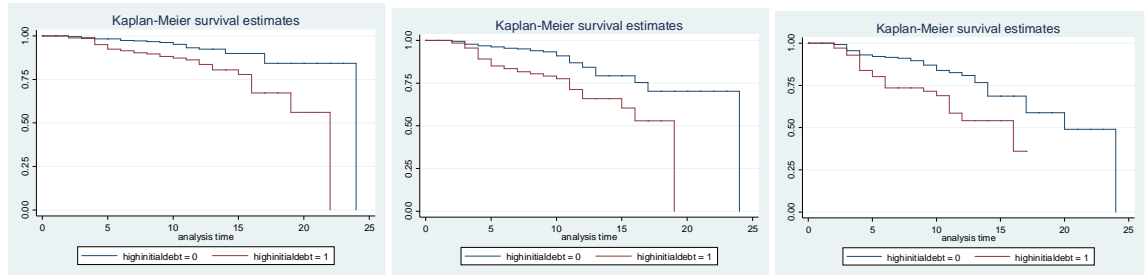
3a) Crisis-to-100% threshold
 $\chi^2(1) = 0.05$
 $\Pr > \chi^2 = 0.8229$

3b) Crisis-to-50% threshold
 $\chi^2(1) = 0.39$
 $\Pr > \chi^2 = 0.5343$

3c) Crisis-to-10% threshold
 $\chi^2(1) = 0.83$
 $\Pr > \chi^2 = 0.3615$

- *Initial conditions:* survivor functions in highly indebted countries prior to the banking crisis are very different from those in countries with low debt levels. For example, after 22 years almost 55 percent of highly indebted countries shows a complete success in their debt-recovery effort, whereas only 20 percent of low-debt countries do (see Figure 4a). The Cox test shows that we can reject the null hypothesis of equality of survival curves showing heterogeneity under this grouping.

Figure 4. Estimated Kaplan-Meier survivor function. By initial conditions (pre-crisis debt)



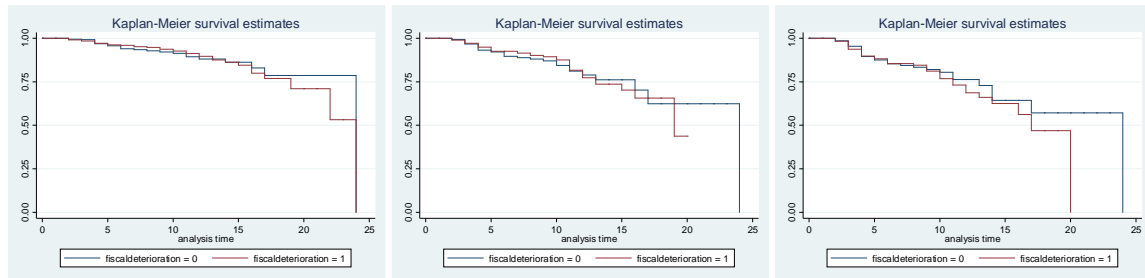
4a) Crisis-to-100% threshold
 $\chi^2(1) = 18.45$
 $\Pr > \chi^2 = 0.0000$

4b) Crisis-to-50% threshold
 $\chi^2(1) = 21.00$
 $\Pr > \chi^2 = 0.0000$

4c) Crisis-to-10% threshold
 $\chi^2(1) = 17.53$
 $\Pr > \chi^2 = 0.0000$

- *Fiscal response:* the survivor functions of those countries which accumulated larger deficits during the banking crisis episode are not significantly different from those countries which showed a more prudent fiscal behavior. Although there is weak evidence that fiscal deterioration shortens the duration of the debt-recovery episode (especially under the weaker threshold-see figure 5a), we cannot reject that both survival functions are equal.

Figure 5. Estimated Kaplan-Meier survivor function. By size of fiscal response



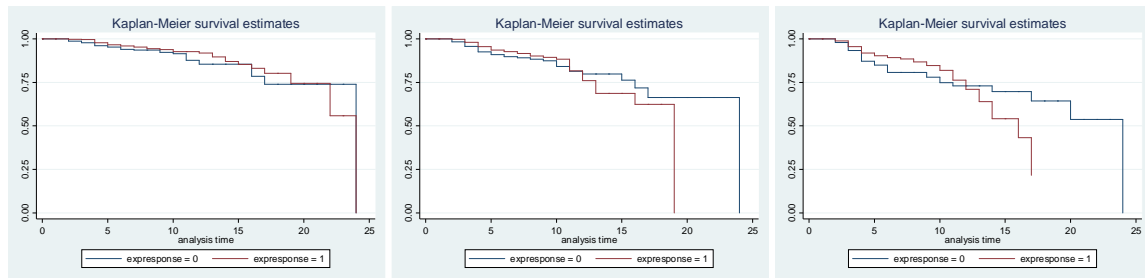
5a) Crisis-to-100% threshold
 $\chi^2(1) = 0.00$
 $\Pr > \chi^2 = 0.9763$

5b) Crisis-to-50% threshold
 $\chi^2(1) = 0.05$
 $\Pr > \chi^2 = 0.8275$

5c) Crisis-to-10% threshold
 $\chi^2(1) = 0.47$
 $\Pr > \chi^2 = 0.4952$

Looking at the average change in expenditures during the crisis episode, we do not find any significant impact of the budget composition on debt-recovery after banking crises. Those countries with a positive average expenditure change during the crisis episode have shorter durations but their likelihood of success is not greater than those countries which have a more prudent spending response (see Figure 6).

Figure 6. Estimated Kaplan-Meier survivor function. By composition of fiscal response



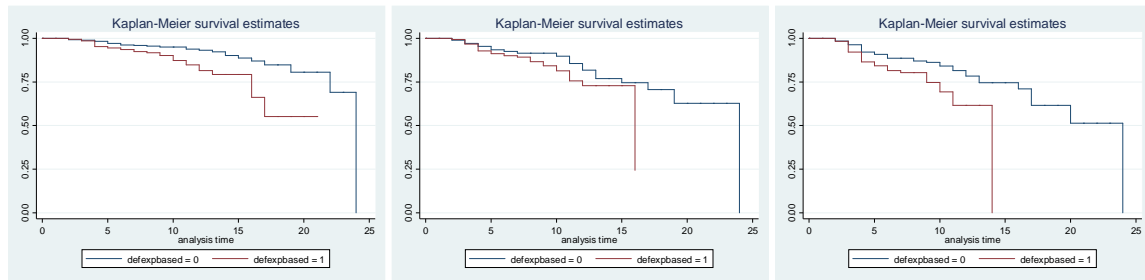
6a) Crisis-to-100% threshold
 $\chi^2(1) = 1.31$
 $\Pr > \chi^2 = 0.2528$

6b) Crisis-to-50% threshold
 $\chi^2(1) = 0.01$
 $\Pr > \chi^2 = 0.9048$

6c) Crisis-to-10% threshold
 $\chi^2(1) = 0.22$
 $\Pr > \chi^2 = 0.6384$

However, focusing on the relative contribution of expenditures versus revenues in terms of the fiscal stimulus during the crisis, the results change substantially. Figure 6bis shows that episodes in which the fiscal stimulus relied mostly on an increase in public expenditures (in a larger proportion than the fall in revenues) were more likely to succeed). Cox tests show that the difference between these distributions is statistically significant, and we should therefore consider this variable as a potential explanatory factor for the parametric analysis.

Figure 6bis. Estimated Kaplan-Meier survivor function. By composition of fiscal response (2)



6bisa) Crisis-to-100% threshold
 $\chi^2(1) = 11.47$
 $\Pr > \chi^2 = 0.0007$

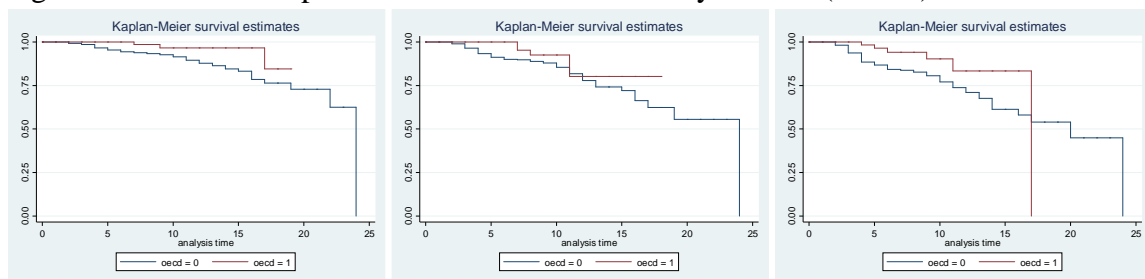
6bisb) Crisis-to-50% threshold
 $\chi^2(1) = 3.79$
 $\Pr > \chi^2 = 0.0514$

6bisc) Crisis-to-10% threshold
 $\chi^2(1) = 11.22$
 $\Pr > \chi^2 = 0.0008$

- *Per capita income*: The survivor functions for OECD countries show that fiscal consolidations tend to be shorter, although they end abruptly. However, Cox tests are not conclusive as to the explanatory power of this factor (see Figure 7).

When we divide the sample according to an alternative classification of income, we see that being an “upper middle income country” (UMIC) becomes a more relevant factor than being an OECD country. As shown in Figure 8, UMIC countries have shorter durations and more progressive transition to low debt. For example, after 12.5 years UMIC countries have a probability of continuing the fiscal adjustment of only 25 percent, because they were already close to reaching the debt target. Cox tests show that these survivor curves are statistically different, and this therefore become a potential explanatory factor for the parametric analysis.

Figure 7. Estimated Kaplan-Meier survivor function. By income (OECD)

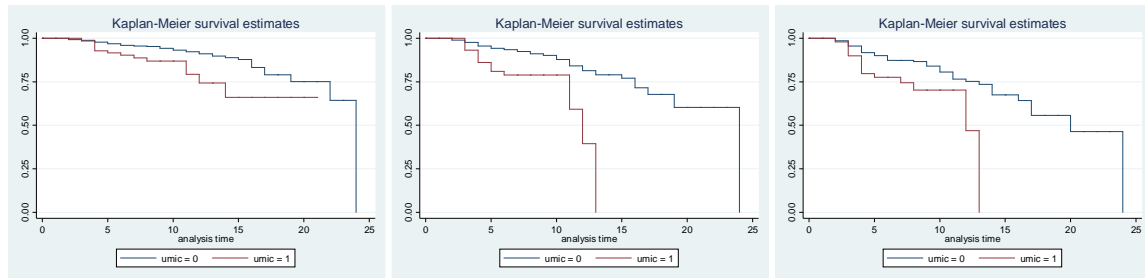


7a) Crisis-to-100% threshold
 $\chi^2(1) = 5.15$
 $\Pr > \chi^2 = 0.0232$

7b) Crisis-to-50% threshold
 $\chi^2(1) = 2.68$
 $\Pr > \chi^2 = 0.1019$

7c) Crisis-to-10% threshold
 $\chi^2(1) = 4.21$
 $\Pr > \chi^2 = 0.0402$

Figure 8. Estimated Kaplan-Meier survivor function. By income (UMIC)



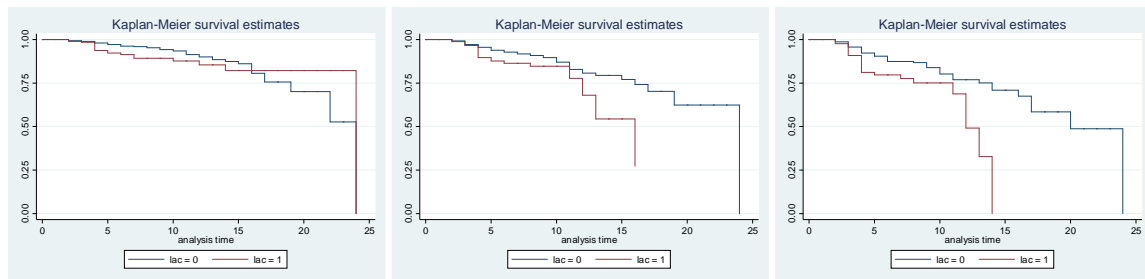
8a) Crisis-to-100% threshold
 $\chi^2(1) = 9.26$
 $\Pr > \chi^2 = 0.0023$

8b) Crisis-to-50% threshold
 $\chi^2(1) = 18.56$
 $\Pr > \chi^2 = 0.0000$

8c) Crisis-to-10% threshold
 $\chi^2(1) = 9.65$
 $\Pr > \chi^2 = 0.0019$

- *Region:* Kaplan Meier survivor curves for different regions are not statistically significant under any type of groupings. The Cox regression-based test for these variables show mixed results. These confirm that these regional groupings only generate statistically important differences in the Kaplan Meier survivor curves under the weaker definitions (see Figures 9 and 10).

Figure 9. Estimated Kaplan-Meier survivor function. By region (LAC)

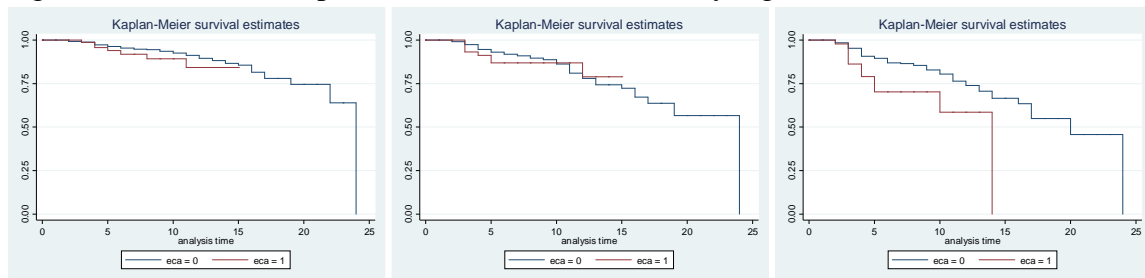


9a) Crisis-to-100% threshold
 $\chi^2(1) = 1.37$
 $\Pr > \chi^2 = 0.2413$

9b) Crisis-to-50% threshold
 $\chi^2(1) = 6.81$
 $\Pr > \chi^2 = 0.0091$

9c) Crisis-to-10% threshold
 $\chi^2(1) = 10.78$
 $\Pr > \chi^2 = 0.0010$

Figure 10. Estimated Kaplan-Meier survivor function. By region (ECA)



10a) Crisis-to-100% threshold
 $\chi^2(1) = 1.06$
 $\Pr > \chi^2 = 0.3023$

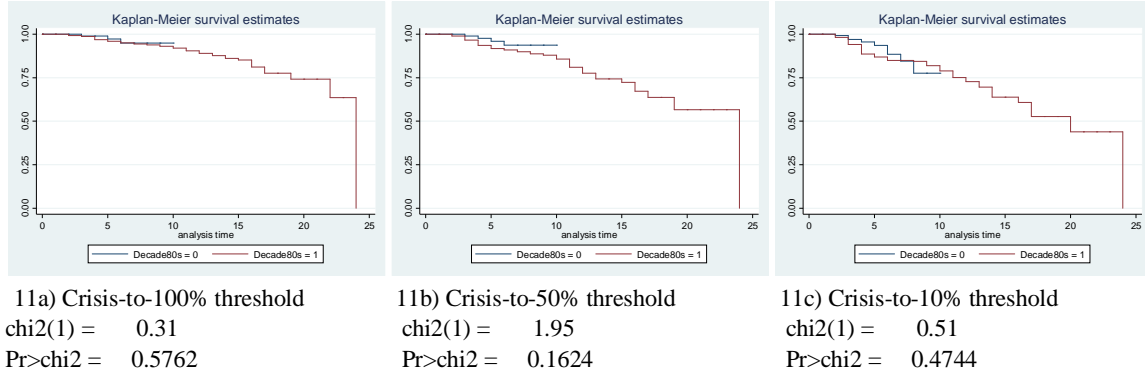
10b) Crisis-to-50% threshold
 $\chi^2(1) = 0.07$
 $\Pr > \chi^2 = 0.7952$

10c) Crisis-to-10% threshold
 $\chi^2(1) = 7.83$
 $\Pr > \chi^2 = 0.0052$

- *Sub-periods:* despite large differences shown in descriptive statistics, the non-parametric analysis does not provide support for the hypothesis that there is a

significant difference between durations and probabilities of success in the 1980s and in the 1990s-2000s (see Figure 11)

Figure 11. Estimated Kaplan-Meier survivor function. By decade (Decade 1980s)



In conclusion, the non-parametric analysis has helped us disentangle the statistical relevance of the different groupings that the descriptive analysis suggested. Out of 9 potential groupings, this section has confirmed that only four factors are influential enough to generate statistically different survivor curves. These factors are the following: (i) high initial level of debt prior to the crisis, (ii) expenditure-based fiscal stimulus during the crisis, and (iii) being an upper-middle income country (and/or being a Latin American country).

V. PARAMETRIC SURVIVAL ANALYSIS

The non-parametric analysis does not take into account other variables that can influence the probability of successfully reducing public debt and ending a period of debt consolidation in the aftermath of a banking crisis. In the literature, the model that has usually been used to characterize the hazard function in the parametric estimations of survival analyses is the *Model of Proportional Hazard* (PH), which assumes that the hazard function can be split as follows:

$$h(t, X) = h_0(t) * g(X) \quad (9)$$

where $h_0(t)$ is the baseline hazard function that captures the dependency of data to duration, and $g(X)$ is a function of individual variables. This function of explanatory variables is a negative function usually defined as $g(X) = \exp(X\beta)$. Note that in this proportional specification regressors intervene re-escalating the conditional probability of abandoning the period of fiscal consolidation, not its own duration.

This model can be estimated firstly without imposing any specific functional form to the baseline hazard function, following the *Cox Model* (1972)⁷:

$$h(t, X) = h_0(t) * \exp(X' b) \quad (10)$$

An alternative estimation can be done by imposing one specific parametric form to the function $h_0(t)$. In this case, the models most commonly used are the *Weibull Model* and the *Exponential Model*. In the first one, $h_0(t) = pt^{p-1}$, where p is a parameter that has to be estimated. When $p=1$, the *Weibull Model* is equal to the *Exponential Model*, where there exists no dependency on duration. On the other hand, when the parameter $p > 1$, there exists a positive dependency on duration, and a negative dependency when $p < 1$. Therefore, by estimating p , it is possible to test the hypothesis of duration dependency of debt consolidations.

In the vector of right-hand side parameters $g(X)$ we include the three variables that came out of the non-parametric analysis as the most relevant ones (namely, an expenditure-based fiscal expansion during the crisis, a high initial level of public debt prior to the crisis, and being an upper-middle income country). Following the literature on fiscal adjustment summarize in Section 2 we also include other variables that control for accompanying economic conditions, and that account for the detailed composition of fiscal policy during the banking crisis episode and during the post-crisis period.

Among the economic policy variables, we include: real GDP growth, private investment as a share of total investment and interest rates on deposits. The first two factors are expected to be important for raising public revenues and should therefore increase the likelihood of success in reducing the amount of debt accumulated during the banking crisis. For the opposite reasons, higher interest rates are expected to have the opposite effects.

Among the fiscal variables, we include two variables that capture the aggregate fiscal response during the crisis: (i) expenditure-based responses (measured by the relative contribution of expenditures versus revenues in terms of the fiscal expansions during the banking crisis); and (ii) average post-crisis public spending as a share to GDP. We also include in the regressions budget composition variables, both referring to the crisis period and after the banking crisis. These variables are: (i) average tax-revenues (as a percentage of total public revenues); (ii) average spending on good and services (as a percentage of total public spending); (iii) average spending on social transfers (as a percentage of total public spending); and (iv) average public investment (also as a percentage of total public spending).

⁷ Mathematically, the baseline hazard function, $h_0(t)$, is defined for all time t in which a change has taken place, and it is not defined for other moments of time. But the survivor function $S_0(t)$ is defined for all values of t .

Other control variables included in the equation are those related to initial country characteristics (dummies equal to one for countries having a High Initial Debt and being an Upper and Middle Income Country) and those related to institutional factors (measured by a dummy variable that takes value one if the party in government holds a minority of seats in the parliament).

The regressions for the different definitions of success (under the three different thresholds) show consistent results that can be summarized as follows (Table 3): Expenditure-based responses to crises are more likely to succeed in achieving debt sustainability. Post-crisis spending does not contribute to success in recovering debt levels. Real GDP growth is always crucial for achieving debt sustainability and private investment is also important for achieving full debt sustainability. Monetary contractions that increase the interest rate diminish the probabilities of success. Highly Indebted countries (and Middle Income Countries) are more likely to succeed. These variables capture the advantages of being an advanced economy. The countries where the government has a minority in the Parliament are less likely to succeed as well. All these factors are equally important for reaching any type of debt-sustainability threshold.

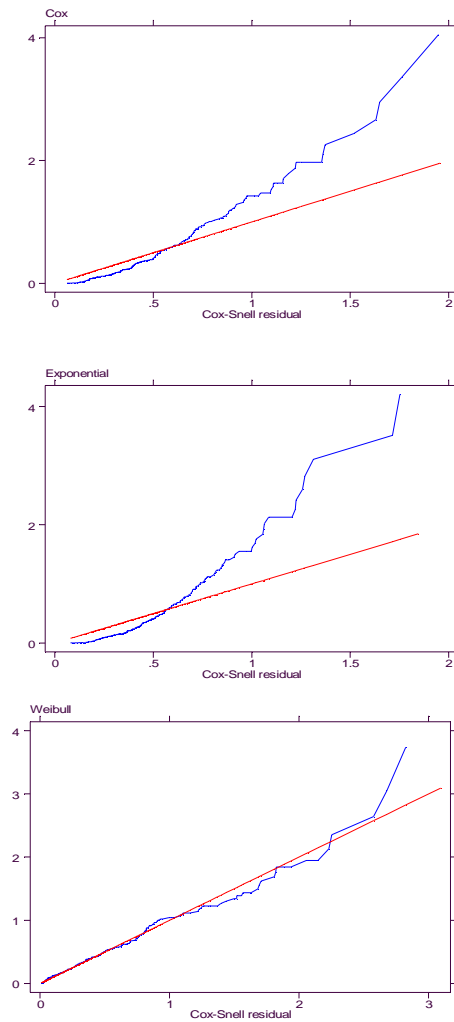
We have reported in Table 3 the results of the same regression model estimated with three different types of techniques. In order to discriminate which of these methods fits the data better, we can test the power of each model through graphic analysis of the Cox-Snell residuals (1968). These residuals are defined as follows:

$$\hat{\epsilon} = -\log S(t/x) \quad (11)$$

where $S(t/x)$ is the estimated probability of surviving to time t . If the fitted model is correct, these residuals, which are always positive, should have a standard censored exponential distribution with hazard ratio 1. We can verify the model's fit by calculating, based for example on the Kaplan-Meier survival estimates or the Aalen-Nelson estimator, an empirical estimate of the cumulative hazard function, using the Cox-Snell residuals (cs) as the time variable. If the model fits the data, then the plot of the cumulative hazard versus cs should be a straight line with slope equal to unity and beginning at the origin.

As can be observed in Figure 12, the *Weibull plot* clearly satisfies the exponential requirement for most of the time, except for larger residuals, where the slope appears to exceed the unity. This confirms that the Weibull model should be our preferred model.

Figure 12. Cox-Snell residuals to evaluate fit of 3 regression models



The effects of fiscal policy composition during and after the banking crisis are also significant (Table 4 and Table 5):

Increasing tax revenues during the crisis reduces the likelihood of achieving debt sustainability, but raising taxes after the crisis helps fiscal consolidation. The policy message of these findings is unequivocal: cut taxes during the crisis (to support aggregate demand) and raise them once the crisis is over, to pay off the accumulated debts. The opposite is true for public spending on goods and services. They have a positive effect on the success probability during the crisis and a negative effect after the crisis. Public spending on transfers, however, has a consistently negative result on debt sustainability. This is because higher spending on transfers is not easily reversible and tends to impose a heavy burden on the budget over time. Finally, public investment always shows a positive sign during crises

and in their aftermath (although it is more statistically significant for the latter period). This result shows that in the short-term, public spending could help, but tends to become very important to generate growth in the medium term, thus having a positive impact on debt sustainability.

VI. ROBUSTNESS CHECKS

As a robustness check of all the previous results, we replicate all our estimations after introducing two important modifications in our baseline model:

All these results are robust to the following robustness checks. A different selection criteria: from crisis-to-threshold to peak-to-threshold (Table 6-8). The introduction of cyclically adjusted fiscal figures (Table 9-11). Results confirm the importance of fiscal policy stance during the crisis, the impact of the stimulus compositions and the need to base the fiscal consolidation in the aftermath of banking crises on a combination of expenditure savings and revenue increases.

Table 3. Parametric estimation of proportional hazard model. Crisis-to-Threshold (general baseline model)

Duration	100%threshold			50% threshold			10% threshold		
	Cox	Exponential	Weibull	Cox	Exponential	Weibull	Cox	Exponential	Weibull
Expansionary Response	0.150*** (5.07)	0.090*** (3.84)	0.162*** (5.30)	0.114*** (4.45)	0.068*** (3.13)	0.123*** (4.67)	0.070*** (3.13)	0.039*** (2.00)	0.075*** (3.23)
Post-crisis Average Public Expenditure	-0.111*** (-3.13)	-0.088*** (-2.70)	-0.120*** (-3.37)	-0.097*** (-3.20)	-0.066*** (-2.53)	-0.112*** (-3.65)	-0.046* (-1.79)	-0.025 (-1.09)	-0.057*** (-2.10)
Private Investment/Total Investment	0.010** (1.87)	0.003* (1.30)	0.010** (1.89)	0.001* (1.36)	0.002* (1.39)	0.008* (1.37)	0.005* (1.50)	0.006** (1.64)	0.003* (1.36)
Real GDP Growth	0.040* (1.43)	0.054*** (2.08)	0.043** (1.62)	0.047*** (2.00)	0.069*** (3.10)	0.050*** (2.15)	0.077*** (3.65)	0.089*** (4.54)	0.073*** (3.57)
Interest Rate of Bank Deposits	-0.011 (-0.92)	-0.019 (-1.30)*	-0.015 (-1.07)	-0.006** (-1.96)	-0.008 (-1.12)	-0.008* (-1.27)	-0.002 (-0.67)	-0.004 (-0.80)	-0.004 (-0.90)
Minority in Parliament	-2.186** (-1.91)	-1.853** (-1.77)	-2.306*** (-2.00)	-1.352* (-1.31)	-0.645 (0.70)	-1.266* (-1.21)	-2.284*** (-2.30)	-1.575** (-1.79)	-2.203*** (-2.15)
Highly Indebted Countries (t-1)	0.827** (1.98)	0.825** (1.89)	0.912** (1.99)	1.031*** (2.48)	0.911*** (2.25)	1.071*** (2.60)	0.999*** (2.50)	0.713** (1.85)	1.238*** (3.03)
Upper and Middle Income Country	1.063** (1.93)	1.026*** (2.08)	1.182*** (2.11)	1.588*** (3.25)	1.376*** (3.11)	1.856*** (3.68)	1.172*** (2.60)	1.012*** (2.47)	1.533*** (3.22)
Constant		-3.940*** (-2.92)	-7.222*** (-4.37)		-4.636*** (-3.68)	7.548*** (-5.21)		-4.174*** (-3.75)	-6.102*** (-5.04)
Wald chi2	43.50	38.45	47.54	50.70	36.27	55.61	53.63	41.76	58.87
No. of failures	35	35	35	45	45	45	51	51	51
Number of obs	564	564	564	458	458	458	375	375	375

(***) significant at a 1% level; (**) significant at a 5% level; (*) significant at a 10% level

Table 4. Parametric estimation of proportional hazard model. Crisis-to-Threshold (fiscal composition DURING CRISIS model)

Duration	100% Threshold				50% Threshold				10% Threshold			
	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull
Expansionary Response	0.690*** (2.17)	0.121*** (2.77)	0.130*** (2.50)	0.157*** (4.35)	0.941* (1.76)	0.081*** (2.10)	0.035* (1.60)	0.114*** (3.58)	0.956* (1.72)	0.688*** (2.82)	0.045*** (1.90)	0.064*** (2.48)
Post-crisis Average Public Expenditure	-0.220*** (2.15)	-0.135*** (-2.37)	-0.053* (-1.77)	-0.109*** (-2.56)	-0.065* (1.37)	-0.163*** (-3.35)	-0.155*** (-2.45)	-0.099*** (-2.68)	0.835* (1.53)	-0.137*** (-3.61)	-0.096** (-1.75)	-0.046* (-1.54)
Private Investment/Total Investment	0.859** (1.91)	0.028* (1.57)	0.045** (1.83)	0.010** (1.86)	0.028* (1.43)	0.002 (1.14)	0.031 (1.09)	0.001* (1.99)	0.026 (0.94)	0.014 (1.03)	0.019 (0.71)	0.003 (0.32)
Real GDP Growth	0.023*** (2.04)	0.275*** (3.37)	0.304*** (3.11)	0.044** (1.83)	0.328*** (2.19)	0.052* (1.41)	0.064* (1.68)	0.051*** (2.13)	0.321*** (2.56)	0.214*** (3.27)	0.323*** (3.72)	0.074*** (3.51)
Interest Rate of Bank Deposits	-0.791** (-1.86)	-0.023* (-1.84)	-0.017 (-0.94)	-0.015 (-1.03)	-0.006 (-1.09)	-0.022*** (-2.24)	-0.020** (-1.84)	-0.008* (-1.35)	0.003 (1.20)	-0.014* (-1.71)	-0.019* (-1.51)	-0.004** (-1.94)
Minority in Parliament	-1.326** (-1.99)	-4.807*** (-3.16)	-3.925*** (-2.09)	-2.347** (-1.96)	-4.495 (-1.14)	-2.573* (-1.80)	-1.358** (-1.88)	-1.387 (-1.26)	-3.477 (-1.04)	-3.074*** (-2.35)	-4.097*** (-2.38)	-2.430*** (-2.26)
Highly Indebted Countries (t-1)	3.542*** (2.18)	1.887*** (2.44)	0.443* (1.48)	0.989*** (2.11)	3.867* (1.39)	1.138** (1.87)	0.590** (1.87)	1.190*** (2.83)	2.840* (1.61)	1.021* (1.84)	0.331* (1.36)	1.316*** (3.17)
Upper and Middle Income Country	4.228*** (2.61)	2.613*** (2.86)	2.573*** (2.90)	1.257*** (2.17)	7.405*** (3.81)	3.018*** (4.49)	4.125*** (4.53)	2.003*** (3.69)	2.711*** (2.40)	2.159*** (3.21)	1.911*** (2.58)	1.646*** (3.29)
Average Tax Revenues (*) During Crisis	-0.372*** (-2.21)				-0.008** (-1.81)				-0.675* (-1.42)			
Average Goods&Services Expenditures(*) During Crisis		0.008*** (2.14)				0.003** (1.88)				0.006*** (2.95)		
Average Transfers Expenditures (*) During Crisis			-0.162** (-1.98)				-0.001* (-1.56)				-0.002* (-1.45)	
Average P.Investment Expenditures During Crisis				0.002* (1.28)				0.006* (1.64)				0.006* (1.75)
Constant	-7.006* (-1.81)	-5.222*** (-2.25)	-3.035*** (-2.88)	-7.340*** (-4.25)	-4.682** (-1.93)	-5.684*** (-2.82)	-9.792*** (-3.31)	-7.848*** (-5.14)	-2.975* (-1.42)	-4.507*** (-2.77)	-3.675* (-1.45)	-6.123*** (-4.88)
Wald chi2	55.38	39.36	37.94	47.96	48.61	43.16	38.07	58.12	38.84	50.64	40.63	60.99
No. of failures	7	20	15	33	27	27	20	43	12	29	22	49
Number of obs	147	351	294	543	116	285	238	445	125	225	179	362

(*) Figures in % of Total Revenues or Total Expenditures

(***) significant at a 1% level; (**) significant at a 5% level; (*) significant at a 10% level

Table 5. Parametric estimation of proportional hazard model. Crisis-to-Threshold (fiscal composition POST CRISIS model)

Duration	100% Threshold				50% Threshold				10% Threshold			
	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull
Expansionary Response	0.122*	0.044*	0.107***	0.093***	0.339***	0.985*	0.079***	0.055***	0.149***	0.007*	0.047*	0.036**
	(1.51)	(1.79)	(2.44)	(3.28)	(3.60)	(1.51)	(2.15)	(2.29)	(2.50)	(1.48)	(1.55)	(1.87)
Private Investment/Total Investment	0.060*	0.030*	0.037**	0.013*	0.048*	0.991*	0.011	0.003	0.060*	0.010	0.005	0.003
	(1.64)	(1.42)	(1.92)	(1.79)	(1.77)	(1.45)	(1.16)	(1.27)	(1.81)	(1.04)	(1.17)	(0.95)
Real GDP Growth	1.114***	0.269***	0.310***	0.044*	0.660***	1.051*	0.064*	0.057***	0.314***	0.200***	0.476***	0.078***
	(2.78)	(3.23)	(3.12)	(1.63)	(2.70)	(1.52)	(1.64)	(2.32)	(2.24)	(3.00)	(4.96)	(3.64)
Interest Rate of Bank Deposits	-0.001	-0.019*	-0.019	-0.009*	-0.001*	0.981**	-0.001	-0.006	0.003*	-0.009*	-0.016	-0.003*
	(-1.13)	(-1.41)	(-1.07)	(-1.79)	(-1.43)	(-1.97)	(-1.11)	(-0.94)	(-1.24)	(-1.24)	(-1.14)	(-1.79)
Minority in Parliament	-1.830*	-2.105***	-4.430***	-3.049***	-3.814*	-1.108*	-1.110*	-1.374*	-4.500*	-3.116***	-3.270***	-2.709***
	(-1.34)	(-3.24)	(-2.43)	(-2.46)	(-1.57)	(-1.51)	(-1.77)	(-1.80)	(-1.48)	(-2.29)	(3.03)	(-2.47)
Highly Indebted Countries (t-1)	1.865*	1.283**	0.106	0.760*	1.923*	2.580*	0.158	1.036***	2.423*	0.496**	1.644***	1.107***
	(1.46)	(1.97)	(1.14)	(1.72)	(1.67)	(1.65)	(1.23)	(2.53)	(1.53)	(1.93)	(2.16)	(2.81)
Upper and Middle Income Country	9.302***	2.170***	2.606***	1.026*	6.876***	7.736***	4.556***	1.908***	2.384***	1.830***	1.871***	1.493***
	(3.28)	(2.76)	(3.02)	(1.78)	(3.68)	(4.22)	(4.86)	(3.38)	(2.40)	(2.78)	(2.23)	(3.03)
Average Tax Revenues (*) Post-Crisis	0.126***				0.197**				0.142***			
	(2.83)				(1.93)				(2.03)			
Average Goods&Services Expenditures(*) Post-Crisis		-0.009*				-0.003*				-0.004***		
		(-1.77)				(-1.76)				(-2.27)		
Average Transfers Expenditures (*) Post-Crisis			-0.121***				-0.009*				-0.003***	
			(-2.68)				(-1.61)				(-3.39)	
Average P.Investment Expenditures Post-Crisis				0.011***				0.012***				0.021***
				(2.29)				(2.92)				(3.75)
Constant	6.924***	-5.596***	-8.571***	-7.599***	-6.752***	5.782***	-9.312***	-8.396***	2.268***	-5.209***	-7.428***	-6.281***
	(10.70)	(-2.61)	(-2.94)	(-4.40)	(-2.03)	(-2.69)	(-3.56)	(-5.45)	(2.50)	(-3.18)	(-2.40)	(-4.97)
Wald chi2	47.59	33.49	37.33	40.72	45.59	32.69	35.67	50.45	30.45	38.31	47.52	58.42
No. of failures	7	20	15	33	9	27	19	43	11	29	20	49
Number of obs	147	351	294	543	108	285	232	445	128	225	162	362

(*) Figures in % of Total Revenues or Total Expenditures

(***) significant at a 1% level; (**) significant at a 5% level; (*) significant at a 10% level

Table 6. Parametric estimation of proportional hazard model. Peak-to-Threshold (general baseline model)

Duration	100% threshold			50% threshold			10% threshold		
	Cox	Exponential	Weibull	Cox	Exponential	Weibull	Cox	Exponential	Weibull
Expansionary Response	0.114*** (4.36)	0.085*** (3.76)	0.137*** (4.89)	0.101*** (4.38)	0.075*** (3.56)	0.116*** (4.75)	0.080*** (3.76)	0.061*** (3.10)	0.093*** (4.04)
Post-crisis Average Public Expenditure	-0.075*** (-2.39)	-0.070*** (-2.54)	-0.100*** (-3.10)	-0.080*** (-2.94)	-0.072*** (-2.78)	-0.100*** (-3.51)	-0.057*** (-2.28)	-0.044** (-1.91)	-0.680*** (-2.59)
Private Investment/Total Investment	0.009** (1.77)	0.002* (1.39)	0.007* (1.62)	0.007* (1.37)	0.006* (1.46)	0.001* (1.42)	0.006** (1.74)	0.006** (1.85)	0.009* (1.41)
Real GDP Growth	0.040* (1.37)	0.049** (1.85)	0.037* (1.37)	0.051*** (2.14)	0.065*** (2.91)	0.050*** (2.17)	0.066*** (2.97)	0.071*** (3.42)	0.059*** (2.77)
Interest Rate of Bank Deposits	-0.001*** (-2.04)	-0.001 (-0.43)	-0.002 (-0.99)	-0.009* (-1.35)	-0.004 (-0.14)	-0.001 (-0.50)	-0.005 (-0.86)	-0.001 (-0.96)	-0.007 (-0.23)
Minority in Parliament	-2.097** (-1.93)	-2.165*** (-2.05)	-2.625*** (-2.32)	-1.122 (-1.17)	-0.797 (-0.88)	-1.229* (-1.25)	-1.175* (-1.29)	-1.187* (-1.35)	-1.239* (-1.28)
Highly Indebted Countries (t-1)	1.013*** (2.17)	0.975*** (2.23)	1.032*** (2.29)	1.087*** (2.61)	1.020*** (2.50)	1.091*** (2.66)	1.230*** (3.01)	1.041*** (2.66)	1.425*** (3.49)
Upper and Middle Income Country	0.890** (1.81)	0.735* (1.58)	0.863** (1.77)	1.326*** (3.11)	1.134*** (2.80)	1.363*** (3.22)	1.021*** (2.54)	0.931*** (2.43)	1.222*** (2.96)
Constant		-4.127*** (-3.13)	-6.323*** (-4.20)		-4.374*** (-3.65)	-6.373*** (-4.85)		-3.377*** (-3.29)	-4.789*** (-4.33)
Wald chi2	38.48	32.97	43.76	44.14	34.66	47.25	42.32	36.37	48.06
No. of failures	35	35	35	45	45	45	51	51	51
Number of obs	543	543	543	543	423	423	323	323	323

(***) significant at a 1% level; (**) significant at a 5% level; (*) significant at a 10% level

Table 7. Parametric estimation of proportional hazard model. Peak-to-Threshold (fiscal composition DURING CRISIS model)

Duration	100% Threshold				50% Threshold				10% Threshold			
	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull
Expansionary Response	0.694*** (2.23)	0.221*** (2.97)	0.140*** (2.10)	0.257*** (4.05)	0.901* (1.86)	0.011*** (2.11)	0.132* (1.64)	0.100*** (3.60)	0.999* (1.78)	0.608*** (2.92)	0.145*** (1.92)	0.164*** (2.38)
Post-crisis Average Public Expenditure	-0.230*** (2.22)	-0.235*** (-2.50)	-0.153* (-1.87)	-0.100*** (-2.66)	-0.165* (1.39)	-0.103*** (-2.35)	-0.105*** (-2.05)	-0.100*** (-2.70)	0.805* (1.73)	-0.147*** (-3.61)	-0.186** (-1.85)	-0.148* (-1.55)
Private Investment/Total Investment	0.812** (1.97)	0.123* (1.67)	0.049** (1.92)	0.011** (1.97)	0.018* (1.44)	0.102*** (2.14)	0.131* (1.29)	0.002* (1.90)	0.126 (0.94)	0.024 (1.13)	0.209 (0.71)	0.043 (0.82)
Real GDP Growth	0.030*** (2.13)	0.223*** (3.30)	0.314*** (3.01)	0.032** (1.89)	0.319*** (2.20)	0.112* (1.49)	0.060* (1.58)	0.081*** (2.23)	0.301*** (2.46)	0.204*** (3.29)	0.303*** (3.52)	0.124*** (3.61)
Interest Rate of Bank Deposits	-0.451** (-1.96)	-0.223** (-1.94)	-0.117 (-0.99)	-0.115* (-1.33)	-0.016 (-1.19)	-0.104*** (-2.14)	-0.021** (-1.87)	-0.038* (-1.25)	0.013 (1.25)	-0.294* (-1.78)	-0.219* (-1.53)	-0.014** (-1.96)
Minority in Parliament	-1.266** (-1.98)	-3.107*** (-3.26)	-3.005*** (-2.12)	-2.222** (-1.99)	-4.095 (-1.24)	-2.013* (-1.88)	-1.003** (-1.98)	-1.037 (-1.46)	-3.007* (-1.44)	-3.100*** (-2.42)	-4.001*** (-2.30)	-2.014*** (-2.27)
Highly Indebted Countries (t-1)	3.435*** (2.20)	1.337*** (2.74)	0.403* (1.49)	0.901*** (2.10)	3.057* (1.49)	1.028** (1.89)	0.410** (1.89)	1.200*** (2.93)	2.010* (1.66)	1.117* (1.88)	0.301* (1.46)	1.318*** (3.12)
Upper and Middle Income Country	4.221*** (2.65)	2.238*** (2.89)	2.073*** (2.98)	1.667*** (2.18)	5.235*** (3.71)	2.019*** (4.19)	2.105*** (4.03)	2.014*** (3.60)	2.111*** (2.48)	2.010*** (3.15)	1.011*** (2.88)	1.004*** (3.12)
Average Tax Revenues (*) During Crisis	-0.382*** (-2.11)				-0.018** (-1.91)				-0.605* (-1.82)			
Average Goods&Services Expenditures(*) During Crisis		0.009*** (2.24)				0.023** (1.98)				0.018*** (2.99)		
Average Transfers Expenditures (*) During Crisis			-0.152** (-2.08)				-0.011* (-1.76)				-0.022* (-1.78)	
Average P.Investment Expenditures During Crisis				0.004* (1.32)				0.008* (1.69)				0.009* (1.82)
Constant	-5.109* (-1.88)	-4.112*** (-2.15)	-2.135*** (-2.98)	-6.010*** (-4.15)	-4.002** (-1.98)	-3.604*** (-2.12)	-4.091*** (-3.33)	-5.033*** (-4.56)	-2.005* (-1.92)	-4.022*** (-2.28)	-3.004* (-1.76)	-5.443*** (-4.67)
Wald chi2	50.18	39.67	38.96	48.16	48.60	42.06	38.45	59.01	38.04	50.32	40.12	49.24
No. of failures	7	20	15	33	27	27	20	43	12	29	22	49
Number of obs	147	351	294	543	116	285	238	445	125	225	179	362

(*) Figures in % of Total Revenues or Total Expenditures

(***) significant at a 1% level; (**) significant at a 5% level; (*) significant at a 10% level

Table 8. Parametric estimation of proportional hazard model. Peak-to-Threshold (fiscal composition POST CRISIS model)

Duration	100% Threshold				50% Threshold				10% Threshold			
	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull
Expansionary Response	0.102*	0.144*	0.109***	0.193***	0.330***	0.885*	0.179***	0.050***	0.109***	0.107*	0.027*	0.136**
	(1.71)	(1.89)	(2.48)	(3.18)	(3.62)	(1.81)	(2.55)	(2.20)	(2.52)	(1.88)	(1.75)	(1.89)
Private Investment/Total Investment	0.080*	0.031*	0.039**	0.018*	0.051*	0.901*	0.021	0.044	0.162*	0.110	0.015	0.023*
	(1.64)	(1.44)	(1.96)	(1.70)	(1.79)	(1.46)	(1.26)	(1.30)	(1.83)	(1.14)	(1.37)	(1.95)
Real GDP Growth	1.124***	0.202***	0.311***	0.040*	0.663***	1.066*	0.087*	0.058***	0.306***	0.220***	0.056***	0.078***
	(2.08)	(3.22)	(3.14)	(1.62)	(2.71)	(1.66)	(1.66)	(2.33)	(2.23)	(3.01)	(4.16)	(3.64)
Interest Rate of Bank Deposits	-0.021	-0.239*	-0.018	-0.019*	-0.011*	0.901**	-0.011	-0.016	0.015*	-0.019*	-0.116	-0.033*
	(-1.18)	(-1.46)	(-1.12)	(-1.85)	(-1.46)	(-1.98)	(-1.10)	(-0.84)	(-1.29)	(-1.84)	(-1.24)	(-1.99)
Minority in Parliament	-1.832*	-2.007***	-3.334***	-2.400***	-3.211*	-1.118*	-1.003*	-1.004*	-4.002*	-3.100***	-3.020***	-2.722***
	(-1.36)	(-3.23)	(-2.90)	(-2.42)	(-1.70)	(-1.57)	(-1.78)	(-1.84)	(-1.42)	(-2.20)	(3.00)	(-2.46)
Highly Indebted Countries (t-1)	1.805*	1.456**	0.101	0.732	1.934*	2.501*	0.155	1.039***	2.418*	0.566**	1.788***	1.008***
	(1.46)	(1.98)	(1.23)	(1.74)	(1.76)	(1.69)	(1.29)	(2.57)	(1.75)	(1.99)	(2.13)	(2.80)
Upper and Middle Income Country	7.002***	2.101***	2.600***	1.001*	5.776***	4.006***	4.507***	1.911***	2.001***	1.110***	1.972***	1.023***
	(3.48)	(2.79)	(3.12)	(1.82)	(3.69)	(4.20)	(4.88)	(3.30)	(2.55)	(2.79)	(2.29)	(3.13)
Average Tax Revenues (*) Post-Crisis	0.176***				0.122**				0.149***			
	(2.93)				(1.94)				(2.30)			
Average Goods&Services Expenditures(*) Post-Crisis		-0.019*				-0.0013*				-0.014***		
		(-1.87)				(-1.79)				(-2.07)		
Average Transfers Expenditures (*) Post-Crisis			-0.181***				-0.019*				-0.014***	
			(-2.60)				(-1.62)				(-3.40)	
Average P.Investment Expenditures Post-Crisis				0.010***				0.014***				0.022***
				(2.32)				(2.90)				(2.75)
Constant	6.024***	-5.226***	-5.560***	-7.091***	-5.002***	5.188***	-5.301***	-5.006***	2.260***	-5.091***	-6.229***	-6.281***
	(9.70)	(-2.69)	(-2.99)	(-4.43)	(-2.33)	(-2.66)	(-3.00)	(-5.06)	(2.61)	(-3.32)	(-2.48)	(-4.97)
Wald chi2	48.50	33.49	37.33	40.32	45.80	32.03	34.69	50.30	30.02	38.88	48.22	59.44
No. of failures	7	20	15	33	9	27	19	43	11	29	20	49
Number of obs	147	351	294	543	108	285	232	445	128	225	162	362

(*) Figures in % of Total Revenues or Total Expenditures

(***) significant at a 1% level; (**) significant at a 5% level; (*) significant at a 10% level

Table 9. Parametric estimation of proportional hazard model. Peak-to-Threshold (Cycl. Adj. General baseline model)

Duration	100% threshold			50% threshold			10% threshold		
	Cox	Exponential	Weibull	Cox	Exponential	Weibull	Cox	Exponential	Weibull
Cycl. Adj. Expansionary Response	0.014*** (4.26)	0.095*** (3.78)	0.197*** (4.88)	0.100*** (4.30)	0.175*** (3.46)	0.106*** (4.77)	0.110*** (3.75)	0.071*** (3.11)	0.198*** (4.11)
Post-crisis Average Cycl. Adj.Public Expend.	-0.175*** (-2.09)	-0.072*** (-2.50)	-0.110*** (-3.12)	-0.082*** (-2.99)	-0.074*** (-2.79)	-0.101*** (-3.52)	-0.111*** (-2.11)	-0.064** (-1.92)	-0.600*** (-2.99)
Private Investment/Total Investment	0.019** (1.79)	0.022* (1.40)	0.017* (1.82)	0.017* (1.77)	0.066* (1.48)	0.030* (1.40)	0.023** (1.79)	0.016** (1.88)	0.019* (1.72)
Real GDP Growth	0.042* (1.57)	0.048** (1.86)	0.099* (1.55)	0.211*** (2.19)	0.069*** (2.92)	0.051*** (2.22)	0.060*** (2.99)	0.078*** (3.41)	0.077*** (2.01)
Interest Rate of Bank Deposits	-0.101*** (-2.14)	-0.011 (-0.47)	-0.012 (-0.90)	-0.019* (-1.39)	-0.014 (-0.99)	-0.011 (-0.52)	-0.015 (-0.88)	-0.011 (-0.98)	-0.047* (-1.63)
Minority in Parliament	-2.007** (-1.98)	-2.160*** (-2.22)	-2.600*** (-2.34)	-1.120 (-1.18)	-0.790 (-0.80)	-1.201* (-1.78)	-1.177* (-1.34)	-1.189* (-1.37)	-1.099* (-1.32)
Highly Indebted Countries (t-1)	1.010*** (2.23)	0.908*** (2.24)	1.031*** (2.27)	1.080*** (2.54)	1.011*** (2.53)	1.090*** (2.68)	1.011*** (3.02)	1.042*** (2.22)	1.401*** (3.54)
Upper and Middle Income Country	0.891** (1.82)	0.730* (1.70)	0.802** (1.78)	1.099*** (3.12)	1.130*** (2.81)	1.364*** (3.20)	1.029*** (2.58)	0.900*** (2.02)	1.010*** (2.92)
Constant		-4.007*** (-3.10)	-6.333*** (-4.24)		-4.300*** (-3.63)	-6.302*** (-4.80)		-3.117*** (-3.31)	-4.017*** (-4.65)
Wald chi2	38.90	32.08	43.99	44.54	34.45	47.93	41.02	36.55	48.89
No. of failures	35	35	35	45	45	45	51	51	51
Number of obs	543	543	543	543	423	423	323	323	323

(***) significant at a 1% level; (**) significant at a 5% level; (*) significant at a 10% level

Table 10. Parametric estimation of proportional hazard model. Peak-to-Threshold (Cycl. Adj. Fiscal composition DURING CRISIS model)

Duration	100% Threshold				50% Threshold				10% Threshold			
	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull
Cycl. Adj. Expansionary Response	0.608*** (2.24)	0.220*** (2.99)	0.142*** (2.11)	0.158*** (4.29)	0.902* (1.88)	0.012*** (2.10)	0.133* (1.66)	0.102*** (3.62)	0.809* (1.90)	0.600*** (2.95)	0.149*** (2.45)	0.194*** (2.32)
Post-crisis Average Cycl. Adj.Public Expend.	-0.100*** (2.20)	-0.205*** (-2.52)	-0.103* (-1.97)	-0.101*** (-2.60)	-0.105* (1.40)	-0.104*** (-2.33)	-0.100*** (-2.02)	-0.108*** (-2.71)	0.800* (1.74)	-0.197*** (-3.62)	-0.180** (-1.97)	-0.140* (-1.50)
Private Investment/Total Investment	0.800** (1.90)	0.120* (1.70)	0.070** (1.99)	0.010* (1.98)	0.010* (1.66)	0.103*** (2.22)	0.132* (1.32)	0.022* (1.94)	0.128 (0.98)	0.029 (1.18)	0.200 (0.91)	0.044 (0.85)
Real GDP Growth	0.034*** (2.10)	0.224*** (3.32)	0.310*** (3.02)	0.033** (1.87)	0.310*** (2.21)	0.120* (1.50)	0.061* (1.87)	0.085*** (2.22)	0.300*** (2.42)	0.200*** (3.20)	0.300*** (3.43)	0.122*** (3.62)
Interest Rate of Bank Deposits	-0.401** (-2.11)	-0.227** (-1.99)	-0.119 (-1.21)	-0.114* (-1.24)	-0.026 (-1.32)	-0.102*** (-2.21)	-0.022** (-1.89)	-0.028* (-1.45)	0.019 (1.27)	-0.204* (-1.79)	-0.719* (-1.63)	-0.024** (-1.98)
Minority in Parliament	-1.201** (-2.02)	-3.104*** (-3.20)	-3.122*** (-2.19)	-2.032** (-1.97)	-4.090 (-1.26)	-1.877* (-1.92)	-1.243** (-2.01)	-1.038* (-1.66)	-2.677* (-1.68)	-3.102*** (-2.48)	-4.021*** (-2.32)	-2.010*** (-2.20)
Highly Indebted Countries (t-1)	3.005*** (2.22)	1.302*** (2.78)	0.412* (1.45)	0.867*** (2.12)	3.007* (1.50)	1.023** (1.90)	0.412** (1.90)	1.202*** (2.93)	2.018* (1.78)	1.110* (1.98)	0.300* (1.65)	1.310*** (3.10)
Upper and Middle Income Country	4.222*** (2.69)	2.240*** (2.09)	2.098*** (2.90)	1.606*** (2.19)	5.002*** (3.72)	2.002*** (4.20)	2.003*** (4.32)	2.414*** (3.65)	2.110*** (3.05)	2.011*** (3.10)	1.010*** (2.84)	1.021*** (3.10)
Cycl. Adj. Average Tax Revenues (*) During Crisis	-0.302*** (-2.01)				-0.028** (-1.94)				-0.202* (-1.80)			
Cycl. Adj. Average Goods&Services Expenditures(*) During Crisis		0.019*** (2.44)				0.025** (2.02)				0.016*** (2.87)		
Cycl. Adj. Average Transfers Expenditures (*) During Crisis			-0.102*** (-2.94)				-0.031** (-1.98)				-0.022* (-1.88)	
Cycl. Adj. Average P.Investment Expenditures During Crisis				0.014* (1.44)				0.018** (1.99)				0.021* (1.87)
Constant	-5.039* (-1.98)	-4.023*** (-2.10)	-2.112*** (-2.87)	-5.011*** (-4.10)	-3.221** (-2.23)	-3.004*** (-2.22)	-4.090*** (-3.34)	-4.032*** (-4.50)	-2.205* (-1.96)	-3.023*** (-2.43)	-3.014*** (-2.66)	-2.432*** (-4.78)
Wald chi2	50.28	39.99	38.32	47.16	47.62	42.48	38.65	59.20	38.54	51.31	40.22	49.02
No. of failures	7	20	15	33	27	27	20	43	12	29	22	49
Number of obs	147	351	294	543	116	285	238	445	95	225	179	362

(*) Figures in % of Total Revenues or Total Expenditures

(***) significant at a 1% level; (**) significant at a 5% level; (*) significant at a 10% level

Table 11. Parametric estimation of proportional hazard model. Peak-to-Threshold (Cycl. Adj. Fiscal composition POST CRISIS model)

Duration	100% Threshold				50% Threshold				10% Threshold			
	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull
Cycl. Adj. Expansionary Response	0.112*	0.184*	0.199***	0.194***	0.331***	0.805*	0.109***	0.052***	0.110***	0.109*	0.087*	0.138**
	(1.77)	(1.90)	(2.40)	(3.10)	(3.60)	(1.82)	(2.50)	(2.22)	(2.55)	(1.99)	(1.79)	(1.90)
Private Investment/Total Investment	0.083*	0.032*	0.030*	0.022*	0.052*	0.900*	0.043	0.042	0.160*	0.112*	0.024*	0.022*
	(1.74)	(1.44)	(1.98)	(1.72)	(1.43)	(1.45)	(1.30)	(1.43)	(1.85)	(1.34)	(1.45)	(1.96)
Real GDP Growth	1.103***	0.200***	0.310***	0.041*	0.660***	1.068*	0.089*	0.059***	0.308***	0.222***	0.065***	0.070***
	(2.54)	(3.12)	(3.15)	(1.67)	(2.65)	(1.69)	(1.68)	(2.23)	(2.24)	(3.11)	(4.18)	(3.62)
Interest Rate of Bank Deposits	-0.111	-0.209*	-0.034	-0.021*	-0.010*	0.912**	-0.021	-0.018	0.012*	-0.021*	-0.126	-0.032*
	(-1.17)	(-1.52)	(-1.23)	(-1.80)	(-1.49)	(-1.99)	(-1.15)	(-0.89)	(-1.32)	(-1.86)	(-1.26)	(-2.02)
Minority in Parliament	-1.956*	-2.107***	-3.044***	-2.232***	-3.221*	-1.110*	-1.100*	-1.104*	-3.982*	-3.102***	-3.021***	-2.011***
	(-1.45)	(-3.29)	(-2.92)	(-2.49)	(-1.78)	(-1.67)	(-1.82)	(-1.89)	(-1.55)	(-2.21)	(3.01)	(-2.49)
Highly Indebted Countries (t-1)	1.800*	1.23**	0.189	0.702	1.876*	2.502*	0.150	1.003***	2.410*	0.543**	1.655***	1.102***
	(1.67)	(2.00)	(1.20)	(1.88)	(1.79)	(1.70)	(1.32)	(2.55)	(1.73)	(2.01)	(2.19)	(2.82)
Upper and Middle Income Country	5.102***	2.100***	2.601***	1.021*	5.002***	4.192***	4.343***	1.901***	2.291***	1.111***	1.856***	1.233***
	(3.98)	(2.102)	(3.13)	(1.89)	(3.79)	(4.24)	(4.80)	(3.33)	(2.58)	(2.80)	(2.32)	(3.18)
Cycl. Adj. Average Tax Revenues (*) Post-Crisis	0.188***				0.120**				0.123***			
	(2.94)				(1.96)				(2.36)			
Cycl. Adj. Average Goods&Services Expenditures(*) Post-Crisis		-0.010*				-0.013*				-0.016***		
		(-1.89)				(-1.81)				(-2.12)		
Cycl. Adj. Average Transfers Expenditures (*) Post-Crisis			-0.182***				-0.021*				-0.016***	
			(-2.66)				(-1.68)				(-3.42)	
Cycl. Adj. Average P.Investment Expenditures Post-Crisis				0.011***				0.019***				0.024***
				(2.36)				(2.92)				(2.79)
Constant	6.004***	-5.220***	-5.444***	-6.192***	-5.108***	5.100***	-5.765***	-5.206***	3.210***	-5.090***	-4.209***	-5.232***
	(9.72)	(-2.33)	(-3.67)	(-4.40)	(-2.44)	(-2.99)	(-3.12)	(-5.26)	(2.69)	(-3.30)	(-2.52)	(-4.86)
Wald chi2	48.43	33.89	37.02	4065	45.81	32.32	34.12	50.43	30.55	38.90	48.30	58.33
No. of failures	7	20	15	33	9	27	19	43	11	29	20	49
Number of obs	147	351	294	543	108	285	232	445	88	225	162	362

(*) Figures in % of Total Revenues or Total Expenditures

(***) significant at a 1% level; (**) significant at a 5% level; (*) significant at a 10% level

VII. CONCLUSIONS

Most countries around the world have piled up large public debts in the aftermath of the recent financial crisis. As the economies recover from the recession, the challenge for governments is to regain fiscal stability by unwinding the exceptional fiscal stimulus and reducing public debt through fiscal consolidation. The unprecedented simultaneous increase in public debt levels worldwide, however, makes this effort particularly demanding. This paper focused on the factors that explain successful public debt consolidations after 100 episodes banking crises during 1980-2008 using survival analysis.

We found that expansionary policies during banking crises can raise the probability of successful post-crisis debt consolidation as they reduce the crisis length and its negative implications on growth. Fiscal adjustment in the aftermath of the crisis is more likely to succeed when based on a combination of expenditure savings and tax increases. Cuts in transfers and public consumption are key to debt reduction. In particular:

- Expansionary policies during banking crises are helpful to increase the probability of success.
- However, these consolidations should be followed by restrictive spending policies in the aftermath of the crisis.
- Increasing tax revenues after the crisis, during the years in which debt consolidation is taking place, is crucial to reaching pre-crisis debt levels.
- Cuts in transfers, public consumption in goods and services and the preservation of public spending on investment are also important factors to increase the probability of success.
- These results are robust to three different thresholds, two definitions of debt consolidation and to cyclical controls.

This paper has addressed crucial questions that had not been previously tackled in the literature which had not focused on financial crisis and debt accumulation. While the results of this study confirm some findings of the literature on fiscal adjustment, such as the importance for fiscal consolidations to be sufficiently large, timely and expenditure bases,

they also point to new evidence. The importance of crisis response we found in previous works (Baldacci, Gupta and Mulas-Granados, 2009) is confirmed also when we look at the post-crisis adjustment determinants. The composition of fiscal consolidation is also important but contrary to some of the literature on fiscal adjustment we find that a combination of revenue increases and expenditure savings is the best approach to reducing the large amount of public debt accumulated in particular by advanced economies. Policy implications of these results could help the authorities in their challenges to regain the control of their public debts.

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