Social Protection for Poverty Reduction in Times of Crisis

Kossi Assimaidou, Youssouf Kiendrebeogo, Abdoulaye Tall

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The authors

Kossi ASSIMAIDOU
Executive Director, Africa Group II Constituency, International Monetary Fund.
Email : kassimaidou@imf.org

Youssouf KIENDREBEOGO
PhD Student in Development Economics, University of Auvergne
Email : youssouf.kiendrebeogo@udamail.fr

Abdoulaye TALL
Senior Advisor to the Executive Director, International Monetary Fund.
Email : atall@imf.org

Abstract

The recent global crisis has highlighted the need to protect the poor and people vulnerable to adverse shocks. Many countries have implemented various programmes to protect social spending and help poor people during periods of financial crisis. This paper uses the most comprehensive database on social spending compiled thus far, and the unique cross-country database on poverty to explore the poverty-reducing role of social protection during financial crises. Using advanced panel data techniques to deal with endogeneity issues, we find that financial crises are associated with slower reductions in the poverty headcount and the poverty gap. Crises lead to 526,400-555,000 additional poor people and to an increase of 4.7-10.6 percentage points in the poverty gap in the medium to long term. These devastating effects of crises on poverty are relatively lowerŮby 11 and 20 percentage points for each percentage point increase in social spending for the poverty headcount and the poverty gap, respectivelyŮin countries with higher social spending, suggesting the importance of social protection for poverty reduction in times of crisis and potential gains from policy intervention.

Key words : Financial Crisis, Poverty, Social Spending

JEL codes : I38, I32, C23

1. Introduction

The recent global crisis has taught us a number of important lessons. Financial crises are usually followed by severe reductions of the availability of financial services and economic downturns, leading to unemployment. When banks experience financial distress, the government usually comes to rescue, thereby causing sovereign defaults. Furthermore, problems in the banking sector are also found to be followed by depreciations of the exchange rate and, therefore, are likely to be associated with changes in relative prices. All of these can affect the distribution of welfare between households belonging to different socio-economic groups and workers of different activity sectors. The effect of crises on poverty is likely to be devastating in low-income countries (LICs), given to their often limited scope for counter-cyclical policies.[1] LICs are relatively more in need of external financing and need to increase relatively more spending to protect the poor in the face of an adverse shock (IMF, 2009).

More importantly, there is some suggestive evidence that the occurrence of financial crises in LICs disproportionately hurt the most vulnerable groups. For example, the 2008-2010 crisis exacerbated the poverty and inequality problem in the Republic of Latvia, by reducing the average real income per capita by about 19 percent and increasing the share of population at risk of poverty by 1.4 percentage points. The wealthiest 20 percent of the population earn seven times more than the bottom 20 percent (IMF, 2012). Moreover, the 1998 crisis in East Asia has been associated with significant lasting welfare costs, accounting for about half of Indonesia's poverty count in 2002 (Ravallion and Lokshin, 2007). Similarly, the sub-Saharan African progress toward the poverty reduction Millennium Development Goals (MDGs) has been delayed by the recent global crisis (Chen and Ravallion, 2009 ; World Bank, 2010 ; IMF, 2011).[2] When considering a larger country sample, the data tell us that the occurrence of financial crises has been important in recent years (Figure 3) and that this has been associated with slower reductions in both the poverty headcount and the poverty gap in developing countries (Figures 4 and 5, respectively).[3]

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1. In particular, in contrast to the counter-cyclical nature of social spending for the advanced economies, LICs experience pro-cyclical health and education outcomes (Ferreira and Schady, 2008).

2. Likewise, the expected impact of the crisis on non-income dimensions of poverty is also severe in sub-Saharan Africa, leading to 30,000-50,000 additional infant deaths, particularly for poorer children and girls (Friedman and Schady, 2009).

3. These calculations are made using a sample of 41 developing countries over the period 1984-2010.

Against this backdrop of a set back progress on poverty reduction in crisis period, the issue of the role of policy intervention in protecting the most vulnerable people during financial crises comes clearly into focus. The latest *Fiscal Forum* has emphasized the need to achieve fiscal adjustment, while at the same time ensuring adequate social protection. Recent experience shows that social policies can help spur sustainable and inclusive growth, thus reducing inequality and poverty. [4] Ravallion (2009) outlined the importance of social assistance in protecting the poorest in the face of the 2008 financial crisis. For example, cash transfer programs, as was the cases of the Bangladeshi *food-for-education*, the Brazilian *Bolsa Familia*, and the Mexican *Oportunidades*, by offering protection and insurance, would help protect the poor in times of crisis. Furthermore, Figures 8 and 9 clearly show that countries with higher levels of social spending tend to experience faster reductions poverty headcount and gap, on average. [5] The questions addressed in this paper are : to what extent financial crises affect the poor in developing countries and whether social protection can help mitigate this possible detrimental effect of crises ?

In theory, financial crises can affect poverty through three main channels : an income effect, a distributional effect, and a disruption effect. For the income effect, crises generate income losses through a slowdown in economic activity. Both formal and informal sectors suffer from this income effect owing to jobs losses in the former and a slowdown in demand for services in the latter. Regarding the distributional effect, financial crises influence income distribution through a fiscal retrenchment and changes in relative prices and the value of assets. For example, a sovereign default crisis, by generating spending cuts, reduces public transfers to most vulnerable people. A currency crisis, by depreciating the domestic currency, can raise the price of tradables relative to nontradables, leading to a fall in earnings in the nontradable sector. [6] Currency crises may also affect households by increasing domestic food prices (see, for instance, Shan et al., 1997). Concerning changes in the value of assets, banking crises can affect the wealth distribution through changes in interest rates.

As regard the disruption effect, it refers to the fact that crises hurt household income

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4. In a recent speech, the IMF Managing Director, Christine Lagarde, stressed the role of targeted social policies in poverty alleviation in the context of the crisis (http://www.imf.org/external/np/speeches/2013/051513.htm).

5. Following Clements et al. (2011), we define social spending as public spending on education and Health.

6. However, this could increase employment and earnings in the tradable sector due the increased demand for exports (see, for instance, Baldacci et al., 2002).

and consumption by reducing the access to financial services (savings, credit, and insurance). Fortunately, policy interventions might help attenuate the social cost of financial crises. Protecting the poor from adverse shocks, for example by increasing their access to social assistance, can help mitigate these detrimental effects of crises. In Particular, social safety nets, by focusing on insurance (ex ante), protection (ex post), and poverty alleviation, may help poor households during periods of crisis (Mahendra Dev et al., 2007).

Previous research has identified macroeconomic shocks as important determinants of households' income (see, for instance, Mahendra Dev et al., 2007; Ravallion, 2009) and has drawn some policy responses that are likely to help dampen the impact of such shocks. Yet few studies have quantified the shock-mitigating effects of social protection. While the occurrence of financial crises is increasingly important in developing countries, it is still unclear the extent to which social assistance can help protect the poor during crises. This is in part due to the lack of cross-country data on poverty and social protection for such countries.

This study extends the previous ones, by using a cross-country framework, exploiting the variations in poverty and in the occurrence of financial crises across countries and over time, and deepens existing findings, by paying a special attention to the importance of social protection in mitigating against the poverty impact of crises. We argue that the extent to which financial crises hurt the poor depends on social spending as a share of total government spending. We find that crisis-hit countries tend to experience slower reductions in both the poverty headcount and the poverty gap. This impact of financial crises on poverty varies significantly with social spending, suggesting a mitigating role of social protection. This mitigating effect of social spending appears to be relatively more pronounced for education spending than for health spending as a result of the relative importance of the former in our country sample.[7]

The plan of the paper is as follows. Section 2 presents a number of stylized facts on the recent evolution of poverty and social spending as well as the occurrence of financial crises. Section 3 provides an empirical investigation of the impact of crises on poverty and the role of social protection in this relationship. The policy implications stemming from the main findings are reported and discussed in Section 4. Section 5 summarizes and concludes.

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[7] In other words, income poverty in developing countries is more sensitive to education spending than to health spending in periods of financial crises.

2. Financial Crises, Social Spending and Poverty in Developing Countries : Stylized Facts

This section provides an overview of the extent to which financial crises influence poverty in developing countries with a special focus on the role of social spending. Based on triennial data on poverty coming from the World Bank's Povcalnet and data on social spending and financial crises from Clements et al. (2011) and Laeven and Valencia (2012), respectively, we find seven main stylized facts on the relationship between financial crises and poverty.[8] The data used here cover 41 developing countries.

FIGURE 1 – Poverty in developing countries over time, 1981-2010
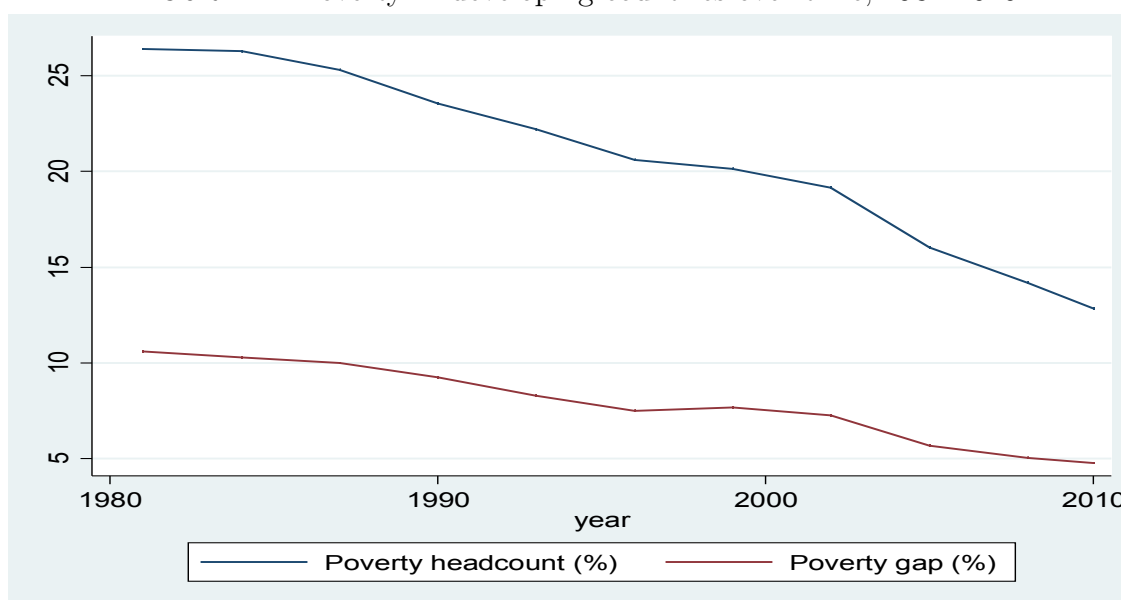
Source : Authors' calculations, based on the World Bank's *Povcalnet*

Poverty can be broadly defined as a pronounced deprivation in people well-being. In monetary terms, poor people are those who do not have enough income or consumption allowing them to meet some minimum leaving standards. The two most commonly used indicators of poverty are the poverty headcount index (H0) and the poverty gap index (H1), derived from the Foster-Greer-Thorbecke (FGT) class of poverty (Foster et al.,1984).

The poverty headcount index is defined as the proportion of the population that is poor, while the poverty gap index measures the extent to which individuals fall below the poverty line, as a proportion of the poverty line.[9] The poverty line considered here is the

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8. The World Bank's Povcalnet data are available at www.worldbank.org.
9. This index is also called the depth of poverty.

FIGURE 2 – Poverty Headcount and Poverty Gap, respectively, across Regions, 1981-2010
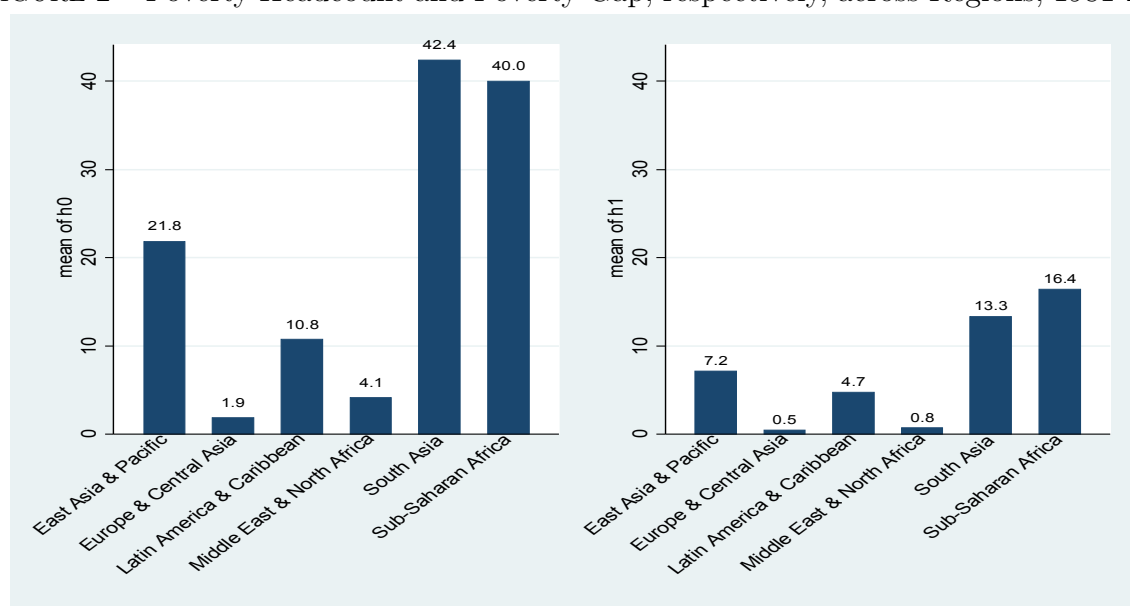
Source : Authors' calculations, based on the World Bank's *Povcalnet*

PPP $1.25 a day.[10] H0 is popular because it is easily understood by the general public. However, unlike H1, H0 does not account for changes in inequality among the poor. H1 is also useful, notably with regard to policy intervention, because it provides the minimum cost of eliminating poverty, if transfers were perfectly targeted. The stylized facts are as follows.

Overall, poverty has declined significantly in developing countries over the sample period. The proportion of people living with less than $1.25 a day dropped by more than half over the sample period, moving from 26.39 percent in 1981 to 12.83 percent in 2010 (Figure 1). Similarly, H1 experiences a long-term downward trend, moving from 10.58 percent in 1981 to 4.78 percent in 2010. Figure 1 also shows that these declines have begun to amplify from 2000, which is the starting point for the implementation of Poverty Reduction Strategy Papers (PRSPs).[11] Indeed, the first adoptions of PRSPs were made in 2000 by 35 countries, including 34 Interim Poverty Reduction Strategy Papers and one Poverty Reduction Strategy Paper.[12]

There is significant heterogeneity between regions lying behind the overall fall in the poverty level, South Asia and Sub-Saharan African regions proving to be the poorest regions.[13] Figure 2 presents the poverty headcount and the poverty

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10. PPP stands for Purchasing Power Parity.

11. The Poverty Reduction Strategy Papers were introduced by the IMF and the World Bank in 1999.

12. Data on the Poverty Reduction Strategy Papers are available at www.imf.org.

13. As we will see in the summary statistics, there is also wide variation in poverty levels across countries.

FIGURE 3 – Number of Countries Experiencing a Financial Crisis (Starting Date)
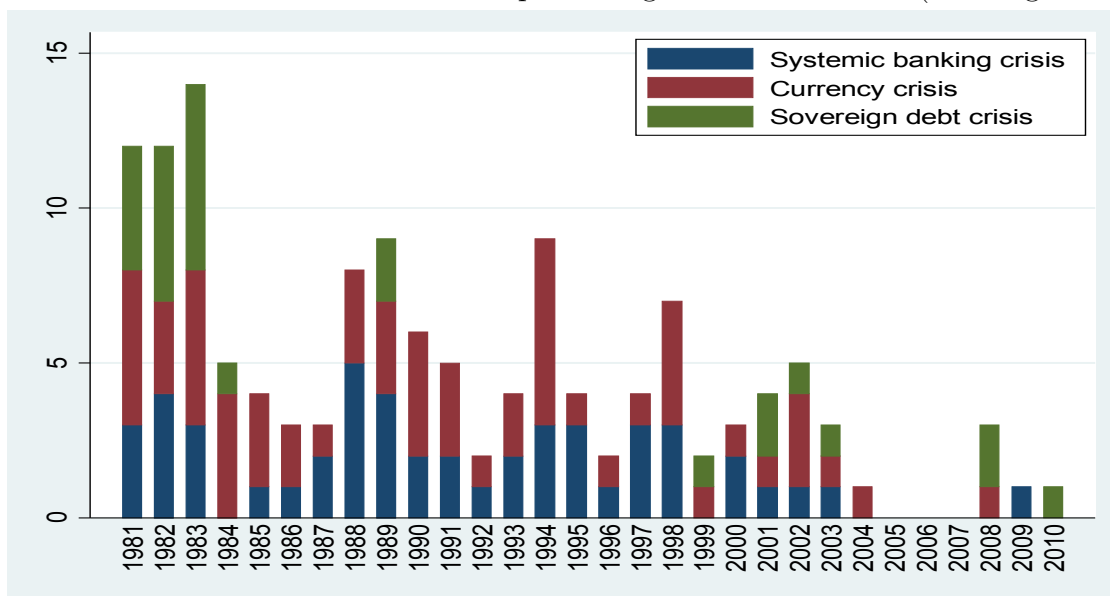
Source : Authors' calculations, based on the Laeven and Valencia (2012) database

FIGURE 4 – Partial correlation between and changes in poverty headcount, 1981-2010 (controlling for initial poverty headcount, initial schooling, and economic growth)
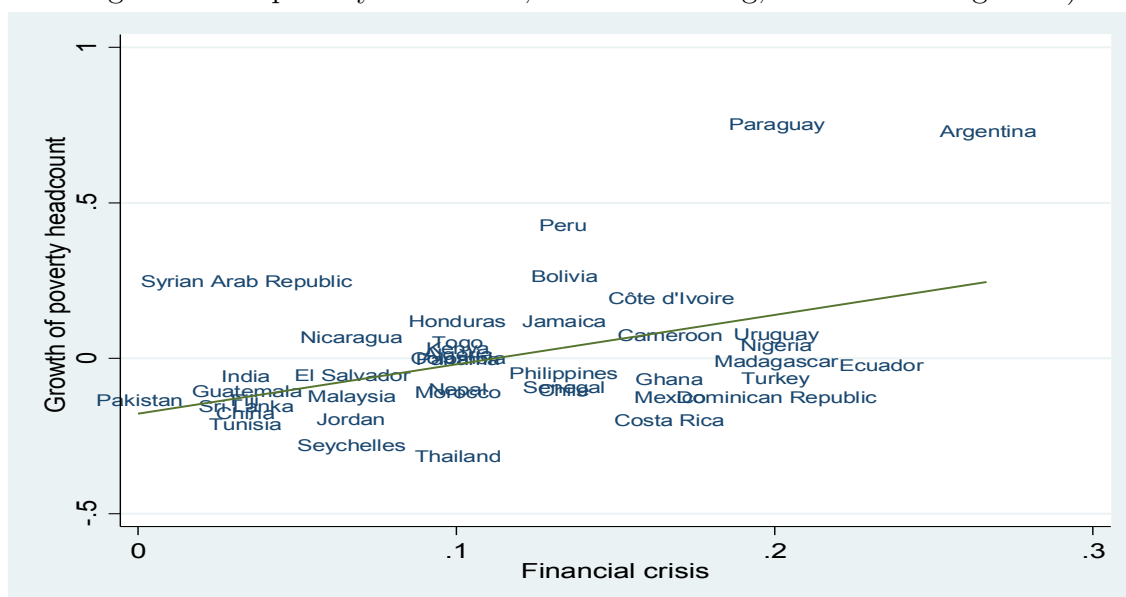
Source : Authors' calculations

FIGURE 5 – Partial correlation between and changes in poverty gap, 1981-2010 (controlling for initial poverty gap, initial schooling, and economic growth)
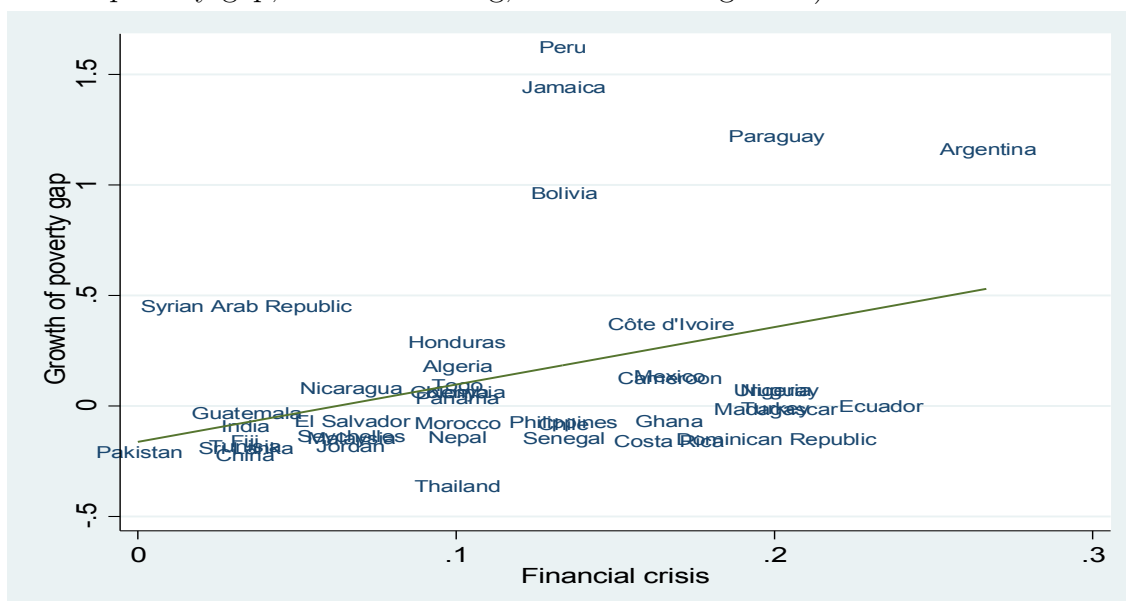
Source : Authors' calculations

FIGURE 6 – Evolution of social spending as a percentage of total government spending, 1985-2009
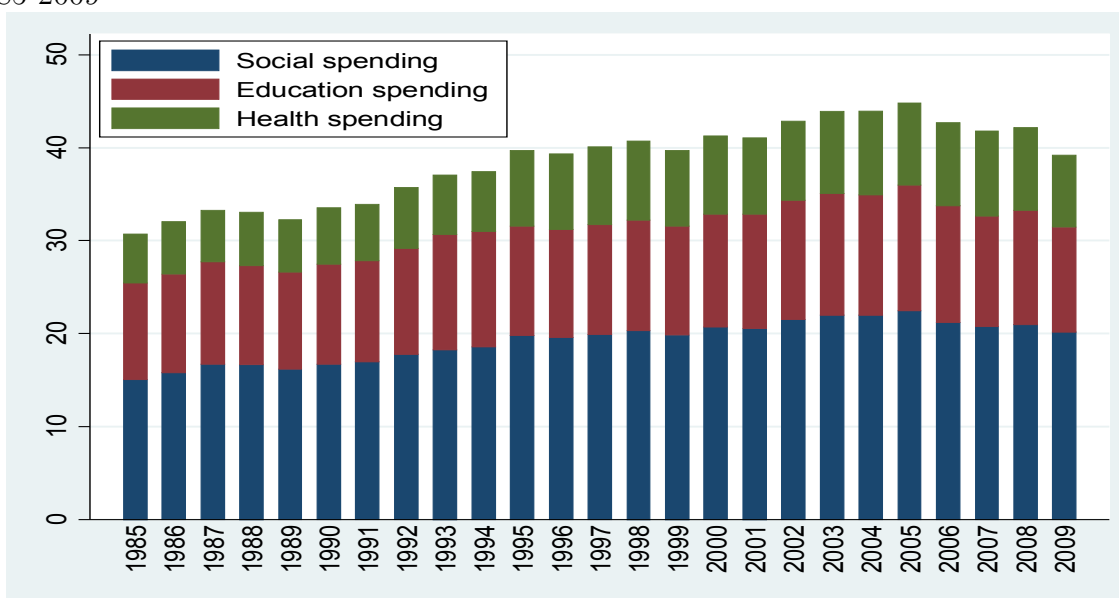
Source : Authors' calculations, based on the Clements et al. (2011) database

gap for six country groups : East Asia and Pacific, Europe and Central Asia, Latin America and Caribbean, Middle East and North Africa, South Asia, and Sub-Saharan Africa. These cross-region differences were dug up during the last two decades. In 2010, the least poor region of the world, Europe and Central Asia, experienced a poverty headcount ratio of 1.34 percent, while Sub-Saharan Africa experienced correspondingly a ratio of 33.70 percent, a value which is more than two times the mean of the poverty headcount in the country sample (12.83 percent). Regarding the variation over time, the Europe and Central Asia region experienced a decline in its poverty headcount of about 130 percent over the 1981-2010 period, while the Sub-Saharan Africa region experienced correspondingly a decline of only 24 percent. We see a similar picture when considering the poverty gap ratio.

FIGURE 7 – Social Spending as a Percentage of Total Government Spending in Developing Countries by Region, 1985-2009
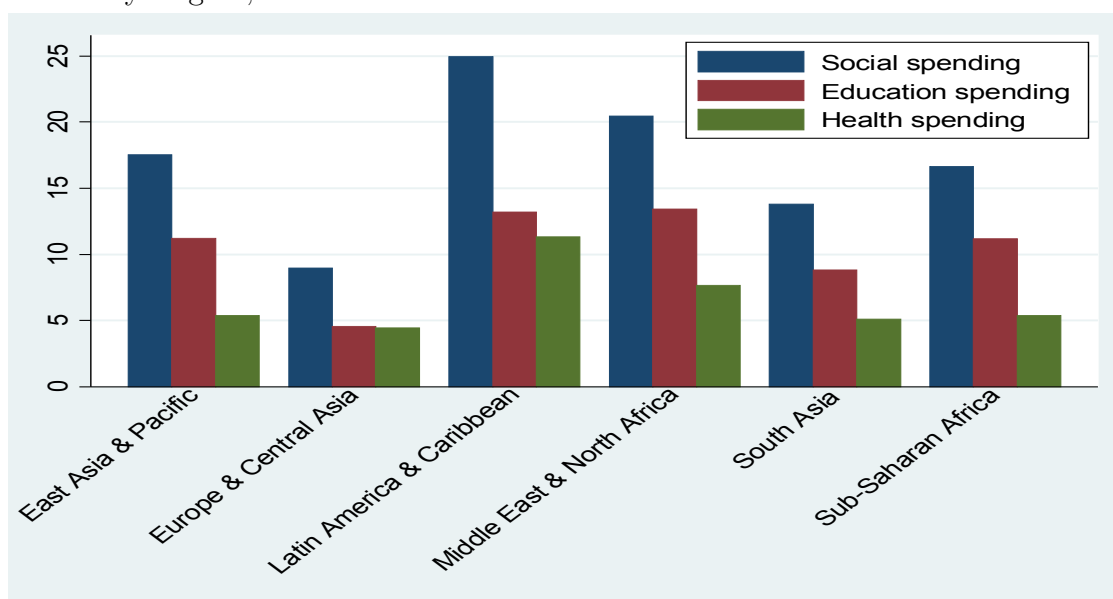
Source : Authors' calculations, based on the Clements et al. (2011) database

Financial crises have been an important feature of the recent economic scene. Figure 3 shows the number of countries experiencing a financial crisis over time, highlighting the importance of the occurrence of banking, currency, and sovereign debt crises in our country sample over the period 1981-2010. All countries of our sample experienced at least one crisis. Many countries experienced more than one crisis over this period, but only two countries, Argentina and Equator, experienced more than five crises. Two other interesting patterns emerge from this figure. Financial crises were relatively

FIGURE 8 – Poverty headcount according to the Level of Social Spending in Developing Countries
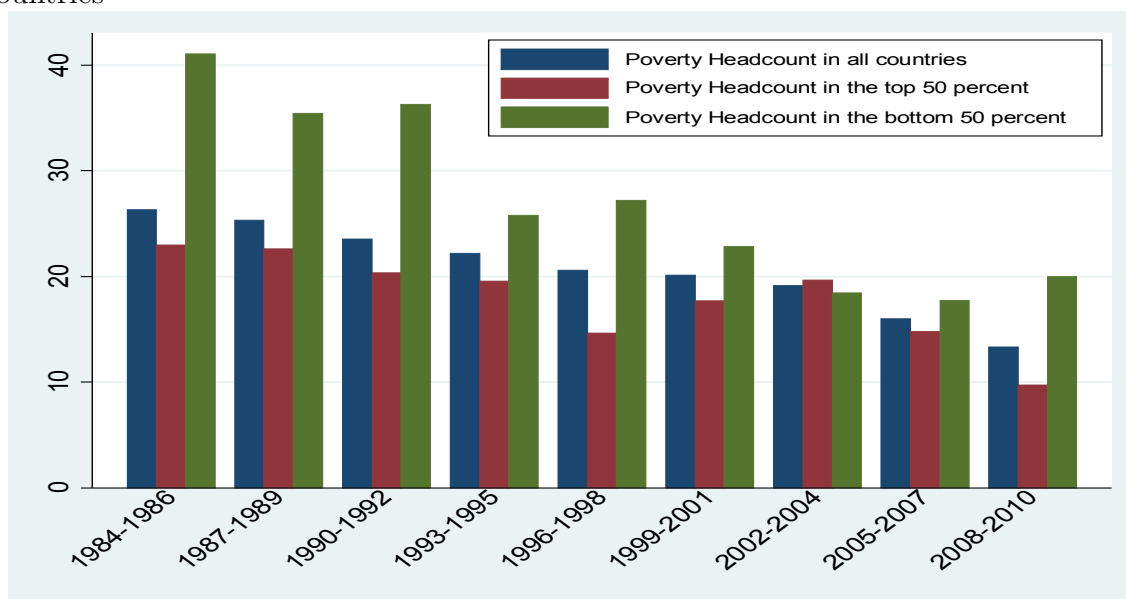
Source : Authors' calculations

more frequent in the 1980s for our country sample. On average, banking and currency crises have been more important than sovereign debt crises, although these latter have become more frequent in recent years.

There is a positive partial association between financial crises and poverty. Figures 4 and 5 show scatter plots for a sample of developing countries, using the H0 and H1 growth as the indicators of poverty, respectively. These figures describe the relationship between the occurrence of financial crises and the growth rate of poverty over the period 1981-2010. The slope of this relationship is positive and statistically significant for both the poverty headcount and the poverty gap, indicating a possible causal detrimental effect of financial crises on poverty.

Social protection has increased in developing countries. For the sample countries, social spending, as a percentage of total government spending, has risen sharply and continuously between 1985 and 2009, moving from 15.10 percent to 20.20 percent, with a peak of 22.50 percent in 2005 (Figure 6). [14] However, this signals a low level of social spending in the developing world. Overall, the share of social spending in total government spending has become relatively large in the 2000s with the introduction of

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14. The use of the share of social spending in total government spending is more informative for policy than that of the ratio of social spending to GDP. In fact, social spending as a percentage of total government spending directly indicates the government efforts to provide social protection.

Figure 9 – Poverty Gap according to the Level of Social Spending in Developing Countries

Source : Authors' calculations

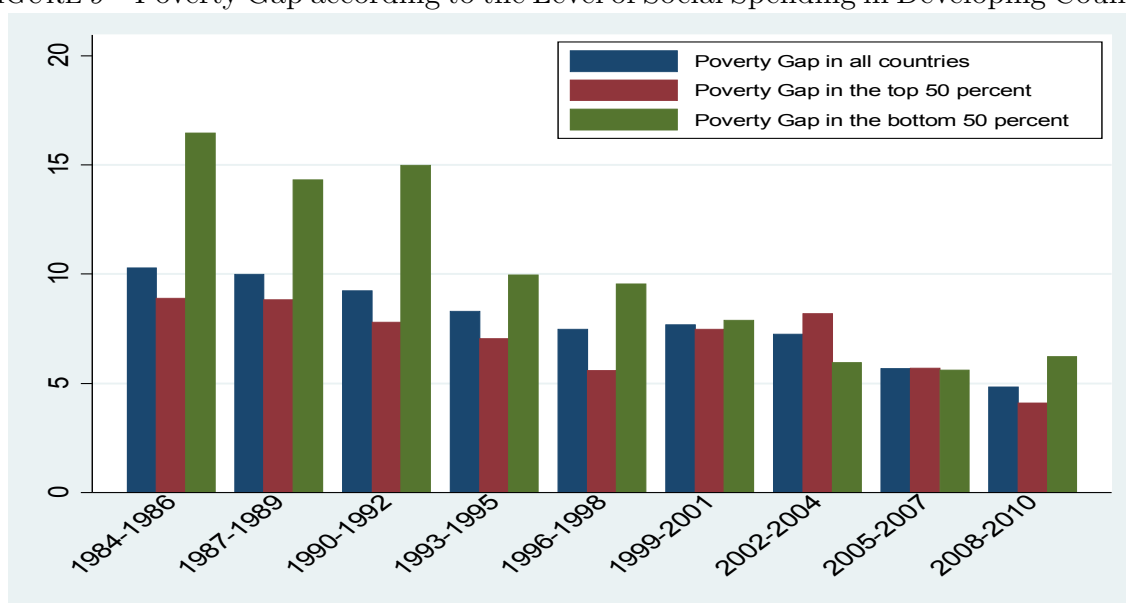the PRSP approach in 1999. On average, education spending (averaging 11.85 percent of total government spending in our sample) is higher than health spending (7.97 percent of total government spending), but the latter shows relatively greater variation over time.

There are differences in social protection across regions. Consistent with earlier studies (see, for instance, Clements et al., 2011), the share of social spending in total government spending varies widely across regions, ranging from 9 percent in the Europe and Central Asia region to 25 percent in the Latin America and Caribbean region (Figure 7). In all regions, education spending is always at least equal to health spending in percent of total government spending. Health expenditures as a percentage of total government expenditures differ more substantially across regions than education expenditures.

Countries with higher levels of social spending experienced faster reductions in poverty. Figures 8 and 9 show, respectively, the levels of both the poverty headcount and the poverty gap for two country groups : the top and bottom 50 percent of the distribution of social spending as a ratio of total government Spending. The level of poverty varies considerably from country to country, depending on the level of social spending in relation to the total government spending. It is clear that both H0 and H1 are negatively correlated with the share of social spending in total government spending. With the exception of the period 2002-2004, the level of poverty headcount in the top 50 percent of the distribution of social spending is always lower than that in the bottom 50 percent. Similarly, the poverty gap is always lower in the top 50 percent of the distribu-

tion of social spending than in the second country group, excepting the periods 2002-2004 and 2005-2007. This suggests a possible negative association between social spending and poverty.

These stylized facts mainly suggest that financial crises may be importantly associated with slower reductions in poverty. Further, the spread of social protection over our sample period indicates that the relationship between crises and poverty might be conditional on the level of social spending. More precisely, this calls into question the role of social spending in mitigating the detrimental impact of crises on poverty.

3. Empirical Investigation

3.1. Sources of variation in poverty

What causes poverty to change across countries and over time ? To understand the sources of variation in poverty patterns, we look at their relationship to factors typically discussed in the literature on this issue : [15] financial crises, social spending, economic growth, demographics, financial development, trade openness, and inflation. In line with the stylized facts, the central idea in this section is that financial crises increase poverty but social spending can help mitigate this detrimental effect.

As discussed above, **financial crises** affect poverty through three alternative but not mutually exclusive channels : an income effect, a distributional effect, and a disruption effect. Financial instability and crises can influence households' income through slowdowns in economic activity and loss of jobs, changes in relative prices, and fiscal retrenchment (Baldacci et al., 2002). Crises can also affect poor through their impact on the returns on physical asset and capital, public transfers as well as community ties (Ferreira et al., 1999). However, **social spending**, as an important countercyclical policy can help dampen the impact of crises on poverty. For example, social safety nets can stop people falling into poverty and promote their livelihoods by raising their skills and productivity. Countries with high social spending will therefore tend to have a higher participation of poor to economic activity and thereby a better inclusiveness of economic growth. In this study, poverty is measured alternatively by the poverty headcount index and the poverty gap index. To proxy for financial crises, we consider dummies indicating the occurrence of

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15. See, for instance, Beck et al. (2007) ; Guillaumont and Kpodar (2011).

banking, sovereign debt, and currency crises.

Economic growth can influence the level of poverty in opposite directions. On the one hand, economies with sustained inclusive growth can allow people to contribute to and benefit from economic growth so that they will experience lower levels of inequality and poverty. [16] On the other hand, in countries where growth is non-inclusive growth, most vulnerable people cannot benefit from economic growth, potentially leading to increased inequalities and to a positive association between economic growth and poverty. Regarding **demographics**, a higher share of the economically inactive dependent population, by decreasing households saving and investment, is likely to increase poverty. This is captured by including both the population growth and the age dependency ratio, which is the ratio of population below 15 and above 65 to population between 15 and 65.

Furthermore, a **better developed financial sector** can raise the access of poor people to financial services (for example, credit, saving, and insurance) and reduce income inequality between rich and poor. The measure of financial development used in this study is the ratio of private credit to GDP (Beck et al., 2007 ; Guillaumont and Kpodar, 2011). Macroeconomic mismanagements and instability, captured by **inflation**, can adversely affect individuals below the poverty line through their impact on real wages (Cardoso, 1992). Periods of rising inflation are associated with faster increases in prices relative to wages and this reduces real incomes, particularly for the poor who mostly hold fixed incomes. **Trade openness** can influence poverty through the efficiency gains from specialization and exchange as well as through the increased availability of larger varieties of goods.

3.2. Estimation Results

Estimating the impact of financial crises on poverty raises a number of questions among which the most important is the endogeneity bias. Although the issue of reverse causality is not likely to be a major concern here, [17] one has to worry about the possibility of omitted variable bias. For example, the same adverse macroeconomic shocks that trigger financial crises may also affect the poor. This may confound our results if such shocks are not taken

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16. Inclusive growth refers to both the pace and distribution of economic growth (see, for instance, Kraay, 2004 ; Berg and Ostry, 2011 ; Anand et al., 2013).

17. Indeed, it not likely that the poor are very important in the portfolios of the banks so that an adverse shock on their revenue cannot affect bank balance sheet adversely. In addition, poor people do not have sufficient foreign currency-denominated assets to significantly influence the probability of currency crises.

into account.

To address this, we first use a mixed system of the probability of financial crises and the poverty impact of crises including fixed effects (Fixed Effects). Then, we use the generalized method of moments (GMM), allowing us to correct for endogeneity for all right-hand side variables. The econometric specification and the identification strategy are detailed in the appendix. As shown in Table 6 in Appendix, there are substantial cross-country variations in poverty headcount and poverty gap. The poverty headcount vary between 0.07 percent in Jordan in 2008 and 87.26 percent in Madagascar in 1981. The poverty gap also varies across countries, ranging from 0.01 percent in Jamaica in 2008 to 53.90 percent in Madagascar in 1981. Similarly, there is wide variation in financial crises and social spending across countries.

3.2.1. Financial Crises, Social Spending and Changes in Poverty Headcount

The regression results from the two estimators–Fixed Effects and System GMM (Generalized Method of Moments)–are presented in Table 1. We first present the results of the Fixed Effects model in columns 1-4. Besides, we present the results using the System GMM estimator to account for the potential endogeneity of the financial crisis dummy as well as all right-hand side variables (columns 5-8). The Fixed Effects model fits the data well, explaining about 71 percent of the variation in poverty growth. Similarly, the diagnostic statistics of the System GMM estimator are favorable. The Hansen test of overidentification, which is robust to heteroskedasticity, does not reject the validity of instrumental variables used and the Arellano and Bond test rejects the second order serial correlation. The overall picture that emerges from this table is that poverty, on average, is increasing with respect to financial crises over time and across countries. Without accounting for the role of social spending in the relationship between crises and poverty, the coefficient on the crisis dummy is positive and statistically significant at the one percent level (column 1).

This coefficient suggests an economically meaningful effect. On average, crisis-hit countries experience slower reductions in poverty headcount compared with non-crisis countries. The poverty reduction outcomes are lowered by 0.77 percentage point relative to that would have happened in the absence of financial crises. Taking the examples of Ecuador and Nigeria with average population of 11,800,000 and 116,000,000, respectively, this corresponds to approximately 91,100 and 895,520 additional poor people, on average. For

TABLE 1 – Financial Crisis, Social Spending, and Changes in Poverty Headcount

Estimator	Fixed Effects				System GMM			
Dependent variable : Growth of Poverty Headcount	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial Poverty Headcount	-0.105***	-0.103***	-0.105***	-0.128***	-0.167***	-0.206***	-0.225***	-0.220***
	(0.032)	(0.031)	(0.033)	(0.041)	(0.043)	(0.064)	(0.076)	(0.068)
Crisis	0.772**	0.347*	0.552**	0.447*	0.814***	0.485***	0.508**	0.258*
	(0.331)	(0.200)	(0.250)	(0.248)	(0.198)	(0.138)	(0.241)	(0.137)
Crisis×Social		-0.111***				-0.119***		
		(0.048)				(0.027)		
Crisis×Education			-0.103**				-0.134***	
			(0.047)				(0.045)	
Crisis×Health				-0.066***				-0.043**
				(0.019)				(0.017)
Economic growth	-0.032**	-0.016**	-0.097***	-0.091**	-0.061***	-0.082***	-0.098***	-0.101***
	(0.015)	(0.009)	(0.030)	(0.037)	(0.018)	(0.026)	(0.029)	(0.026)
Age dependency ratio	0.109	0.074	0.223	0.154	0.307	0.231	0.216	0.309
	(0.204)	(0.066)	(0.234)	(0.191)	(0.288)	(0.140)	(0.233)	(0.333)
Population growth	0.053*	0.057*	0.026	0.097*	0.115*	0.175**	0.118*	0.089
	(0.030)	(0.033)	(0.028)	(0.056)	(0.063)	(0.075)	(0.069)	(0.106)
Private credit ratio	-0.015*	-0.012*	-0.081**	-0.023*	-0.020*	-0.026*	-0.018*	-0.069*
	(0.008)	(0.006)	(0.040)	(0.013)	(0.011)	(0.015)	(0.009)	(0.040)
Trade openness	-0.002*	-0.001	-0.003	-0.003	-0.010*	-0.003	-0.001	-0.007
	(0.001)	(0.001)	(0.003)	(0.004)	(0.006)	(0.003)	(0.004)	(0.019)
Inflation	0.000	0.000	0.000	0.000	0.000	0.008	0.001	0.000
	(0.001)	(0.004)	(0.001)	(0.001)	(0.001)	(0.010)	(0.002)	(0.011)
IMR	-0.210	-0.183	-0.315	-0.161				
	(0.587)	(0.215)	(0.311)	(0.158)				
IMR×Social		1.423						
		(2.017)						
IMR×Education			0.243					
			(0.232)					
IMR×Health				-0.147				
				(0.209)				
Number of observations	328	320	320	280	328	320	320	280
Number of countries	41	40	40	40	41	40	40	40
R-squared	0.710	0.716	0.707	0.713	...	...	...	...
P-value for AR(2) test	...	...	...	...	0.840	0.640	0.318	0.276
P-value for Hansen test	...	...	...	...	0.956	0.999	0.822	0.842

Notes : The dependent variable is the annual growth of the percentage of the population living on $1.25 a day or less, over each three-year period. Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1-percent, 5-percent, and 10-percent levels, respectively.

the entire country sample, the number of additional poor resulting from financial crises is about 526,400-555,000, respectively for the Fixed Effects and the System GMM estimators. [18] These results are consistent with earlier findings on the impact of financial crises on poverty (see, for instance, Chen and Ravallion, 2009; Habib et al., 2010). [19]

When taking into account the role of social spending in this relationship, we find that countries with higher levels of social spending observe faster reductions in the poverty headcount in times of crisis, thus withstanding the crises better than countries with lower levels of social spending. With the same country examples, Ecuador and Nigeria have ratios of social spending to total government spending of 24.96 percent and 8.88 percent, respectively, while the country at the 95th percentile of social spending (El Salvador) has a ratio of 36.95 percent, on average, over the period 1985-2009. The coefficient of -0.11 on the interaction between the crisis dummy and social spending in column 2 suggests that social protection helped 13,098 persons out of 40,946 to get out of poverty during periods of crisis in Ecuador. But this number would have been 326,926 persons, rather than the actual 13,098 persons, had Ecuador had the ratio of social spending as El Salvador, a situation in which the impact of crises is more than offset by social protection.

Similarly, the results in column 2 indicate that in Nigeria, social protection would help prevent 1,143,000 persons from falling below the poverty line during financial crises. More importantly, this number would have reached 4,758,000 persons, had Nigeria had the same share of social spending in total spending as El Salvador. These results continue to hold when using the System GMM estimator as an alternative method to deal with the endogeneity bias.

We present the results when differentiating between education spending and health spending in the next two left-side columns (columns 3 and 4 and columns 7 and 8, respectively for the Fixed Effects and System GMM estimators). It is apparent that both education and health spending help mitigate the detrimental effect of financial crises on poverty. The coefficients on the interactions between the crisis dummy and the two components of social spending are all negative and statistically significant. But the poverty-reducing role of social spending is more pronounced for education spending than for health spending, with interacting coefficients of 0.103 and 0.066, respectively.

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18. The average number of additional poor associated with crises is given by $(\beta \times \text{Population})/100$, where β is the coefficient on the crisis dummy and Population is the average total population over the period (See Section A1 in the appendix for further details).

19. Using country-specific growth projection, Chen and Ravallion (2009) find that the 2008 global financial crisis would increase the 2009 count of people living below \$1.25 a day by 50 million.

The coefficient on the interaction between the crisis dummy and education spending suggests that a one percentage point increase in education spending as a percentage of total government spending–a very large change given the cross-country variation in the data–allows 931,890 people to prevent failing below the poverty line in the event of financial crises. As regard the heath spending, a one percentage point increase reduces the number of people living below the \$1.25 a day by 422,310 during financial crises. One possible explanation of this differential effect is the relatively higher level of education spending in our country sample over the sample period, in line with the relatively higher countercyclicality of education outcomes compared with health outcomes found in Ferreira and Schady (2008).

With regard to the control variables, the estimated coefficients have the expected signs and plausible magnitudes. The initial level of poverty headcount enters negatively and significantly, indicating a convergence effect in poverty levels in our sample. As expected, the growth of GDP per capita enters negatively and significantly, indicating the central role of economic growth in poverty alleviation. Its coefficient implies that a one percentage point increase in the output growth leads to a 1.6 to 10.1 percentage points decrease in the poverty headcount index. The coefficient on population growth is positive and significant in most regressions. A one percentage point increase in the population growth increases the poverty headcount by 5.3 to 17.5 percent. Consistent with earlier studies, financial sector development significantly contributes to the poverty alleviation (see, for instance, Honohan, 2004; Beck et al., 2007; Guillaumont and Kpodar, 2011).

The age dependency and inflation are found to exert a positive but statistically insignificant effect on the growth of H0. Interestingly, the coefficients on the inverse Mills ratio and its interaction with the indicators of social spending are small in magnitude and statistically insignificant, signaling that there is no evidence that the errors in the crisis and the poverty equations are correlated.

3.2.2. Financial Crises, Social Spending and Changes in Poverty Gap

The poverty gap index measures the extent to which the income of individuals falls below the poverty line. In contrast to the headcount index, this index provides the minimum cost of eliminating poverty, if transfers were perfectly targeted. The use of this measure informs us about the extent to which the decrease in the poverty reduction cost is lowered in times of crisis than that would have been in the absence of financial crises.

Table 2 contains the results using the poverty gap index as the indicator of poverty. We present the results from the two previous estimators in columns 1-4 and 5-8, respectively. As before, we begin by running the regression without accounting for the interaction between the crisis dummy and social spending (columns 1 and 4). Once again, the initial level of H1 enters negatively and significantly, indicating the convergence in poverty gaps in our country sample.

These results suggest that the occurrence of a financial crisis is associated with slower reductions in the poverty gap. The coefficient on the crisis dummy is positive and statistically significant. Being affected by a financial crisis leads to 14.4 and 19.5 percentage points increases in the poverty gap growth, respectively for the Fixed Effects and System GMM estimators. This corresponds to substantial increases in the minimum cost of eliminating poverty, in regard to the cross-country variation of the poverty gap in the data.

Next, we include the interactions between the financial crisis dummy and the measures of social spending to account for the role of social protection in the crisis-poverty nexus. The coefficients on these interactions are all negative and statistically significant at the one percent level. This suggests that social spending importantly reduces the cost of financial crisis on poverty alleviation efforts. On average, financial crises have been associated with faster reductions in the poverty gap in countries with higher shares of social spending in total government spending. The magnitude of these coefficients indicates an economically large effect of social spending in mitigating the negative impact of crises on poverty gap. During our sample period, the average value of social spending across countries went up by about 34 percentage points, which implies there was a seven percentage points decrease in the impact of crises on the poverty gap growth during this period that was associated with social spending. More suggestively, to fully offset the increased cost of reducing poverty associated with crises, social spending should have been increased by almost 14 percentage points, on average, in the country sample over the period.

These poverty-friendly aspects of social spending are also economically important when differentiating between education spending and health spending. Once again, the results show that the mitigating effect of education spending is relatively more important than that of health spending. The coefficient of -0.576 on the interaction between the crisis dummy and education spending in column 3 suggests that the effect of financial crises on the poverty gap growth is about 10 percentage points higher in the country at the 25th

TABLE 2 – Financial Crisis, Social Spending, and Changes in Poverty Gap

Estimator	Fixed Effects				System GMM			
Dependent variable : Growth of poverty gap	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial poverty gap	-0.082* (0.042)	-0.105** (0.040)	-0.086* (0.049)	-0.116** (0.046)	-0.126*** (0.039)	-0.135** (0.058)	-0.111** (0.050)	-0.137** (0.065)
Crisis	0.144** (0.057)	0.195** (0.089)	0.117*** (0.030)	0.074** (0.033)	0.196*** (0.052)	0.181** (0.083)	0.103* (0.054)	0.108* (0.063)
Crisis×Social		-0.203*** (0.058)				-0.401*** (0.101)		
Crisis×Education			-0.576*** (0.151)				-0.603*** (0.223)	
Crisis×Health				-0.259*** (0.076)				-0.241*** (0.080)
Economic growth	-0.220 (0.220)	-0.228 (0.234)	-0.283* (0.163)	-0.223 (0.231)	-0.288 (0.317)	-0.255 (0.247)	-0.296* (0.173)	-0.298* (0.168)
Age dependency ratio	0.009 (0.019)	0.035 (0.061)	0.043 (0.098)	0.027 (0.040)	0.106 (0.172)	0.117 (0.137)	0.113 (0.129)	0.089 (0.104)
Population growth	0.141 (0.198)	0.135 (0.192)	0.147 (0.153)	0.128 (0.136)	0.187 (0.191)	0.165 (0.160)	0.138 (0.141)	0.119 (0.123)
Private credit ratio	-0.192 (0.201)	-0.209* (0.122)	-0.208* (0.120)	-0.226* (0.131)	-0.288* (0.162)	-0.296* (0.170)	-0.274* (0.153)	-0.228* (0.131)
Trade openness	-0.085 (0.087)	-0.079 (0.089)	-0.052 (0.060)	-0.078 (0.085)	-0.121 (0.183)	-0.105 (0.141)	-0.113 (0.129)	-0.134 (0.147)
Inflation	0.054 (0.031)	0.072* (0.041)	0.072* (0.040)	0.075* (0.043)	0.083* (0.047)	0.079* (0.044)	0.078* (0.044)	0.013 (0.042)
IMR	-0.098 (0.103)	-0.132 (0.151)	-0.148 (0.156)					
IMR×Social		0.239 (0.284)						
IMR×Education			-0.375 (0.500)					
IMR×Health				-0.196 (0.309)				
Number of observations	328	320	320	280	328	320	320	280
Number of countries	41	40	40	40	41	40	40	40
R-squared	0.637	0.639	0.671	0.600	...	...	...	...
P-value for AR(2) test	...	...	...	...	0.198	0.235	...	...
P-value for Hansen test	...	...	...	...	0.503	0.429	0.411	0.382

Notes : The dependent variable is the annual growth of the poverty gap, over each three-year period. Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1-percent, 5-percent, and 10-percent levels, respectively.

percentile of education spending (low education spending) than that in the country at the 75th percentile (high education spending). [20]

Regarding health spending, the coefficient estimate of -0.259 in column 4 predicts that in the face of a financial crisis, the reduction of the poverty gap should be 2.96 percent faster in the country at the 75th percentile of health spending (Nicaragua), as compared with the country at the 25th percentile (Nigeria). These differential effects of crises on the depth of poverty across countries with varying levels of social spending are substantial, in regard to the average growth of -5.62 percent of the poverty gap over the sample period.

Turning to the control variables, the results remain broadly similar to those reported in Table 1. A one percentage point increase in economic growth is associated with a 0.3 percentage point decrease in the poverty gap growth, although the coefficient on this variable lose its statistical significance in most cases. A higher access to private credit reduces the cost of eliminating poverty. The coefficient on private credit ratio to GDP implies that a one percentage point increase in the access to private credit induces roughly a 0.2 percentage point decrease in the growth of the poverty gap.

An increase of one percentage point in inflation leads to a 0.07 percentage point reduction in the poverty gap growth. The age dependency, the population growth, and trade openness do not significantly influence the growth of the poverty gap, though their coefficients display the expected signs. As before, the coefficients on the inverse Mills ratio and its interaction with the indicators of social spending are not statistically significant. The results from columns 5-8 using the System GMM estimator are qualitatively similar.

To summarize, the results in Tables 1 and 2 indicate that financial crises robustly and importantly hurt both the poverty headcount and the poverty gap but their impact is relatively more pronounced for the former. Interestingly, however, when conditioning the relationship between crises and poverty on the level of social protection, we find that both education spending and health spending help mitigate this detrimental effect of crises. This mitigating effect of education spending is relatively more pronounced than that of health spending, a reflection of the relatively higher countercyclicality of education spending..

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20. The country at the 75th percentile of education spending is Thailand, while the country at the 25th percentile is Malaysia.

3.3. Sensitivity to the inclusion of additional controls

In the baseline specification, we use the conditioning information suggested by earlier empirical studies (see, for instance, Beck et al., 2007). However, it is possible that other factors generate significant variations in poverty, leading to a potential omitted variables bias. To account for this, we include additional control variables, namely the lagged level of the government balance to control for the influence of fiscal distortions on poverty, the lagged level of foreign direct investment (FDI) accounting for the effects of financial openness, and dummies for PRSP, IMF concessional programs, as well as twin and triplet crisis dummies to take into account the simultaneous occurrence of banking, currency, and sovereign debt crises. The twin crisis is defined as the simultaneous occurrence of banking and currency crises and the triplet crisis is the simultaneous occurrence of banking, currency, and debt crises. [21]

To account for the shock-absorbing role of exchange rate flexibility, we include the interaction between the crisis dummy and the index of exchange rate classification. [22] We also interact the crisis dummy with remittances to control for the counter-cyclical nature of remittances in LICs. Consistent with the spirit of Frankel (2010), this suggests that remittances help to smooth short-term income disturbances in the worker's country of origin. Regional dummies for East Asia and Pacific (EAP), Latin America and the Caribbean (LAC), Middle East and North Africa (MENA), South Asia (SA), and Sub-Saharan Africa (SSA) are also included. The estimated coefficients are presented in Tables 3 and 4 of the appendix when using H0 and H1 as the measures of poverty, respectively.

Overall, the main results remain quantitatively similar to the baseline findings reported in Tables 1 and 2. Consistent with previous findings, government balance are associated with faster reductions in both the poverty headcount and the poverty gap. This suggests that countries with stronger fiscal positions, thus taking advantage of fiscal buffers, are likely to protect the poor against adverse shocks. The coefficient on FDI is negative but statistically insignificant, regardless the measure of poverty used. Moreover, greater exchange rate flexibility improves the resilience of the poor during crises, although the coefficient on the corresponding interaction term is mostly insignificant. The result on

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21. The other cases, namely the simultaneous occurrence of banking and debt, and currency and debt crises appear to be quite rare in our sample.

22. The index of exchange rate classification is scaled from 1 to 15, a higher value indicating a more flexible exchange rate regime.

the interaction between the crisis dummy and remittances shows that countries receiving higher levels of remittances are likely to experience relatively faster reductions in poverty in the face of a domestic financial crisis.

Additionally, the SSA dummy tends to be positive and statistically significant, confirming the relatively high levels of poverty in this region (Figure 2). The coefficient on the PRSP dummy is negative and significant, reflecting the fact that countries under a PRSP experience faster reductions in the poverty headcount and the poverty gap as can be seen in Figure 10 (Appendix). Similarly, the coefficient on the IMF-concessionary program dummy is negative and statistically significant. The twin crises dummy enters positively and significantly, indicating the exacerbating effect of crises on poverty when banking and currency crises occur simultaneously. On average, the dummy of triplet crises, which are relatively less frequent than twin crises, is positive but statistically insignificant. The coefficients on the first set of control variables are not shown but remain broadly similar to the baseline results.

4.   Implications for Policy

The results reported earlier can help inform the design of policy responses to reduce vulnerability and protect households again adverse shocks during financial crises. On the one hand, crises are significantly associated with slower reductions in poverty. On the other hand, social protection, captured by spending on education and health spending, helps mitigate this detrimental effect of crises on poverty. Policy should therefore focus on macroeconomic stabilization measures at the least cost to poor households to mitigate the income, distributional, and disruption effects.

Fiscal policy. The fundamental question facing by policymakers in the face of a financial crisis is how to ensure a balanced and equitable fiscal adjustment. Fiscal policy needs to balance short-run cyclical concerns and long-run sustainability objectives, while protecting vulnerable groups. In the event of a crisis, the focus should be on both macro-level and micro-level issues to limit changes in factors that increase poverty. The fiscal policy stance that each country requires depends on its initial conditions. Given that the government balance is favorable to poverty alleviation, countries with initially weaker fiscal positions should rely more on rebalancing the composition of public spending, by enhancing the transparency and efficiency of spending, to permit directing limited resources to

priority areas such as social spending. As underscored in the April 2013 *Fiscal Monitor*, energy subsidies, for example, increase inequalities as they are captured by the non-poor. Subsidies reforms can therefore help reduce inequality by shifting public resources toward more pro-poor spending (IMF, 2013a).

When these countries are in a poverty trap, the international financial assistance will be needed to break negative feedback loops. For example, the IMF's Poverty Reduction and Growth Trust (PRGT) provides two lending windows–the Standby Credit Facility (SCF) and the Rapid Credit Facility (RCF)–that can fulfill the short-term financing needs. [23]

In countries with room for fiscal policy maneuvering, the available fiscal space could be used to support an expansion of social spending and foster inclusive growth, while implementing credible medium-term fiscal plans to reduce uncertainties and give confidence to the market. Education spending (for example, expenditures on primary schools) and health spending (for example, the provision of health care) may help increase human capital and labor productivity of the poor.

Particularly, the provision of social safety nets and workfare programmes, by providing consumption-smoothing and thus mitigating the distributional effect, could be the main short term pro-poor direct public action in the face of crises. The set up of these safety nets should focus on providing effective assistance to the most vulnerable households using conditional cash transfers, for example. The models of the Bangladeshi *food-for-education*, the Brazilian *Bolsa Familia*, the Indian education programmes (free uniforms, textbooks, etc.), and the Mexican *Oportunidades* programs can serve as examples. In the medium term, a fiscal stimulus can be oriented to labor-intensive programs such as rural employment programs to protect the poor from large shocks. One other point is protecting the consumption of the poor through adequate mechanisms to stabilize food prices and provide food subsidies. A temporary reduction of consumption tax on commodities consumed by the poor could be a second best option.

Countries with high initial debt ratios would benefit from pursuing fiscal adjustment steadfastly. Fiscal adjustment in the context of a crisis can hurt the poor disproportionately, although pursuing unbalanced policies is not sustainable. In these countries, gradual and pro-poor adjustments guided by structural targets are needed to rebuild fiscal buffers. The focus should be put on spending lines cuts that can be done to preserve pro-poor

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23. The advantage of such financial supports is that they are concessional and accompanied by policy advice that can fuel the adjustment process.

spending, for example by reducing or delaying spending that is typically beneficial to the non-poor.

In economies where the commodity sectors are expanding rapidly, it will be critical to put in place policy frameworks that insulate the economy from the effects of commodity price volatility while using commodity revenue to meet urgent public infrastructure and social needs.

Monetary and financial policies. In the face of banking and sovereign default crises, the financial system needs to be rebooted and put on a safer path, in line with the recommendations of the April 2013 *Global Financial Stability Report* (IMF, 2013b). In this regard, policy responses that help clean-up and recapitalize the banking sector remain the short-term priorities to foster the access to financial services, especially for the poor. The results point to a positive association between inflation and the poverty gap (Table 2) and to a negative association between private credit and the poverty headcount and poverty gap (Tables 1 and 2). At the height of the crisis, an accommodative monetary policy is needed, for example through purchases of long-term public bonds or the provision of credit to the private sector by the central bank, notably in countries with low inflation or when the lower interest rate bound constraint is binding. But these actions need to be accompanied by macro- and microprudential measures aimed at preserving financial stability and improving monetary policy transmission. This could also help monitor the risks associated with credit booms. However, in the medium-term, monetary policy should be designed to avoid high inflation, since the poor mostly rely on fixed incomes. In the long term, the development and the soundness of the financial sector will help create financial buffers and boost micro-finance, thereby allowing the most vulnerable people (households and small and medium-sized enterprises) to smooth consumption and rebuild assets.

Exchange rate policy. In the face of currency crises, exchange rate policy can be used to influence relative price changes in a pro-poor way. For example, a real devaluation leads to increases in the prices of tradable goods relative to those of nontradable goods. This can be beneficial to the poor who are net suppliers of tradable goods or who work in tradable sectors. However, devaluations may disproportionately affect the poor if they are associated with increases in food prices. Moreover, our results suggest that countries with flexible exchange rate regimes are likely preserve the poor against the devastating impact of crises. Countries with flexible exchange rate systems should therefore allow their exchange rates to be more market determined to facilitate adjustments and to fully take

advantage of the shocks-absorbing role of such regimes.

Structural reforms. The policy measures outlined above are about actions to be implemented when crises have started or during the recovery. But a fundamental challenge is what should be done in non-crisis periods to mitigate the effects of future crises or when preparing for crises. Here, the appropriate policy intervention is to design long term institutional structures for reducing the risks facing by most vulnerable households. The challenge is threefold. First, the immediate implication of the devastating impact of financial crises on the poor is to put in place policy packages that help prevent future crises. In this regard, it is important to build up better financial systems through further regulation and supervision at the national and regional levels. At the international level, the Basel III agenda can help create better capital and liquidity buffers in the medium to long term.

Second, the structure of social safety nets may focus on providing insurance against the risk of income loss before the crisis, without creating longer-term distortions. In practice, this could consist in providing insurance to households with severe working capital constraints, for example by putting in place capital guarantee funds. Our results show that the adoption of IMF-Supported concessional programs and the PRSP are significantly associated with faster reductions in poverty. This suggests that to protect the poor against adverse shocks from future crises, comprehensive poverty reduction programs including Poverty Reduction Strategy Papers can help reduce both the headcount of the poverty and the poverty gap in developing economies, particularly in Africa. [24]

Third, the focus should be on pro-poor structural reforms to regain competitiveness and growth, while gauging the relative impact on different groups. Our results also suggest that trade openness and financial openness are good for the poor, although the effect of the latter is mostly insignificant. Trade liberalization should be strengthened while implementing pro-poor actions, especially in services, agriculture, and informal sectors where the poor are more concentrated. For example, taxes or supports for important food staples or agricultural inputs could help increase the income of the poor and improve the availability of products they consume. In addition, conversion of non-tariff barriers–for reasons other than for health, safety and the environment–to tariff barriers is needed. This can be more beneficial for the poor than for the non-poor since license recipients,

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24. Indeed, our results also indicate that Sub-Saharan African countries tend to experience slower reductions in poverty, compared with other regions.

who are mostly non-poor, usually collect rents.

Regarding financial openness, the key pro-poor policy response is to improve domestic capacity to better exploit foreign investment, for example by building up the infrastructure and the quality of labor force and by increasing investment in human capital in labor-intensive sectors and regions. Further, the labor market reform, through the reduction of acquired rights of formal sector workers to improve informal workers labor prospects, can help the poor. At the international level, the IMF and the World Bank conditionality in development policy lending should further focus on social spending, notably in periods of crisis. However, policymakers should be aware of the difficulties of implementing certain structural reforms, for example, owing to weak information, institutional rigidities, and political pressures to preserves fiscal support to the non-poor.

5. Conclusion

This study sets out with the aim of assessing the implications of social protection for poverty reduction amid the recent financial crisis episodes, using data on 41 developing countries over the period 1984-2010. What do we learn from the results ? The study has provided some important insights into the poverty-reducing role of social protection in periods of crisis. While developing countries experience an overall downward trend of poverty, crisis-hit countries tend to experience slower reductions in both the poverty headcount and the poverty gap. The progress toward the poverty reduction in developing countries are significantly delayed by the occurrence of financial crises. Interestingly, this detrimental effect of crises on poverty is conditional on the levels of social spending and suggests a mitigating effect of social protection. Countries with high levels of spending on education and health are found to be relatively more resilient–in terms of poverty headcount and poverty gap–in the face of financial crises.

The quantitative implications of these findings for poverty reduction confirm the substantial real effects of financial crises on the poor and the potential gains from policy intervention in times of crisis. Although fiscal policy is at the center of the policy framework for social protection, monetary and exchange rate policies as well as structural reforms can also help to protect the poor against adverse shocks.

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Appendix

Section A1 : Methodology

Data The estimation sample includes 41 developing countries for the period from 1984 to 2010. Nonoverlapping three-year averages from 1984-1986 to 2008-2010 are used in the estimation. [25] This allows us to smooth out short-term fluctuations. The main data sources are Povcalnet, Clements et al. (2011), Laeven and Valencia (2012), and the World Development Indicators (WDI). Data on poverty were observed at the beginning of each period (1984, 1987, 1990, 1993, 1996, 1999, 2002, 2005, and 2008). Variable definitions and sources are described in detail in Table 5.

Econometric model and identification issues We estimate variants the following econometric model for the two measures of poverty :

$$P_{it} - P_{i(t-3)} = \alpha_0 + \alpha_1 P_{i(t-3)} + \beta_1 Crisis_{iT} + \beta_2 Crisis_{iT} \times Protection_{iT} + \gamma X_{iT} + \nu_i + \lambda_T + u_{iT}$$

(1)

where P_{it} represents the indicator of poverty for country i in period t. $Crisis_{iT}$ refers to a dummy variable taking 1 if the country i experiences a financial crisis during the period T. *Protection* is either social spending, education spending or health spending, as a percentage of total government spending. X is a set of conditioning information to control for other factors associated with poverty. The explanatory variables are measured either as an average over the period T or as an initial value. ν_i, λ_T, and u_{it} are country fixed effects, time fixed effects, and the idiosyncratic error term, respectively. ν_i and λ_T allow accounting for fixed effects common across countries and for business cycle effects, respectively.

The main variable of interest is the interaction between the financial crisis dummy and the indicator of social protection ($Crisis_{iT} \times Protection_{iT}$). The coefficient on this interaction term estimates the differential effect of financial crises on the growth of poverty across countries with varying levels of social spending. In other words, the term $\beta_1 + \beta_2 \times Protection_{iT}$ captures the crisis-driven change in poverty growth for different levels of social spending. We expect that countries may have faster reductions in poverty in the face of a financial crisis when they experience higher levels of social spending, namely

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25. Since the social spending data cover the 1985-2009 period, the averages on this variable for the two extreme periods are that of 1985-1986 and 2008-2009, respectively.

$\beta_1 > 0$ and $\beta_2 < 0$. Thus, the number of additional poor resulting from the crisis is given by $(\beta_1 \times Population)/100$, whereas the number of individuals that one additional percentage point of social protection helps prevent from falling below the poverty line of \$1.25 a day during the crisis is given by $(\beta_2 \times Population)/100$.[26] The initial level of poverty $(P_{i(t-3)})$ is included to control for a possible convergence among countries in poverty.

In estimating this baseline specification (equation 1), it is clear that the most immediate concern is the endogeneity arising from the selection problem. Indeed, crisis-hit countries can differ systematically from other non-crisis countries, suggesting that the formers are not randomly selected in such a case. They can be adversely selected because of their relatively poor economic performance increases the occurrence of financial crises. The implication of this problem is that simple Ordinary Least Squares (OLS) will be biased.

We use two estimation methods, namely the Fixed Effects and System GMM estimators. For the Fixed Effects estimator, the selection bias is controlled for by estimating a mixed system of both continuous and discrete dependent variable. In doing so, we properly isolate the part of the variation in the occurrence of financial crises that is not associated with reverse causation or omitted variables (see, for instance, Vella and Verbeek, 1999 ; Keen and Lockwood, 2010). This procedure consists of estimating the impact of endogenous treatment effects. Here, the occurrence of crises is supposed to be a treatment that is driven by a number of factors. Regarding the System GMM estimator, the lagged values of regressors (in levels and in differences) are used as instruments for right-hand-side variables.

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26. Population refers the number of total population.

TABLE 3 – Financial Crisis, Social Spending, and Changes in Poverty Headcount : Sensitivity to Additional Controls

Estimator	Fixed Effects				System GMM			
Dependent variable : Growth of Poverty Headcount	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial Poverty Headcount	-0.100*** (0.028)	-0.100*** (0.029)	-0.113*** (0.042)	-0.119*** (0.036)	-0.149*** (0.054)	-0.183*** (0.058)	-0.189*** (0.065)	-0.216*** (0.071)
Crisis	0.104* (0.060)	0.122* (0.071)	0.144** (0.072)	0.177* (.104)	0.105** (0.045)	0.024 (0.027)	0.107** (0.044)	0.101* (0.056)
Crisis×Social		-0.097** (0.044)				-0.101** (0.040)		
Crisis×Education			-0.211*** (0.066)				-0.099** (0.042)	
Crisis×Health				-0.120*** (0.030)				-0.050** (0.002)
Crisis×ERC	-0.016** (0.007)	-0.019** (0.008)	-0.011* (0.005)	-0.008* (0.004)	-0.038*** (0.011)	-0.035*** (0.009)	-0.050** (0.020)	-0.026** (0.011)
Crisis×Remittances	-0.133* (0.071)	-0.114* (0.065)	-0.107 (0.112)	-0.118 (0.139)	-0.139* (0.077)	-0.100 (0.094)	-0.093 (0.105)	-0.116* (0.066)
Government balance (lagged)	-0.514* (0.295)	-0.510 (0.518)	-0.421* (0.247)	-0.458 (0.506)	-0.520* (0.288)	-0.495 (0.501)	-0.486 (0.503)	-0.517 (0.586)
FDI	-0.190* (0.109)	-0.189* (0.106)	-0.238 (0.230)	-0.226* (0.124)	-0.188* (0.096)	-0.296 (0.306)	-0.198* (0.114)	-0.203* (0.109)
PRSP dummy	-0.048*** (0.014)	-0.034*** (0.010)	-0.048** (0.025)	-0.041* (0.023)	-0.042 (0.048)	-0.047* (0.026)	-0.048* (0.026)	-0.041 (0.045)
IMF concessional program	-0.098 (0.109)	-0.043 (0.075)	-0.043 (0.067)	-0.106* (0.059)	-0.107 (0.098)	-0.063 (0.100)	-0.062 (0.093)	-0.106* (0.061)
EAP dummy	-0.103* (0.057)	-0.076 (0.103)	-0.135** (0.058)	-0.130* (0.076)	-0.051 (0.056)	-0.118 (0.125)	-0.106 (0.129)	-0.097 (0.113)
LAC dummy	0.004 (0.016)	0.005 (0.014)	0.005 (0.019)	0.007 (0.016)	0.013 (0.013)	-0.001 (0.013)	0.008 (0.017)	0.009 (0.016)
MENA dummy	0.105 (0.230)	0.118 (0.116)	0.115 (0.118)	0.109 (0.117)	0.108 (0.117)	-0.074 (0.102)	0.105 (0.122)	0.149 (0.206)
SA dummy	-0.042 (0.101)	-0.153* (0.080)	-0.100 (0.153)	0.013 (0.134)	-0.067 (0.099)	-0.094 (0.155)	0.048 (0.090)	0.081 (0.102)
SSA dummy	0.353** (0.156)	0.319* (0.176)	0.226 (0.259)	0.284* (0.162)	0.303* (0.178)	0.286 (0.293)	0.204 (0.235)	0.195 (0.308)
Twin crises	0.093* (0.054)	0.101 (0.119)	0.088 (0.120)	0.092 (0.124)	0.106* (0.058)	0.052 (0.122)	0.104 (0.218)	0.107 (0.171)
Triplet crises	0.009 (0.105)	0.009 (0.094)	0.022 (0.100)	0.000 (0.075)	0.007 (0.069)	0.085 (0.109)	0.103 (0.205)	0.000 (0.056)
Number of observations	262	262	262	262	262	262	262	262
Number of countries	40	40	40	40	40	40	40	40
R-squared	0.731	0.720	0.717	0.720	...	...	...	...
P-value for AR(2) test	...	...	...	...	0.133	0.159	0.245	0.137
P-value for Hansen test	...	...	...	...	0.373	0.358	0.408	0.340

Notes : The dependent variable is the annual growth of the percentage of the population living on \$1.25 a day or less, over each three-year period. Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1-percent, 5-percent, and 10-percent levels, respectively. ERC stands for the IMF exchange rate classification.

TABLE 4 – Financial Crisis, Social Spending, and Changes in Poverty Gap : Sensitivity to Additional Controls

Estimator	Fixed Effects				System GMM			
Dependent variable : Growth of poverty gap	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial poverty gap	-0.140** (0.060)	-0.082* (0.048)	-0.085* (0.048)	-0.184* (0.103)	-0.083* (0.047)	-0.038 (0.039)	-0.106* (0.058)	-0.150** (0.060)
Crisis	0.107* (0.060)	0.072 (0.110)	0.103 (0.107)	0.151** (0.067)	0.094 (0.111)	0.082 (0.129)	0.068 (0.103)	0.139* (0.081)
Crisis×Social		-0.203** (0.086)				-0.201*** (0.059)		
Crisis×Education			-0.353 (0.406)				-0.377* (0.221)	
Crisis×Health				-0.091* (0.050)				-0.041* (0.024)
Crisis×ERC	-0.203* (0.117)	-0.218** (0.100)	-0.147* (0.084)	-0.096 (0.055)	-0.241*** (0.075)	-0.209*** (0.061)	-0.215** (0.097)	-0.178 (0.081)
Crisis×Remittances	-0.083 (0.047)	-0.089 (0.088)	-0.072 (0.087)	-0.105 (0.097)	-0.122* (0.067)	-0.090* (0.048)	-0.101 (0.117)	-0.095 (0.120)
Government balance (lagged)	-0.182 (0.208)	-0.230 (0.247)	-0.171 (0.305)	-0.074 (0.210)	-0.185* (0.105)	-0.144 (0.260)	-0.139 (0.163)	-0.206 (0.246)
FDI (lagged)	-0.083 (0.159)	-0.101 (0.168)	-0.089 (0.104)	-0.138 (0.183)	-0.106 (0.240)	-0.075 (0.204)	-0.120 (0.143)	-0.146 (0.218)
PRSP dummy	-0.146*** (0.041)	-0.145*** (0.039)	-0.105* (0.061)	-0.099 (0.108)	-0.101 (0.120)	-0.094 (0.107)	-0.005 (0.129)	-0.126* (0.073)
IMF concessional program	-0.059* (0.033)	-0.104 (0.129)	-0.089 (0.180)	-0.158* (0.068)	-0.095*** (0.028)	-0.062 (0.084)	-0.103 (0.132)	-0.109 (0.133)
EAP dummy	-0.319* (0.176)	-0.258 (0.290)	-0.185 (0.204)	-0.397* (0.225)	-0.330* (0.190)	-0.206 (0.214)	-0.203 (0.256)	-0.294 (0.304)
LAC dummy	0.116 (0.142)	0.007 (0.105)	-0.004 (0.093)	0.001 (0.048)	0.050 (0.119)	0.103 (0.107)	-0.095 (0.123)	-0.094 (0.115)
MENA dummy	0.147 (0.200)	0.180 (0.203)	0.094 (0.106)	0.120 (0.150)	0.057 (0.102)	-0.099 (0.137)	0.150 (0.159)	0.131 (0.201)
SA dummy	-0.203 (0.215)	-0.195 (0.199)	0.084 (0.160)	-0.120 (0.142)	-0.230* (0.132)	-0.182 (0.236)	0.105 (0.269)	-0.067 (0.140)
SSA dummy	0.144** (0.059)	0.148** (0.067)	0.102 (0.110)	0.093 (0.108)	0.173* (0.098)	0.156* (0.090)	0.083 (0.151)	0.120 (0.144)
Twin crises	0.114* (0.066)	0.081 (0.106)	0.104 (0.103)	0.095 (0.110)	0.103 (0.106)	0.158** (0.069)	0.093* (0.052)	0.083 (0.102)
Triplet crises	0.018 (0.106)	0.017 (0.106)	0.017 (0.105)	0.008 (0.106)	0.015 (0.143)	0.034 (0.085)	0.027 (0.106)	0.015 (0.122)
Number of observations	262	262	262	262	262	262	262	262
Number of countries	40	40	40	40	40	40	40	40
R-squared	0.640	0.640	0.671	0.604	...	...	...	...
P-value for AR(2) test	...	...	...	...	0.133	0.159	0.245	0.137
P-value for Hansen test	...	...	...	...	0.140	0.193	0.216	0.168

Notes : The dependent variable is the annual growth of the poverty gap, over each three-year period. Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1-percent, 5-percent, and 10-percent levels, respectively.

TABLE 5 – List and definition of variables used

Variable	Variable Definition	Source
Poverty Headcount	Percentage of population living on $1.25 a day or less	Povcalnet, World Bank
poverty gap index	Average poverty gap in the population as a proportion of the poverty line, such that the non-poor have zero gaps	Povcalnet, World Bank
Social spending	Public Spending on education and health as a percentage of total government spending	Clements et al. (2011)
Financial crisis dummy	1 for the banking, currency, or sovereign debt crisis inception year and the two following years and 0 otherwise	Laeven
Valencia (2012)		
Economic growth	Growth rate of real GDP	World Development Indicators, World Bank
Private credit	Ratio of domestic credit to private sector to GDP	World Development Indicators, World Bank
Primary schooling	School enrollment, primary (% gross)	World Development Indicators, World Bank
Inflation	Inflation, consumer prices (annual %)	World Development Indicators, World Bank
Trade openness	Ratio of imports plus exports to GDP	World Development Indicators, World Bank
Age dependency	Ratio of population below 15 and above 65 to population between 15 and 65	World Development Indicators, World Bank
Population growth	Average annual growth rate of total population	World Development Indicators, World Bank

TABLE 6 – Summary statistics of the key variables

Variable	Obs.	Mean	Std. Dev.	Minimum	Maximum
H0	369	20.974	21.449	0.07	87.26
Growth of H0	328	-9.476	15.052	-23.41	18.02
H1	369	7.982	9.735	0.01	53.9
Growth of H1	328	-5.623	4.803	-13.81	11.645
Crisis dummy	369	6.89e-02	0.244	0	1
Social spending	360	19.559	10.763	5.224	55.729
Education spending	360	19.559	10.763	5.224	55.729
Health spending	320	19.559	10.763	5.224	55.729
Economic growth	369	3.703	3.105	-6.219	12.666
Primary schooling	369	101.366	15.000	44.733	151.739
Age dependency	369	25.937	40.781	11.783	76.928
Private credit	369	33.762	25.684	0	156.267
Trade openness	369	69.478	37.189	9.314	256.361
Inflation	369	41.055	272.800	-1.840	4435.775
Population growth	369	2.01e-02	8.27e-03	-5.47e-04	6.95e-02

FIGURE 10 – PRSP adoption and poverty, 1981-2008
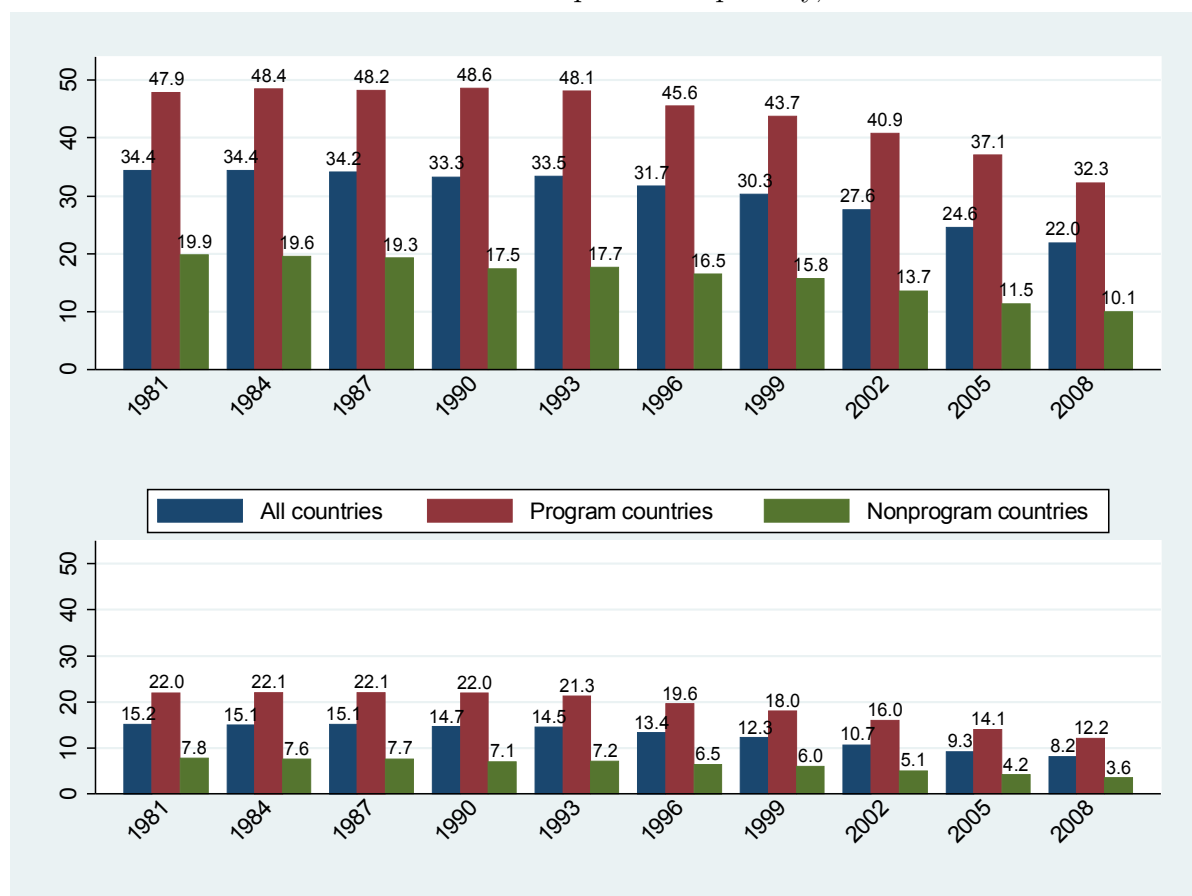
Source : Authors' calculations

TABLE 7 – Results of the Probit Regression to Generate Inverse Mills Ratio

Dependent variable	Crisis
Crisis (lagged)	0.402***
	(0.091)
Economic growth (lagged)	-0.116***
	(0.036)
Growth rate of terms of trade (lagged)	-0.085*
	(0.048)
Real interest rate (lagged)	0.166***
	(0.051)
Growth rate of real private credit (lagged)	0.209***
	(0.049)
Inflation (lagged)	0.043*
	(0.024)
Number of observations	328
Number of countries	41
Pseudo R-squared	0.496

Notes : Standard errors are reported in parentheses. ***, **, and * denote significance at the 1-percent, 5-percent, and 10-percent levels, respectively. Pseudo R-squared denotes unity minus the ratio of the maximized log likelihood to the log likelihood when only a constant term is included.