

# THE IMPACT OF FINANCIAL CRISES ON THE POOR

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**Abstract:** Financial crises have detrimental impacts on the economy via depressed economic growth and rising unemployment, however, their impact on the poorest in society is relatively under-researched. This paper investigates the impact of three different types of financial crises on the income of the poor. Using a variety of estimation techniques and controlling for a lagged dependent variable, the results suggest that currency crises are the most harmful to the poor, followed by banking crises. Debt crises only have a statistically significant effect on the income of the poor in richer countries. © 2017 The Authors *Journal of International Development* Published by John Wiley & Sons Ltd.

**Keywords:** financial development; financial crises; poverty reduction

**JEL Classification:** G01; O15; I3

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## 1 INTRODUCTION

Whilst it is acknowledged that financial crises are harmful to the well-being of a country's citizens, little research has been carried out to quantify these effects. Notably, the effects of financial crises may differ across the income distribution; and this study examines their impact on the poor, who usually have limited resources at their disposal to insulate from such negative shocks.

We investigate episodes of banking, currency and debt crises using a new database from Laeven and Valencia (2013) and measure the well-being of the poor as the income of the lowest quintile in a population. This permits us to study crises in developed, as well as under-developed nations, as financial crises are not just limited to developing countries.

In our specifications, using a System GMM estimator with a lagged dependent variable, we show that currency crises reduce the income of the poor by 14.9%, followed by 10.6% for banking crises. Only in richer countries do we find that debt crises influence the income of the poor. In addition, including a lagged dependent variable in the specification is

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important, as numerous papers that study the effect of average growth on the income of the poor (Dollar & Kraay, 2002; Rewilak, 2013) omit this variable. This may lead to the model being misspecified. Nevertheless, the results confirm that whilst the short run coefficient falls in size, in the long run, increases in average growth may be good for the poor, adding a further valuable contribution to the literature.

Financial crises are associated with periods of macroeconomic instability that disrupt the normal functioning of the economy. Furthermore, during severe economic downturns, as output falls below its natural rate, unemployment increases, and usually the first workers to lose their jobs, are the low skilled poor. The financial crisis of 2007 began with problems in the banking sector, but as public debt increased to bail out financial institutions, debt crises emerged with further negative repercussions for the poor. In Greece, a prolonged period of austerity reduced the state's ability to create adequate safety nets for those in need, further depressing their welfare.

Laeven and Valencia (2013) outline three different types of crises in their paper; however, other types of financial crises exist, such as asset bubbles and inflation crises.<sup>1</sup> We focus on banking, currency and debt crises, all which may have their own independent effects on the poor. However, these different types of crises may occur simultaneously, or one crisis may bring about the onset of another.

Financial development is shown to be poverty reducing, where studies find that financial deepening and increasing financial access to the poor may reduce poverty, (Burgess & Pande, 2005; Beck, Demirgüç-Kunt, & Levine, 2007). Despite these findings, as financial development increases, there is often an unintended consequence occurring simultaneously—financial instability, (Akhter & Daly, 2009; Guillaumont Jeanneney & Kpodar, 2011). Financial instability may be harmful to society as it may disrupt payment systems and harm long term growth. Moreover, it is usually the poor that are more vulnerable to disruptions in the financial system compared to the rich. When the financial system suffers a negative shock, banks begin to hoard liquidity resulting in a credit crunch.<sup>2</sup> This may damage society both in the short and long term. As banks increase their cost of credit to recoup lost interest income (and increase profits), short term borrowing costs may rise, but additionally, current reductions in credit reduce long run investment, harming long run growth. In severe cases, when confidence in the banking sector completely evaporates, bank runs and capital flight may occur that require immediate resolution. These may include strict capital controls and short term bank closures until policy restores confidence in the banking sector.<sup>3</sup> These extreme measures are not only disruptive to the overall functioning of the economy, but may severely harm the poor who may not have access to other assets unlike the rich to help them during such times.

A currency crisis is defined as a substantial devaluation or depreciation in the nominal value of a currency, and this may have severe consequences for the poor. In particular, a weakened currency makes imported goods more expensive. If imported goods have inelastic demand, (food, energy and other necessities) the large surge in inflation may be harmful to the economy. As the poor usually spend a far greater proportion of their overall income on such necessities, they may be hardest hit. In addition, as the poorest in society are often in low paid jobs with little bargaining power, or are on fixed incomes such as

<sup>1</sup>See (Reinhart & Rogoff, 2009) for the various types of crises and their definitions.

<sup>2</sup>With under capitalised banks, low profitability and uncertainty about credit quality, banks may hoard liquidity by restricting lending until market conditions become clearer and the shock passes.

<sup>3</sup>During the Cypriot crisis of 2013, banks were closed for 2 weeks and a monthly cap was put in place on transfers to foreign banks.

pensions, inflation will reduce their purchasing power. In poor countries where the state is a major employer, during a currency crisis, if the state is servicing foreign denominated debt, these effects may be amplified as the government seeks cost saving measures. A further way that the citizens may be harmed by a currency crisis is when the government attempts to defend its currency. By raising domestic interest rates, policymakers may prevent capital outflows; however, this comes at a cost. As interest rates increase to protect the currency, local citizens now face higher repayments on personal debt, which was a common feature during the East Asian crisis in 1997.

Debt crises may be both internal and external, but their effects on domestic citizens, in particular the poor are similar. Repayment of public debt requires either a reduction in government spending or a tax increase or a combination of both. If income tax increases are progressive, they may not be fully felt by the poor, but increases in consumption tax will affect all citizens.<sup>4</sup> The poor may feel this tax increase more than the rich, as their marginal propensity to consume would theoretically be greater than their richer counterparts. The other method that a government has at its disposal to manage a debt crisis is to implement austerity programmes and cut public spending. For example, a government may freeze public sector wages and reduce pro-poor expenditure such as healthcare and education. As affluent members of society may not use such public services (they can afford private health insurance, send their children to fee-paying schools), the consequences of lower public spending is yet another way the poor may be harmed due to debt crises.

Financial crises usually reduce average incomes, and Demetriades, Rousseau and Rewilak (2017) find that banking crises are negatively related with economic growth. If increases in average income growth are associated with like-for-like increases in the income growth of the poor (Dollar & Kraay, 2002), the poor will be harmed with lower incomes during crisis episodes. On the other hand, Baldacci, de Mello and Inchauste (2002) propose that as the poorest in society do not own property, or other tangible assets that may lose a significant amount of their nominal value during a crisis, they may not ultimately feel the burden of financial crises. Nevertheless, the authors do suggest that when formal sector workers lose their jobs due to a crisis, they may enter the informal sector. If those entering the informal sector are better educated, more productive and efficient, then they may drive their poorer competitors out of the market. If this occurs, once again, it is the poorest in society who lose out.

There are several studies that examine the impact of financial crises on the poor's welfare. Gerry, Mickiewicz and Nikoloski (2014) show that currency crises may increase mortality rates, as when the poor suffer negative income shocks associated with crises, combined with increases in food prices, their nutritional levels fall and their health levels deteriorate. Additionally, Habib, Narayan, Olivieri and Sanchez (2010) find that due to the 2007 financial crisis, poverty reduction slowed in the Philippines and actually increased in Mexico. These results compliment Chen and Ravallion (2009) who show that at the aggregate level, the 2007 crisis will add a further 53 million people to the number living below \$1.25 a day globally, and that whilst aggregate poverty rates are still expected to fall over time, they will do so at a slower rate.

This paper adds to the literature by quantifying the effect of three different crises on the income of the poorest quintile. Rather than focusing on just one specific crisis episode, it

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<sup>4</sup>In the United Kingdom, ad valorem tax was increased to 20 per cent in January 2011 as the government looked to boost tax revenues to cut its deficit.

differentiates itself from the literature by focusing on all past banking, currency and debt crises across multiple countries from 1973 to 2011. The rest of this paper is organised as follows: Section 2 introduces the empirical strategy used in this paper, outlining the methods and data. Section 3 presents the results and Section 4 concludes.

## 2 EMPIRICAL STRATEGY

Equation (1) shows the benchmark estimation technique, fixed effects (FE). In Equation (1) and all subsequent equations, (*i*) subscripts for individual countries, (*t*) subscripts for individual years, where ( $\alpha$ ) and ( $\beta$ ) are parameters to be estimated. The term ( $\alpha_i$ ) represents a country specific intercept, and the dependent variable is denoted (*Y*). Our variable of interest (*C*) denotes the different types of financial crises, and matrix (*X*) contains our covariates. The random error term ( $\epsilon$ ) is denoted.

As we anticipate that our explanatory variables will be correlated with the error term, pooled ordinary least squares (OLS) will be biased and inconsistent, and therefore we prefer the fixed effects estimator. Whilst a random effects estimator may account for the panel structure of the data, it too may be inconsistent. A Hausman test may be used to determine the consistency of random effects, but regardless of the result, as we believe our covariates are correlated with the error term, we use the fixed effects estimator.

$$Y_{i,t} = \alpha_i + \beta_1 C_{i,t} + \beta_2 X_{i,t} + \epsilon_{i,t} \quad (1)$$

In Equation (1), we assume our variable of interest (*C*) to be exogenous for the following reasons. First, financial crises occur in both developed and developing countries, therefore income or poverty should have no influence on whether a crisis will occur or not.<sup>5</sup> Likewise, financial crises occur in both equal and unequal societies, thus we argue that simultaneity bias is not an issue. Second, we treat financial crises as exogenous because they are unpredictable. If crises were predictable, then both national governments and multilateral agencies would do their utmost to prevent them from occurring. Hence, we can treat crises as a random shock.

In Equation (2), a lagged dependent variable is introduced to the empirical specification. As the dependent variable, the income of the poor, is partly determined by inequality which changes slowly through time, we believe previous values of the dependent variable may be strong predictors of its current value. Leaving this unaddressed may bias the estimates, but using a fixed effects estimator with a lagged dependent variable may introduce a different type of bias into the estimates (Nickell, 1981), which only disappears as (*T*) tends to infinity. However, the System GMM estimator proposed by (Blundell & Bond, 1998) overcomes this problem. This estimator may also alleviate any remaining endogeneity concerns by using instrumental variables. In addition, this estimator still controls for country specific effects, but also permits the estimation of time invariant variables, something the fixed effects estimator cannot do.

<sup>5</sup>Banking crises have occurred in developing countries such as Venezuela in 1994 and similarly the global financial crisis in 2007 hit a plethora of developed nations. Currency crises have hit developing countries/emerging markets such East Asia 1997 and also developed nations, for example, Italy 1993. Finally, developing nations such as Mexico in 1993 have had debt crises and recently developed nations such as the PIIGS (Portugal, Ireland, Iceland, Greece and Spain) have found themselves on the cusp of debt crises.

Table 1. Summary statistics

Variable	Mean	Standard deviation	Minimum	Maximum
Income of the poor	11.10	1.14	7.94	13.44
GDP per capita	9.35	0.86	7.26	11.42
Private credit	3.64	0.89	-1.68	5.74
Trade openness	91.35	44.11	15.64	348.39
Government spending	16.46	4.60	5.63	28.06
Inflation rate	-3.01	1.14	-11.99	1.41
Bank crisis	0.19	0.40	0.00	1.00
Currency crisis	0.03	0.16	0.00	1.00
Debt crisis	0.02	0.12	0.00	1.00

The following variables are entered as their natural logarithms as presented previously; income of the poor, GDP per capita, and private credit. The inflation rate is first transformed so all values are positive and then logged. Trade openness and government spending are ratios to GDP and the crises variables are all dummy variables taking a value equal to 1 if a crisis occurred and 0 otherwise.

$$Y_{i,t} = \alpha_i + \gamma Y_{i,t-1} + \beta_1 C_{i,t} + \beta_2 X_{i,t} + \epsilon_{i,t} \quad (2)$$

$$\Delta Y_{i,t} = \gamma \Delta Y_{i,t-1} + \beta_1 \Delta C_{i,t} + \beta_2 \Delta X_{i,t} + \Delta \epsilon_{i,t} \quad (3)$$

The System GMM estimator is shown in Equations (2) and (3). This estimator tests the relationship between financial crises and the income of the poor as a system; and for it to be valid, it requires that several diagnostic tests are satisfied. First, the estimator is designed for a large number of cross sections and a smaller time dimension. In this paper, the number of cross sections is 61 and the average number of time periods equals 9 satisfying both conditions. The estimator requires the presence of first order serial correlation; however, it requires no second order serial correlation. In addition, the estimator uses internal instruments to identify the parameters. In the level equation, the internal instruments used are lagged differences of the endogenous variables and in the differenced equation; the lagged levels are used as instruments. The System GMM estimator also allows for external instruments to be used in the specification, in addition to any internal instruments. In a recent paper examining financial crises and mortality, Gerry *et al.* (2014) include regional dummies as external instruments and this paper follows this approach. The validity of the instruments may be tested using the Hansen test, where a non-rejection of the null hypothesis indicates instrument validity. A further aspect of this estimator is that it has a bias versus efficiency trade off. Whilst more instruments increase the efficiency of the estimator, a large instrument count can overfit the endogenous variables and bias the results. As there is no ideal instrument count, the literature recommends that the number of instruments do not exceed the total number of cross sections.<sup>6</sup>

We empirically address our research question using annual data for 61 countries from 1973 to 2011. The summary statistics are presented in Table 1. Our crisis data comes from Laeven and Valencia (2013), and a value of one is assigned if a crisis has occurred in a country in a given year and zero otherwise. The authors categorise crises into three distinctive types: banking crises, currency crises and debt crises. The remaining variables used in this study are available from the World Development Indicators website via the

<sup>6</sup>For further information regarding this estimator, we direct the reader to Baltagi (2008).

World Bank. We select our control variables following Gerry *et al.* (2014) and these variables are standard in the literature, appearing in many growth, poverty and other macroeconomic studies.

We control for GDP per capita and in its level form, the variable is highly skewed. As a result, we take its natural logarithm which creates a more normal distribution. Moreover, this allows us to compare our results with Dollar and Kraay (2002) who also apply a logarithmic transform to this variable. Dollar and Kraay (2002) find that the coefficient on this variable is equal to one, suggesting that any increase in average income is associated with an analogous increase in the income of the poor. Furthermore, we control for financial sector size using the natural logarithm of private credit. We include it in the specification as numerous studies show that providing finance to the poor may indeed reduce poverty, (Akhter & Daly, 2009; Ang, 2010). Trade openness is measured as the sum of exports and imports divided by GDP and government spending is measured using final government expenditure divided by GDP. The expected sign on government spending is ambiguous. Whilst pro-poor government spending may be beneficial for poverty reduction, and redistribution programmes may reduce inequality, excess government consumption has found to reduce economic growth in a plethora of studies. Moreover, if government spending is not pro-poor, with high amounts attached to national defence, or spending on gentrification aimed at the middle and upper classes, then this variable could enter the specifications negatively. To generate the inflation variable we trim the data at the 1st and 99th percentile to remove influential observations. We then add one to the variable so all values are strictly positive and take its natural logarithm. We expect the inflation rate to enter the specifications negatively, as the poor are usually on fixed incomes and do not have access to financial instruments that overcome the negative effects of inflation. As a result, the poor's purchasing power would fall as would their real income. In extreme cases, the poor may spend their time on cash management, as opposed to focusing on productive activity that may help them generate income.

### 3 RESULTS

Tables 2–4 present the benchmark findings. Each table examines the effect of a different type of crisis on the income of the poor. Columns 1–3 present the fixed effects estimates, whereas columns 4–6 introduce a lagged dependent variable into the specification and are estimated using System GMM. The diagnostics of the System GMM estimates are presented at the bottom of each table where *p*-values are reported for the AR(1) and AR(2) test of serial correlation and for the Hansen test of instrument validity.

Table 2 presents the results for banking crises where column 1 estimates a bivariate regression, column 2 adds the covariates GDP per capita and private credit and column 3 adds the remaining control variables. In the bivariate regression, the banking crisis variable is insignificant, but in the following two regressions, it enters with a negative and significant sign. In columns 2 and 3, the only additional covariate that is significant is GDP per capita. The results suggest that a 1% increase in average income transcends into a 1.15–1.19% increase in the income of the poor.

Columns 4–6 replicate the results from the previous three columns in Table 2. In the bivariate regression, banking crises enter with a negative and significant sign, a result that holds in the latter two columns. In the final and preferred specification, the results suggest

Table 2. Effect of banking crises on the income of the poor

	(1)	(2)	(3)	(4)	(5)	(6)
Crisis dummy	0.016 (0.22)	-0.031 <sup>a</sup> (-1.77)	-0.032 <sup>a</sup> (-1.79)	-0.055 <sup>c</sup> (-3.18)	-0.159 <sup>c</sup> (-2.99)	-0.106 <sup>c</sup> (-3.63)
(Ln) GDP per capita		1.154 <sup>c</sup> (16.05)	1.190 <sup>c</sup> (14.82)		0.368 <sup>a</sup> (1.80)	0.134 <sup>c</sup> (3.84)
(Ln) Private credit		-0.048 (-1.35)	-0.044 (-1.18)		-0.155 (-1.63)	-0.080 <sup>c</sup> (-3.05)
Trade openness			-0.001 (-1.01)			0.001 <sup>b</sup> (2.52)
Government spending			-0.003 (-0.63)			-0.017 <sup>c</sup> (-3.68)
(Ln) Inflation			0.018 (1.53)			0.001 (0.10)
(Ln) Lag income of poor				0.991 <sup>c</sup> (173.71)	0.903 <sup>c</sup> (7.37)	0.996 <sup>c</sup> (40.06)
Number of instruments				19	29	54
AR(1) <i>p</i> -value				0.00	0.00	0.00
AR(2) <i>p</i> -value				0.25	0.16	0.13
Hansen <i>p</i> -value				0.12	0.30	0.21
Cross sections	61	61	61	61	61	61
Observations	514	514	514	514	514	514
Technique	FE	FE	FE	SYS-GMM	SYS-GMM	SYS-GMM

Each column represents a different regression and all models estimated using robust standard errors. T-statistics are reported in parentheses.

<sup>a</sup>denotes the 10% statistical significance level

<sup>b</sup>denotes the 5% statistical significance level

<sup>c</sup>denotes the 1% statistical significance level

AR(1) is the test for first order serial correlation and AR(2) is the test for second order serial correlation. The Hansen test examines the validity of the instruments, where a non-rejection indicates valid instruments. We use regional dummy variables as instruments in addition to internal instruments for regressions in columns 4–6.



Table 3. Effect of currency crises on the income of the poor

	(1)	(2)	(3)	(4)	(5)	(6)
Crisis dummy	-0.332 <sup>c</sup> (-4.38)	-0.058 <sup>a</sup> (-1.87)	-0.058 <sup>a</sup> (-1.72)	-0.137 <sup>b</sup> (-2.30)	-0.088 <sup>a</sup> (-1.84)	-0.149 <sup>c</sup> (-3.17)
(Ln) GDP per capita		1.110 <sup>c</sup> (19.36)	1.185 <sup>c</sup> (14.47)		0.280 <sup>b</sup> (2.22)	0.126 <sup>b</sup> (2.37)
Trade openness		-0.001 (-0.93)	-0.002 (-1.08)		0.003 <sup>c</sup> (4.98)	0.001 (1.62)
(Ln) Private credit			-0.045 (-1.20)			-0.091 <sup>c</sup> (-2.93)
Government spending			-0.004 (-0.83)			-0.017 <sup>c</sup> (-3.65)
(Ln) Inflation			0.019 (1.52)			0.007 (0.78)
(Ln) Lag income of poor				0.982 <sup>c</sup> (205.33)	0.590 <sup>c</sup> (5.34)	0.994 <sup>c</sup> (25.08)
Number of instruments				19	29	54
AR(1) <i>p</i> -value				0.00	0.00	0.00
AR(2) <i>p</i> -value				0.25	0.12	0.16
Hansen <i>p</i> -value				0.10	0.55	0.24
Cross sections	61	61	61	61	61	61
Observations	514	514	514	514	514	514
Technique	FE	FE	FE	SYS-GMM	SYS-GMM	SYS-GMM

Each column represents a different regression and all models estimated using robust standard errors. T-statistics are reported in parentheses.

<sup>a</sup>denotes the 10% statistical significance level

<sup>b</sup>denotes the 5% statistical significance level

<sup>c</sup>denotes the 1% statistical significance level

AR(1) is the test for first order serial correlation and AR(2) is the test for second order serial correlation. The Hansen test examines the validity of the instruments, where a non-rejection indicates valid instruments. We use regional dummy variables as instruments in addition to internal instruments for regressions in columns 4–6.



Table 4. Effect of debt crises on the income of the poor

	(1)	(2)	(3)	(4)	(5)	(6)
Crisis dummy	-0.243 <sup>b</sup> (-2.53)	-0.039 (-1.07)	-0.019 (-0.49)	-0.099 (-0.90)	-0.080 (-1.05)	-0.097 (-1.24)
(Ln) GDP per capita		1.099 <sup>c</sup> (19.01)	1.191 <sup>c</sup> (14.42)		0.233 (1.20)	0.128 <sup>c</sup> (2.97)
Government spending		-0.005 (-0.87)	-0.004 (-0.75)		-0.027 <sup>c</sup> (-2.73)	-0.018 <sup>c</sup> (-5.13)
(Ln) Private credit			-0.048 (-1.26)			-0.088 <sup>c</sup> (-3.66)
Trade openness			-0.001 (-1.01)			0.001 <sup>c</sup> (2.82)
(Ln) Inflation			0.017 (1.44)			0.001 (0.06)
(Ln) Lag income of poor				0.983 <sup>c</sup> (196.91)	0.757 <sup>c</sup> (3.92)	0.988 <sup>c</sup> (31.36)
Number of instruments				19	29	54
AR(1) <i>p</i> -value				0.00	0.01	0.00
AR(2) <i>p</i> -value				0.25	0.13	0.15
Hansen <i>p</i> -value				0.11	0.37	0.28
Cross sections	61	61	61	61	61	61
Observations	514	514	514	514	514	514
Technique	FE	FE	FE	SYS-GMM	SYS-GMM	SYS-GMM

Each column represents a different regression and all models estimated using robust standard errors. T-statistics are reported in parentheses.

<sup>a</sup>denotes the 10% statistical significance level

<sup>b</sup>denotes the 5% statistical significance level

<sup>c</sup>denotes the 1% statistical significance level

AR(1) is the test for first order serial correlation and AR(2) is the test for second order serial correlation. The Hansen test examines the validity of the instruments, where a non-rejection indicates valid instruments. We use regional dummy variables as instruments in addition to internal instruments for regressions in columns 4–6.

that a banking crisis may reduce the income of the poor by 10.6%.<sup>7</sup> When introducing a lagged dependent variable into the specification, the short run elasticity of average income falls to 0.37% in column 5 and 0.13% in column 6. Private credit, whilst insignificant in column 5 is negative and significant in the final column, whilst trade openness and government spending are statistically significant in column 6. The diagnostics are well satisfied in columns 4–6, where in all three regressions, there is evidence of first order serial correlation and the null hypothesis of second order serial correlation is rejected ( $p$ -values range from 0.13–0.25). The  $p$ -value of the Hansen test exceeds the traditional level in all three regressions indicating that the instruments appear to be valid. Furthermore, the number of instruments does not exceed the number of cross sections as proposed by Baltagi (2008).

Table 3 presents the results when the variable of interest is a currency crisis. In the bivariate regression, the currency crisis dummy is negative and significant as anticipated and this result holds across columns 2 and 3. Similar to Table 2, the only covariate in columns 2 and 3 that enters significantly is average income with an elasticity ranging from 1.10–1.19.

In columns 4–6, the currency crisis dummy is negative and significant, and the results suggest that a currency crisis may reduce the income of the poor between 9% and 15%, where the highest magnitude is in column 6. In column 5, both controls average income and trade openness are positive and significant, as is the lagged dependent variable. However, once including the remaining covariates in the final column, trade openness becomes insignificant. The diagnostics for the models in the final three columns of Table 3 are well satisfied as there is no presence of second order serial correlation and the Hansen test shows the instruments appear to be valid. The instrument set is the same as in Table 2 and does not exceed the number of cross sections.

Table 4 examines the impact of debt crises on the income of the poor. The bivariate regression in column 1 suggests that a debt crisis may reduce the poor's income by 24%. However, once average income and government spending enter the regression, the coefficient becomes insignificant. In column 3, when a full set of controls are used, the only variable that is significant is average income. The results suggest that a 1% in average incomes may increase the income of the poor by 1.19%, similar to the corresponding regressions in Tables 2 and 3.

Columns 4–6 present the results using the System GMM estimator. As in the previous Tables, the lagged dependent variable is positive and highly significant across all three columns. Whilst entering with its expected negative sign, the debt crisis variable is statistically insignificant in columns 4–6. In the preferred regression in column 6, the results suggest that increases in average income are good for the poor. In particular, a 1% increase in average income is associated with a 0.13% increase in the income of the poor when examining the short run marginal effect. The Hansen test shows that the instruments appear to be valid in all three specifications, with  $p$ -values ranging from 0.11–0.37. In all three columns, the diagnostics show that there is no presence of second order serial correlation. Furthermore, the number of cross sections exceeds the instrument count as recommended in the literature.

Table 5 presents the first set of robustness tests. Until now, each crisis was entered on its own in the regressions; however, the different types of financial crises studied in this

<sup>7</sup>Column 6 is the preferred specification because it contains a full set of controls, including the lagged dependent variable, which is shown to be very important based on its high statistical significance.

Table 5. Effect of all three crises on the income of the poor

	(1)	(2)	(3)
Banking crisis dummy	-0.040 <sup>b</sup> (-2.14)	-0.091 <sup>c</sup> (-2.86)	-0.100 <sup>c</sup> (-3.87)
Currency crisis dummy	-0.093 <sup>a</sup> (-1.87)	-0.139 <sup>b</sup> (-2.35)	-0.140 <sup>c</sup> (-2.84)
Debt crisis dummy	-0.048 (-0.56)	0.012 (0.19)	0.025 (0.37)
(Ln) GDP per capita		0.130 <sup>c</sup> (4.51)	0.136 <sup>c</sup> (4.44)
(Ln) Private credit		-0.070 <sup>c</sup> (-3.18)	-0.070 <sup>c</sup> (-3.05)
Trade openness		0.001 (1.62)	0.001 <sup>b</sup> (2.56)
Government spending		-0.014 <sup>c</sup> (-3.64)	-0.015 <sup>c</sup> (-3.67)
(Ln) Inflation		0.009 (0.91)	0.014 (1.45)
(Ln) Lag income of poor	0.990 <sup>c</sup> (193.99)	0.987 <sup>c</sup> (48.70)	0.989 <sup>c</sup> (44.99)
Number of instruments	33	68	59
AR(1) <i>p</i> -value	0.00	0.00	0.00
AR(2) <i>p</i> -value	0.20	0.13	0.12
Hansen <i>p</i> -value	0.18	0.66	0.37
Cross sections	61	61	61
Observations	514	514	514
Technique	SYS-GMM	SYS-GMM	SYS-GMM

Each column represents a different regression and all models estimated using robust standard errors. T-statistics are reported in parentheses.

<sup>a</sup>denotes the 10% statistical significance level

<sup>b</sup>denotes the 5% statistical significance level

<sup>c</sup>denotes the 1% statistical significance level

AR(1) is the test for first order serial correlation and AR(2) is the test for second order serial correlation. The Hansen test examines the validity of the instruments, where a non-rejection indicates valid instruments. We use regional dummy variables as instruments in addition to internal instruments for all the regressions.

paper may occur simultaneously. Table 5 contains three columns. In column 1, only the three different types of crises are entered into the regression along with the lagged dependent variable. Column 2 then adds the remaining covariates into the regression specification. Finally, column 3 re-estimates the regression in column 2 using a smaller instrument set.

In column 1, it is evident that both banking and currency crises are negative and significant, whereas debt crises, although negative in sign, are insignificantly related to the income of the poor. Examining the results from column 2, only trade openness, debt crises and the inflation rate are insignificant, where both banking and currency crises retain their negative signs. However, by including an extra two variables in the specification, the number of instruments exceeds the number of cross sections. According to Baltagi (2008) having the number of instruments exceed, the number of cross sections may overfit the endogenous regressors and bias the results. Therefore in column 3, the number of instruments is reduced and the regression in column 2 is re-estimated. The results show that the coefficients in column 3 are very similar to those in column 2 providing confidence in the results. In column 3, the results suggest that banking crises may reduce the income of the poor by approximately 10% and currency crises reduce the income of the poor by 14%. The coefficients are similar in size to those in the previous tables, and it can be confidently stated, that the impact of financial crises on the income of the poor was not over-estimated in the previous tables.

Table 6 examines whether the effects of financial crises differ depending on the level of financial development, trade openness or government expenditure. Therefore, Table 6 includes interaction terms between the different types of crises and these variables.

Table 6. Financial crises and the income of the poor: Interaction terms

	(1)	(2)	(3)
Crisis dummy	-0.158 <sup>c</sup> (-2.95)	-0.148 <sup>c</sup> (-2.60)	-0.097 (-1.20)
Crisis × private credit	0.054 (1.32)		
Crisis × trade openness		0.005 (0.89)	
Crisis × government spending			-0.002 (-0.13)
(Ln) GDP per capita	0.136 <sup>c</sup> (3.53)	0.137 <sup>c</sup> (3.96)	0.126 <sup>c</sup> (3.30)
(Ln) Private credit	-0.082 <sup>c</sup> (-3.47)	-0.093 <sup>c</sup> (-3.58)	-0.088 <sup>c</sup> (-3.63)
Trade openness	0.001 <sup>b</sup> (2.30)	0.001 <sup>c</sup> (3.00)	0.001 <sup>c</sup> (3.18)
Government spending	-0.016 <sup>c</sup> (-4.24)	-0.017 <sup>c</sup> (-4.89)	-0.018 <sup>c</sup> (-4.90)
(Ln) Inflation	0.005 (0.49)	0.003 (0.31)	0.000 (0.04)
(Ln) Lag income of poor	0.986 <sup>c</sup> (34.37)	0.984 <sup>c</sup> (48.36)	0.990 <sup>c</sup> (36.45)
Number of instruments	54	54	54
AR(1) <i>p</i> -value	0.00	0.00	0.00
AR(2) <i>p</i> -value	0.17	0.16	0.16
Hansen <i>p</i> -value	0.25	0.21	0.19
Cross sections	61	61	61
Observations	514	514	514
Technique	SYS-GMM	SYS-GMM	SYS-GMM

Each column represents a different regression and all models estimated using robust standard errors. Columns 1 reports results for banking crises, column 2 for currency crises and columns 3 for debt crises. T-statistics are reported in parentheses.

<sup>a</sup>denotes the 10% statistical significance level

<sup>b</sup>denotes the 5% statistical significance level

<sup>c</sup>denotes the 1% statistical significance level

AR(1) is the test for first order serial correlation and AR(2) is the test for second order serial correlation. The Hansen test examines the validity of the instruments, where a non-rejection indicates valid instruments. We use regional dummy variables as instruments in addition to internal instruments for all the regressions.

In column 1, the banking crisis dummy is interacted with private credit, as banking crises may potentially harm the poor more in underdeveloped banking systems compared to well-developed banking sectors. This is because well-developed banking sectors usually have greater provisions in place that may safeguard customer deposits, or even be better equipped to keep lending through turbulent times. The results show that whilst the crisis dummy retains its negative sign and statistical significance, the interaction term between banking crises and credit is insignificant. Nevertheless, the interaction term is positive, which implies that larger financial sectors may reduce the negative impact of a banking crisis on the income of the poor. All the remaining covariates are statistically significant, with signs consistent from the previous estimations, with the exception of the inflation rate.

In column 2, the currency crisis dummy is interacted with trade openness, as the impact of a crisis on the income of the poor, may depend on the openness of an economy. As in column 1, the crisis dummy is negative and significant with a magnitude similar to previous estimates, although the interaction term is positive and insignificant. The positive coefficient on the interaction term suggests that similar to banking crises, the more open an economy is, the less damaging a currency crisis may be to the income of the poor. A crisis that devalues the currency may be a blessing if it makes a country more competitive internationally. In export-oriented labour intensive industries, following a depreciation in the currency, product demand may increase. The knock on effect here may increase employment or wages in this sector. As it is usually the poor who work in such sectors, then they may actually benefit from a currency devaluation. The control variables in column 2 are very similar to those in column 1, where only the inflation rate enters insignificantly.

The final column of Table 6 interacts debt crises with government spending. The impact of a debt crisis on the poor may be greater in countries with higher government spending as opposed to countries with lower spending. For example, if government expenditure is close to zero, then further reductions in spending due to a crisis would be negligible and may not impact society compared with larger reductions in government spending. The results suggest that the coefficient on debt crises is negative and insignificant, as is the interaction term. Furthermore, the remaining covariates are consistent with the previous two regressions. The diagnostics in Table 6 are all well satisfied with Hansen *p*-values all exceeding 0.19. There is no presence of second order serial correlation with AR(2) *p*-values between 0.16–0.17 and in all three specifications the number of cross sections exceeds the instrument count.

Table 7 examines whether the effects of financial crises on the income of the poor is homogeneous across the large number of countries. As the System GMM estimator requires that the number of cross sections is large, splitting the sample into multiple income groups or geographic regions would violate this assumption. As a result, the sample was split to investigate the effects of the three types of financial crises on the poorest 30 countries in the sample and richest 31 countries in the sample. Columns 1 and 2 present the results for banking crises, columns 3 and 4 for currency crises and the final two columns examine the effects of debt crises.

Columns 1 and 2 show that banking crises are harmful to the poor's income, both in poorer and richer countries in the sample. The magnitude for poorer countries is approximately 9%, whereas for richer countries it is close to 13%. This is an interesting finding as it may capture the fact that in some of the poorest nations in the world, many citizens do not have access to formal financial services. Therefore, if a banking crisis occurs, the poor who are excluded from finance may not face as serious consequences as those who are included in the financial system, possibly explaining the difference in the magnitude of the coefficients.

In the middle two columns, the results are very similar to columns 1 and 2 where a currency crisis will reduce the income of the poor in both poorer and richer countries. However, the impact on poorer countries is lower than that of richer countries, an interesting finding which may potentially be explained for the following reasons. First, as it is usually richer countries who engage in international capital markets, and as currency devaluations increase foreign denominated debt, only participants in such markets will be harmed via this channel. Additionally, imported inflation, another consequence of currency devaluations, may be better overcome by low income households in poorer countries compared with low income households in richer countries. In developing economies, with a greater reliance on agriculture and the experience to trade using a barter economy, the poor may be able to avoid dealing with cash whose value is frequently changing and falling. On the other hand, in OECD nations, due to the industrialised nature of their economies, the poor may not have such options readily available to them, as most of the individuals in the lowest income quintile would be working in secondary or tertiary sectors and would be paid in cash, rather than in goods and services.

Finally, columns 5 and 6 show the impact of debt crises on the income of the poor is negative and significant only in the richer sub-sample of countries. In previous estimates debt crises were always insignificant, thus, splitting the sample unearths a further important finding. However, as richer economies may be in a better position to target the poor with the governmental expenditure, this result is not overly surprising.

Table 7. Financial crises and the income of the poor: Splitting the sample

	(1) Low income		(2) High income		(3) Low income		(4) High income		(5) Low income		(6) High income	
Crisis dummy	-0.094 <sup>b</sup>	(-2.53)	-0.129 <sup>c</sup>	(-3.83)	-0.137 <sup>a</sup>	(-1.92)	-0.195 <sup>c</sup>	(-2.64)	-0.064	(-0.58)	-0.171 <sup>c</sup>	(-3.20)
(Ln) GDP per capita	0.117 <sup>a</sup>	(1.90)	0.084 <sup>c</sup>	(2.86)	0.106 <sup>b</sup>	(2.10)	0.084 <sup>c</sup>	(3.10)	0.121 <sup>b</sup>	(2.11)	0.069 <sup>c</sup>	(3.03)
(Ln) Private credit	-0.061 <sup>b</sup>	(-2.55)	0.011	(0.75)	-0.059 <sup>c</sup>	(-3.10)	-0.021	(-1.19)	-0.067 <sup>b</sup>	(-2.29)	-0.014	(-1.37)
Trade openness	0.000	(0.28)	0.000	(1.62)	0.000	(0.39)	0.000 <sup>a</sup>	(1.84)	0.000	(0.51)	0.000 <sup>c</sup>	(2.69)
Government spending	-0.004	(-1.05)	-0.004	(-1.01)	-0.004	(-0.93)	-0.004 <sup>a</sup>	(-1.80)	-0.003	(-0.69)	-0.004	(-1.29)
(Ln) Inflation	0.009	(1.23)	0.014 <sup>b</sup>	(2.53)	0.012	(1.45)	0.003	(0.39)	0.005	(0.67)	0.005	(0.67)
(Ln) Lag income of poor	0.970 <sup>c</sup>	(25.97)	0.954 <sup>c</sup>	(59.84)	0.965 <sup>c</sup>	(27.43)	0.937 <sup>c</sup>	(49.45)	0.954 <sup>c</sup>	(25.89)	0.945 <sup>c</sup>	(63.71)
Number of instruments	29		30		29		30		29		30	
AR(1) <i>p</i> -value	0.00		0.06		0.00		0.10		0.00		0.08	
AR(2) <i>p</i> -value	0.39		0.20		0.44		0.23		0.41		0.28	
Hansen <i>p</i> -value	0.20		0.24		0.21		0.18		0.16		0.29	
Cross sections	30		31		30		31		30		31	
Observations	290		224		290		224		290		224	
Technique	SYS-GMM		SYS-GMM		SYS-GMM		SYS-GMM		SYS-GMM		SYS-GMM	

Each column represents a different regression and all models estimated using robust standard errors. Columns 1 and 2 report results for banking crises, columns 3 and 4 for currency crises and columns 5 and 6 for debt crises. T-statistics are reported in parentheses.

<sup>a</sup>denotes the 10% statistical significance level

<sup>b</sup>denotes the 5% statistical significance level

<sup>c</sup>denotes the 1% statistical significance level

AR(1) is the test for first order serial correlation and AR(2) is the test for second order serial correlation. The Hansen test examines the validity of the instruments, where a non-rejection indicates valid instruments. In this Table, only financial crises, average income and the lagged dependent are treated as endogenous to ensure the instrument count does not exceed the number of cross sections. In addition to the internal instruments, regional dummies are included as additional instruments in all the regressions.

The diagnostics are generally satisfied in Table 7. However, because the sample was split and the number of cross sections reduced, in order to avoid overfitting the endogenous regressors, the instrument set had to be reduced. This was performed by treating only average income, the financial crises and the lagged dependent variable as endogenous. Therefore, it is important to treat the findings in Table 7 with caution.

Overall, the results show that different types of crises may have different impacts on the income of the poor. In the preferred specifications, both bank and currency crises negatively influence the income of the poor, but debt crises only have a negative and significant effect for the richest countries in the sample. Examining the covariates, private credit is found to be harmful in raising the income of the poor. This is somewhat surprising as finance has been shown to be beneficial in poverty reduction. However, studies show that there are certain conditions for finance to be pro-growth and pro-poor. Rewilak (2013) shows that whilst increasing financial sector development may reduce poverty in certain worldwide regions, in others it may detrimental. Rioja and Valev (2004) show that finance is most beneficial for growth in middle income countries, a result that may extend to poverty reduction, potentially explaining this finding.<sup>8</sup> This finding is well demonstrated in Table 7 as finance is only negative and significant in the subsample of poorer countries. Government spending also enters negatively in the specifications but this is not overly surprising. Increases in government spending such as redistribution programmes may increase the incomes of the poor, but if this spending fails to reach the target population, or if the government engages in wasteful expenditure, for example beautifying government buildings, it may be harmful to the income of the poor if their taxes are paying for such projects.

#### 4 CONCLUSION

This study investigates whether financial crises have a negative impact on the income of the lowest quintile. This permits us to examine the role of financial crises on the poor in both developed and developing countries. Three different types of crises are examined in this analysis, which include banking, currency and debt crises.

The results show that a banking crisis may harm the income of the poor by 10.6%. When the banking system comes under distress, methods of payment may shut down. If the poor are relying on financial institutions for remitted payments, they may suffer from temporary income shortfalls, or may have to use more expensive methods to receive their funds, which in turn will reduce the total payment received. Bank closures may result in a shortage of liquidity and as a method to cope, the poor may sell off their non-monetary assets, possibly at a discount, jeopardising their wealth. Finally, if a financial institution becomes insolvent and is not backed by a government guarantee, depositors may lose their money.

Currency crises are found to have the most detrimental impact on the poor, where a currency crisis may reduce the income of the lowest quintile by 14.9%. Whilst, a currency depreciation may result in higher remitted payments in local currency from abroad, the negative consequences of a depreciation may more than offset this benefit. Imported inflation will make the cost of living more expensive, especially if imported goods have

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<sup>8</sup>Further evidence, by Nikoloski (2013), shows that a financial Kuznets curve may exist, where increasing financial sector development may initially lead to higher rates of inequality before eventually falling.



a low elasticity of demand. Even if the poor consume local goods, if intermediate goods are imported, then producers may pass these costs onto the consumer and local prices will still rise. If a country has been fighting devaluation, interest rate increases to defend the currency may hurt the poor if they have obtained credit, as the poor will face higher loan repayments. Moreover, with higher interest rates, even if the poor are not borrowers, they may be subject to higher rental fees as landowners look to pass on their higher costs.

Debt crises are only shown to have a statistically significant effect on the income of the poor in richer countries. Whilst debt crisis may result in higher taxes and lower social spending, these effects may not be wholly felt by the poor in less affluent countries. If the poor do not work in the formal sector, they will not be subject to income tax and are unaffected by tax increases as a government seeks to generate revenue. Indeed, if the tax system is progressive and the tax increases are felt at the higher end of the income distribution, once more the poor may be unaffected. A government reducing social spending may be harmful to the poor; however, this depends on how well a government targets its spending. If a government is incorrectly targeting the poor, then they should feel no effects to cuts in spending. Moreover, spending cuts may end up harming the middle classes (those higher up in the income distribution), a question I leave unaddressed for future research.

In this study, we uncover a further valuable contribution to the academic literature. By including a lagged dependent variable in the specifications, we still find evidence that growth may be good for the poor. Nevertheless, as financial crises depress economic growth, they may have additional consequences on the poor, and to what extent requires further research, which may stimulate future policy debate.

## ACKNOWLEDGEMENTS

I would like to extend my thanks to delegates at the 49th MMF conference, the Journal of International Development including the editorial team, in addition to two anonymous referees. Their comments and suggestions have led to substantial improvements to this paper.

Johan Rewilak acknowledges support of ESRC-DFID grant number ES/J009067/1.

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