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Cross Country Evidence on the Linkages between Financial Development and Poverty

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Abstract

This paper presents empirical evidence of a direct relationship between financial development and poverty. The empirical modeling employs an efficient panel data estimation technique called fixed effect vector decomposition (FEVD) which is applied to a poverty determination model designed to explain poverty in term of financial development and financial instability. This technique can efficiently estimate time-invariant and rarely changing variable which traditional panel data models cannot. Using panel data the study finds that on average financial development is conducive for poverty reduction but the instability accompanying financial development is detrimental to the poor. This result holds for both measures of financial development namely the ratio of money to GDP (M3-GDP) and the ratio credit to GDP.

Keywords: Finance-poverty nexus, Fixed effect vector decomposition, Financial development, Poverty determination

1. Current Research on the Linkages between Financial Development and Poverty

In this study we employ a fixed effect (FE) model to predict the impacts of both the level and the instability of financial development on poverty (Note 1). We chose FE model to allow for the fact that unobserved country specific factors not only affect the poverty rate but also are correlated with our explanatory variables namely level of financial development and financial instability. Pure time series or cross-sectional models provides inconsistent and biased parameter estimates in presence of such correlation. FE models consider the unobserved factors affecting the dependent variable as consisting of two types: those that do not change over time but vary across units, and those that vary both over time and units. FE models remove the time invariant effects by applying some simple transformation (e.g. differencing or demeaning) to the data, and then apply OLS to the transformed data in order to minimize the effect of time varying omitted variables. Briefly this is how FE models handle the potentially large number of unobserved explanatory variables (Note 2).

However, this apparent superiority of FE models over pure time-series or cross-sectional ones in handling unobserved heterogeneity does not come free of cost. A widely recognized limitation of FE models is their inability in estimating time-invariant variables (see for instance Baltagi 2001, Wooldridge 2002, and Hsiao 2003). Since the FE models use only the within variance for the estimation and disregards the between variance, they do not allow the estimation of time-invariant variables. A second and by far the less recognized drawback of the FE models results from their inefficiency in estimating the effect of variables that have very little within variance. An inefficient estimation is not only a nuisance leading to somewhat higher standard errors (SEs) but also leads to highly unreliable point estimates and may thus cause wrong inferences in the same way a biased estimator could. Therefore, the inefficiency of the FE models in estimating variables with low within variance needs to be taken seriously.

Recently, Plümper and Troeger (2007) propose a remedy to the problems of estimating time-invariant and rarely changing variables in FE models with unit effects. They suggest an alternative estimator that allows estimating time-invariant variables and that is more efficient than the FE model in estimating variables that have very little longitudinal variance. They label this alternative as ‘‘fixed effects vector decomposition’’ (FEVD) model. As the name suggests, the FEVD estimator decomposes the unobserved unit fixed effect into two segments: an unexplained part and a part explained by the time invariant or the rarely changing variables. The FEVD technique involves the following three steps: in the first step, the procedure estimates the unit FE by running a FE estimate of the baseline model. In the second step, the procedure splits the unit effects into an explained and an unexplained part by regressing the unit effects on the time-invariant and/or rarely changing explanatory variables of the original model. Finally, the third stage performs a pooled-OLS estimation of the baseline model by including all explanatory time-variant variables, the time-invariant variables, the rarely changing variables, and the unexplained part of the FE vector. This third stage allows computing correct SEs for the coefficients of the (almost) invariant variables. In addition, one can conveniently use this stage to adjust for serial correlation of errors.

This paper uses the FEVD model to investigate empirically the direct impact of financial development and instability on poverty. The primary reason for choosing FEVD model is to control for the influences of such variables as corruption, legal standards, regional identity, government type, and some slowly changing macroeconomic variable like trade in the finance-poverty nexus. We believe that not only our dependent variable, the poverty rate, but also our explanatory variables are correlated with country specific factors such as corruption, legal system, and trade. In traditional panel data models, either we drop them in the so-called unobserved variable category, or discard them from analysis because they have little or no within variance. In pure cross-sectional analysis or even in case of panel data analysis using the fixed effect dummy variable method (see Gujarati 2003), it may be possible to use dummies in model for time invariant variables if their number is not very large. But what if a variable changes very rarely and has only a little within variance as some of our explanatory variables do (see table A2 in appendix)? As we have already mentioned, popular panel data estimators e.g. FE, RE or DPD models cannot identify these variables because they involve transformation of data e.g. differencing, demeaning or quasi demeaning (as in the case of RE model), all of which require adequate within variance. But FEVD model can estimate such variables rather efficiently. The primary objective of this paper is to provide empirical support for this efficient alternative of estimating time invariant and rarely changing variables from panel data.

More specifically, we consider a panel data model where poverty is explained by a set of time-varying, time-invariant, and rarely changing variables. Parameters of the models are estimated by the technique of fixed effect vector decomposition using panel data on 54 developing countries. The FEVD technique helps us extracting the impacts of such time-invariant and rarely changing factors as corruption, political stability, and legal system from the finance-poverty linkage. Even after controlling for the impact these variables, we cannot reject the null hypothesis that on average financial development is conducive for poverty reduction but the instability accompanying financial development is detrimental to the poor. Our results also point to the conventional wisdom that while corruption is a constraint, political stability is a catalyst in fighting against poverty by means of financial development.

We proceed as follows: section 2 describes the research issue and briefly reviews related literature· Section 3 presents the model and estimation technique. Results and their interpretations are provided in section 4, and section 5 concludes the paper.

2. The Research Issue

There is little doubt in the literature that financial development boosts economic growth (e.g. Levine *et al* 2000, Levine 1997, Easterly 1993), and sustainable growth is a necessary condition for poverty alleviation (Beck *et. al* 2004, Julilian and Kirkpatrick 2002, and Dollar and Kraay 2002). These studies allude to an indirect linkage between financial development and poverty alleviation. In other words, these studies suggest that economic growth is the channel through which financial development helps the poor. A more fundamental question, however, is: can financial development exert a direct impact on poverty? This paper investigates this question empirically. We are not interested in the indirect link between finance and poverty because it has already gained unanimous theoretical and empirical support. But there are still doubts about the direct role of financial development in reducing poverty and income inequality. The hypothesis of a direct link between finance and poverty seems to have found no support, particularly from academia, which sees financial services as simply costly for the poor who cannot afford to pay for them. This argument appears to be true in context of the fact that financial services for the poor people in the developing countries have mostly been expensive or absent. Why are the poor people in developing countries so badly served compared to the rich in developed countries? An easy answer is that the poor people have too little money to be suitable clients for sophisticated financial services. The idea is more formally presented by Greenwood and Jovanovic (1990) who argue that getting involved in the financial sector or subscribing to such financial services as screening and risk pooling requires an initial set-up cost. Poor people are not in a position to incur this cost. Moreover, the low to medium income groups may not find financial intermediaries a beneficial place to park their savings.

However, empirical support to Greenwood and Jovanovic (1990) proposition has been mixed so far. For instance, Li *et al* (1997), Rajan and Zingales (2003), Honohan (2004) and Beck *et al* (2004) are renowned among those that strongly reject the Greenwood and Jovanovic (1990) hypothesis. Li *et al* (1997) find that financial depth enters strongly and significantly as a contributor of lowering income inequality (Gini index) and raising the average income of the lower 80% of the population. They conclude that financial development removes credit constraints for poor households and thereby feeds their desire to spend money on activities such schooling and healthcare for children. Rajan and Zingales (2003) observe that as the financial system becomes healthier, powerful and more competitive, financial strength of firms and households enhances; as a result, they can bear with even higher cost of capital. Moreover, the development of informal credit, which is often the only source of borrowing for poor people, is made easier by the growth of a formal financial system which offers opportunities for profitable investments.

The Greenwood and Jovanovic proposition (1990) is shortsighted in the sense that it fails to apprehend the 'hidden wealth' of the poor. The hidden wealth of the poor is their creativity which financial service providers should consider as the collateral that they look for before providing finance to their clients. Rajan and Zingales (2004) present strong theoretical arguments why the poor are deprived of institutional finance. They believe that it is the deficiency of financial institutions to explore the creative potentials of the poor that is to be blamed, not the inability of the poor to provide so-called collateral. They observe that the reason why the poor people in developing countries cannot get finance at a reasonable rate is that these countries are deficient in institutions; ownership rights are neither well demarcated nor well enforced; there are no agencies collecting, storing, and disseminating information on the creditworthiness of potential borrowers; there is little competition between moneylenders; the laws governing credit are outdated; contracts are not enforced because the judiciary is all too often either asleep or corrupt. Thus the idea that people who have little money do not make suitable clients for financial services is at most a half-truth. A more reasonable explanation is that the poor have been hurt by massive market and regulatory failure. Fortunately that failure can be, and increasingly is being, remedied. There are instances that finance can be redirected from the vicinity of the rich to the unexplored wealth of the poor, and in consequence, the disparity in the distribution of income between the rich and the poor can be minimized.

Honohan (2004) considers the relationship between financial development and absolute poverty. Using a cross country sample, he shows that financial development reduces the share of the population with income below one dollar a day while controlling for GDP per capita. Beck *et al* (2004) use a sample of 52 developing and developed countries with data averaged over the period 1960 to 1990 and examine whether there is a direct relationship between financial intermediary development and changes in income distribution. They consider the ratio of credit by bank and non-bank financial institutions to GDP as the measure of financial development and investigate its impact on the income growth of the poor. They conclude that financial intermediary development is pro-poor as it boosts the income growth of the poor at a faster rate than that of the rich. But Jeanneney and Kpodar (2005) produce opposing results in regard to the direct relationship between financial intermediary development and poverty alleviation. This difference is due to the difference in econometric techniques that they have applied. Studies such as Beck *et al* (2004) and Honohan (2004) apply cross sectional analysis which fails to capture a wider set of information and therefore, cannot provide much insight into the dynamics of changes in a given phenomenon. Moreover, they consider only financial development but ignore the instability that follows development. Jeanneney and Kpodar (2005) overcome these limitations. They integrate both the level and instability of financial development in a poverty determination model and estimate parameter coefficients from panel data. They employ two different measures of financial development (ratio of M3 to GDP and the ratio of credit to GDP) and estimate their impact on absolute poverty measured as the percentage of population under a dollar daily income. They find that financial depth, represented by the ratio of M3 to GDP, is beneficial to poverty reduction but the ratio of credit to GDP fails to explain poverty. They interpret their results as an evidence of the relevance to McKinnon's (1973) *conduit effect* which implies that financial intermediaries do not exert a direct impact on poverty but stimulate growth by enhancing economic activities. Poor people participate in these activities, and hence, eventually benefit from financial development. They conclude however, that the benefit of financial development is constrained by instability that follows financial development as the poor has to suffer disproportionately from the consequences of such instability. An identical conclusion has been drawn in our previous attempt (Daly and Akhter 2007) where we consider a similar specification as proposed by Jeanneney and Kpodar (2005) and estimate parameters using fixed unit effect model. Since the FE model can consider only time-varying variables, our previous study suffers from the problem of omitting time-invariant variables. More specifically, we consider poverty to be determined exclusively by some variables which have sufficient within variance. However, there are many factors which change at a very slow rate or even not at all over time in a given country but are believed to have substantial impacts on the living condition of the people in the country. The present study considers some of these variables. There are two types of time-invariant variables. Plümper and Troeger (2007) present description of these types which are briefly reproduced below before we decide which ones are to be considered for the present study.

The first category includes those that are time invariant by nature. For example, regional identity, geographic location, and inheritance belong to this category. Indonesia is located in a geographically vulnerable zone so it has to encounter devastating earth-quake more frequently than other countries on the globe. Bangladesh is a low-lying delta, hence, subject to flood more frequently than the landlocked countries like Hungary or Switzerland. It is almost unlikely that the geographic characteristics of these countries are going to change in a foreseeable future. For the same reason, colonial heritage, cultural background, and climatic features are some of those variables which are time-invariant by nature. In fixed effect models, effects of these variables are assumed to be captured by the so-called fixed effect which is removed from the model by differencing or demeaning. As a result, there coefficients cannot be estimated. Whereas in cross-sectional analysis, researchers use dummies for these variables in order to estimate their impacts on a given relationship. For instance, Laporta et al (1997) have applied dummies for legal origin and estimated their impacts on the growth of financial system. Beck et al (2004) have used legal origin in their cross-sectional analysis of the relationship between finance and income inequality. But these time-invariant variables are never considered in panel context because of the technical difficulty of panel data models in estimating coefficients for these variables. However, this study incorporates some strictly time-invariant variables such as legal origin, regional identity and government type with a view to controlling for their impacts on the finance and poverty relationship.

The second category of time-invariant variables covers those that are time invariant for the period under analysis or because of researchers' selection of cases. By increasing the number of periods and/or the number of cases it would be possible to render these variables time-variant. These variables may more accurately be referred to as rarely-changing variables. Political variables such as level of democracy, the status of the president, electoral rules, central bank autonomy, or federalism are some exquisite examples of variables belong to this category. They do change over time; but the within variance, the variance over time, typically falls short of the between variance, the variance across units. This is equally true for many macroeconomic variables such as government spending, social welfare, tax rates, pollution levels, or per capita income; they do change from year to year, but in context of panel data, their within variances are found to be less than their between variance unless the time period is sufficiently large. This has been the case with most of the variables in this study. In our previous study we used panel data for the period over 1980 to 2004 and found the within variance of each variable higher than the between variance (see table A1 in appendix). As a result we could identify a fixed effect model. But in the present study, we consider a shorter time period from 1993 to 2004 because the poverty indices (percentage of population under a dollar income per day) before 1993 appear to be suspicious for some countries. Moreover, for some countries, poverty data before 1993 appear not to be comparable with data after 1993. The reason is that the poverty index is constructed on the basis of an internationally comparable concept of income, that is, income measured in terms of a currency unit which is comparable across countries. This is done by converting a local currency unit to a currency unit of international purchasing power parity (PPP). But consistent information about PPP before 1993 is not available for many countries, especially the developing ones. This makes poverty index before 1993 and after 1993 inconsistent for many countries. We therefore, decide to use data for the period 1993 to 2004 in this study. But as the time period is contrasted, we find the within variance to become less than the between variance for most variables (see table A2 in appendix). Thus, most variables including the variables of interest in this study, namely level of financial development and financial instability belong to the second category of time-invariant variables. We will extract the impacts of some other variables e.g. corruption, political stability, and per capita arable land from the relationship between financial development and poverty.

As the results in table A3 in the appendix reveal, when we use data for period 1993 - 2004 to estimate the same panel data models that we estimated in our previous study, no significant relationship is found between financial development and poverty. Should we accept these results? According to Beck (2001), accepting these results means a compromise with the underlying inefficiency of FE models in estimating rarely changing variables. Nathaniel Beck has rightly observed:

''Although we can estimate [a model] with slowly changing independent variables, the fixed effect will soak up most of the explanatory power of these slowly changing variables. Thus, if a variable . . .changes over time, but slowly, the fixed effects will make it hard for such variables to appear either substantively or statistically significant'' (Beck 2001, 285).

Perhaps even more importantly as Plümper and Troeger (2007) emphasize, inefficiency does not just imply low levels of significance; point estimates are also unreliable since the influence of the error on the estimated coefficients becomes larger as the inefficiency of the estimator increases. We should therefore, look for an efficient technique for estimating rarely changing variables rather than relying on results in table A3. An available technique is the random effect (RE) model. But the RE model yields inconsistent and biased estimates when regressors are correlated with the unit effects. This makes RE models unviable for the present study because we assume correlation between regressors and the unobserved country specific effects. Another alternative which econometric textbooks (e.g. Wooldridge 2002, 325–8; Hsiao 2003, 53) typically recommend is the Hausman and Taylor (1991) procedure. This estimator overcomes the bias of the RE model in the presence of correlated unit effects by means of appropriate instruments for endogenous variables. From an econometric perspective, the procedure provides a consistent solution to the potentially severe problem of correlation between unit effects and time-invariant variables. Unfortunately, the procedure can only work well if the instruments are uncorrelated with the errors and the unit effects and highly correlated with the endogenous regressors. Identifying those instruments is a formidable task especially since the unit effects are unobserved (and often unobservable).

Plümper and Troeger (2007) suggest a three-stage procedure for the estimation of time-invariant and rarely changing variables in panel data models with unit effects. They refer to the procedure as Fixed Effect Vector Decomposition (FEVD). They use Monte Carlo simulations to compare the finite sample properties of FEVD estimator to those of some competing estimators and find FEVD to provide the most reliable estimates under a wide variety of specifications common to real world data. This motivates us to apply FEVD in order to examine a poverty determination model where most of the explanatory and controlling variables are either time-invariant by nature or change over time only at a snail's pace.

3. Model, Estimation Technique, and Data

Financial development enhances growth and growth is good for the poor. We are not interested in this indirect effect of financial development on poverty because it is already well documented in literature. We are interested in a more fundamental issue: can financial development exert a direct impact on poverty? Accordingly, we hypothesize that financial development directly helps reduce poverty. But there are barriers that may limit the impact of financial development on poverty alleviation. The most likely limit is the instability that accompanies financial development. Among the other barriers (Note 3), we consider inflation, corruption, and political instability

The reason for integrating these factors in the finance-poverty nexus is pretty clear. In most developing countries, inflation tends to be high and volatile; government is often incompetent; and the necessary legal framework is missing. Incomplete and erratic regulation of financial institutions has also undermined the confidence of the poor in the financial services that are available. Corruption is also commonplace in many developing countries. It raises the cost of every financial transaction, allows undesirable transactions to take place and undermines consumer confidence in financial system. The lack of confidence causes a great majority of the population to be excluded from financial services and consequently retards economic growth and increase poverty and inequality. Theoretical models have shown that financial market frictions that prevent broad access can be the critical mechanism for generating persistent income inequality or poverty traps (Banerjee and Newman, 1993; Galor and Zeira, 1993). With this view in mind, we incorporate variables such as inflation, corruption, and political instability our model in order to extract their impacts from the finance-poverty relationship. The finance-poverty nexus is also controlled for trade and some other indicators such as legal origin, regional identity, and government type. As mentioned earlier, because these variables are either rarely changing or time-invariant by nature, we consider a fixed effect vector decomposition (FEVD) model which is describe in the following section.

3.1 Fixed Effects Vector Decomposition (FEVD) (Note 4)

A panel data model with time-invariant variables can be defined as:

$$y_{it} = \alpha + \sum_{k=1}^{K} \beta_k x_{kit} + \sum_{m=1}^{M} \gamma_m z_{mi} + u_i + \varepsilon_{it} \tag{1}$$

where the x variables are time-varying and the z variables are time invariant (and/or rarely changing), u_i denotes the ($N - 1$) unit-specific fixed effects (FE) of the data generating process (DGP), ε_{it} is the independent and identically distributed error term, α is the intercept of the base unit, and β and γ are the parameters to be estimated.

In the first stage, the FEVD procedure estimates a standard FE model. The FE transformation can be obtained by first averaging equation (1) over the time period T:

$$\bar{y}_i = \alpha + \sum_{k=1}^{K} \beta_k \bar{x}_{ki} + \sum_{m=1}^{M} \gamma_m z_{mi} + u_i + \bar{e}_i \tag{2}$$

where $\overline{y}_i = \frac{1}{T}\sum_{t=1}^{T} y_{it}$, $\overline{x}_i = \frac{1}{T}\sum_{t=1}^{T} x_{it}$, $\overline{e}_i = \frac{1}{\mathrm{T}}\sum_{t=1}^{T} e_{it}$ and e stands for the residual of the estimated model. Then equation (2) is subtracted from equation (1). This transformation removes the individual effects u_i and the time invariant variables z. We get

$$y_{it} - \overline{y}_i = \beta_k \sum_{k=1}^{K}(x_{kit} - \overline{x}_{ki}) + \gamma_m \sum_{m=1}^{M}(z_{mi} - z_{mi}) + (e_{it} - \overline{e}_i) + (u_i - u_i)$$
$$\equiv \tilde{y} = \beta_k \sum_{k=1}^{K} \tilde{x}_{kit} + \tilde{e}_{it};\ \text{with } \tilde{y}_{it} = y_{it} - \overline{y}_i,\ \tilde{x}_{it} = x_{it} - \overline{x}_i,\ \text{and } \tilde{e}_{it} = e_{it} - \overline{e}_i \tag{3}$$

We run this FE model with the sole intention to obtain estimates of the unit effects $\hat{u}_i$. It is important to note here that the ''estimated unit effects'' $\hat{u}_i$ do not equal the unit effects u_i in the DGP (Note 5). Rather, these estimated unit effects include all time-invariant variables, the overall constant term, and the mean effects of the time varying variables x—or, in other words,

$$\hat{u}_i = \overline{y}_i - \sum_{K=1}^{K} \beta_k^{FE} \overline{x}_{ki} - \overline{e}_i \tag{4}$$

Where β_k^{FE} is the pooled-OLS estimate of the demeaned model in equation (3). This $\hat{u}_i$ includes the unobserved unit-specific effects as well as the observed unit specific effects z, the unit means of the residuals $\overline{e}_i$ and the time-varying variables $\overline{x}_{ki}$, whereas u_i in equation (1) only accounts for unobservable unit-specific effects.

In stage 2, we regress the unit effects $\hat{u}_i$ from stage 1 on the observed time-invariant and rarely changing variables—the z variables (see equation 5) to obtain the unexplained part h_i (the residual from regressing the unit-specific effect on the z variables). In other words, we decompose the estimated unit effects into two parts, an explained and an unexplained part that we label h_i:

$$\hat{u}_i = \sum_{m=1}^{M} \gamma_m z_{mi} + h_i \tag{5}$$

The unexplained part hi is obtained by computing the residuals from equation (5):

$$h_i = \hat{u}_i - \sum_{m=1}^{M} \gamma_m z_{mi} \tag{6}$$

As we said above, this crucial stage decomposes the unit effects into an unexplained part and a part explained by the time-invariant variables. We are solely interested in the unexplained part h_i.

In stage 3, we rerun the full model without the unit effects but include the unexplained part h_i of the decomposed unit FE vector obtained in stage 2. This stage is estimated by pooled OLS.

$$y_{it} = \alpha + \sum_{k=1}^{K} \beta_k x_{kit} + \sum_{m=1}^{M} \gamma_m z_{mi} + \delta h_i + \varepsilon_{it} \tag{7}$$

By design, hi is no longer correlated with the vector of the z variables. If the time invariant variables are assumed to be orthogonal to the unobserved unit effects, the estimator is consistent. If this assumption is violated, the estimated coefficients for the time-invariant variables are biased (Note 6), but this bias is of course just the normal omitted variable bias. Yet, given that the estimated unit effects $\hat{u}_i$ consist of much more than the real unit effect ui and since we cannot disentangle the true elements of ui from the between variation of the observed and included variables, researchers necessarily face a choice between using as much information as possible and using an unbiased estimator. The FEVD procedure thus gives as much power as possible to the available variables unless the within variation is sufficiently large to guarantee efficient estimation.

The estimation of stage 3 proves necessary for various reasons. First of all, only the third stage allows obtaining the correct standard errors (SEs). Not correcting the degrees of freedom leads to a potentially serious underestimation of SEs and overconfidence in the results. Second, the third stage also allows us to explicitly deal with the dynamics of the time-invariant variables. This is important since estimating the model requires that heteroscedasticity and serial correlation must be eliminated. Keeping this in mind we present estimates which are robust to heteroscedasticity. We also include lagged dependent variable and present results (table 2) from Prais-Winsten (Note 7) version of feasible generalized least square (FGLS) estimation.

3.2 Data

For empirical investigation we specify our baseline panel data model as:

$$\begin{aligned} hci_{i,t} &= \beta_i + \beta_1 \log(pci_{i,t}) + \beta_2 FD_{i,t} + \beta_3 FI_{i,t} + \beta_4 \log(1+Inf)_{i,t} + \beta_5 corrupt_{i,t} + \beta_6 polstab_{i,t} \\ &+ \beta_7 trade_{i,t} + \gamma_1 legalorg_i + \gamma_2 region_i + \gamma_3 govtype_i + u_i + e_{i,t} \end{aligned} \tag{8}$$

where the response variable—poverty, is represented by the head count index (*hci*) and is defined as the percentage of population under a dollar daily income. On the explanatory side we include per capita income (*pci*) with a view to capturing a reasonably wider set of conditioning information. Per capita income is one of the principal determinants of poverty. Hence a poverty model is inadequately specified if a principal determinant like *pci* is discarded from the model. Data on *hci* and *pci* are obtained from the World Bank poverty database called *PovcalNet* (Note 8).

We use two measures of financial development (*FD*) namely the Credit-GDP ratio and the M3-GDP ratio. Credits include those extended to the private sector by the bank and non-bank financial institutions while M3 includes currencies and deposits. One cannot expect financial development to have immediate impact on poverty. It may take couple of years to exert an influence on peoples' living condition. Moreover, poverty index is observed at irregular intervals. For these reasons, we take an average of five years. Thus, each observation of *FD* at time *t* is an average taken over the year of poverty index and preceding four years.

Financial instability (*FI*) is measured by the average (again over the year of poverty index and preceding four years) of the absolute value of the residual of the equation: $FD_t = a + bFD_{t-1} + ct + \varepsilon_t$ (where *t* is the trend indicator). Thus

$$FI_{i,t} = \frac{1}{n}\sum_{t=1}^{n} |\varepsilon_t| \text{ where n = 5} \tag{9}$$

Inflation (*Inf)* represents annual rate of change in consumer price index. Data on the two measures of FD, and inflation are obtained from the online version of the World Development Indicator (WDI) 2006.

In regard to corruption and political stability, we use data from two popular sources. For corruption, we use the corruption perception index (CPI) prepared by the Berlin based Transparency International (TI) (Note 9). CPI Sco**re** relates to perceptions of the degree of corruption as seen by business people and country analysts, and ranges between 10 and 0. The high CPI indicates less corruption, while a low CPI score represents more corruption. For political stability (*polstab*), we use the World Bank's index of political stability constructed by Daniel Kaufmann and associates (Note 10).The index represents the perceptions of the likelihood that a government will be destabilized or overthrown by unconstitutional or violent means, including political violence and terrorism. Its value ranges between -2.5 to 2.5; with a high value indicates more stability while a low score represents less stability of the government. Hence we expect negative coefficients for both corruption and political stability.

For data time-invariant or indicator variables such as legal origin, regional identity and government-type, we use the CIA World Factbook (Note 11). A summary of the data we employ can be found in the appendix.We consider time period from 1993 to 2004 with at least three observations for each country. This gives us a panel of 54 developing countries. As mentioned earlier, the reason for using a shorter time period is that the poverty indices (percentage of population under a dollar income per day) before 1993 appear to be suspicious for some countries. Moreover, for some countries, poverty indices before 1993 are not comparable with the indices after 1993. The reason is that the poverty index is constructed on the basis of an internationally comparable concept of income, that is, income measured in terms of a currency unit which is comparable across countries. This is done by converting a local currency unit to a currency unit of international purchasing power parity (PPP). But consistent information about PPP before 1993 is not available for many countries, especially the developing ones. This makes poverty index before 1993 and after 1993 inconsistent for many countries. We therefore, decide to use data for the period 1993 to 2004 in this study.

4. Results and Interpretations

This section interprets results that we obtained at the third stage of the FEVD procedure discussed in section 3.2. In other words, results presented in this section are actually the empirical estimates of equation 7 (estimates of *hi* are not reported). As table 1 exhibits, in all FEVD models, both measures of the level of financial development (the ratio of M3 to GDP and the ratio of credit to GDP) appear as a significant explanatory variable with minus sign. The minus sign of both M3-GDP and C-GDP implies that poverty falls as the level of financial development enhances. For instance, as our first specification (model 1) in table 1 reveals, if other variables remain unchanged, the current period poverty reduces by an average of four percent in response to a 10 percent average increase in the ratio of M3-GDP over the preceding five years (Note 12). The impact of financial development on poverty alleviation turns out to be stronger when the level of financial development is measured by the ratio of credit to GDP. As model 3 suggests, a 10 percent average increase in the ratio of Credit-GDP over last five years alleviates poverty by seven percent in the current period. Table 1 also exhibits the fact that poverty is less responsive to the level of financial development as financial instability is dropped from the model. The coefficient of M3-GDP falls from 0.04868 to 0.0371 in absolute terms when financial instability is discarded from the model.

The strength of the linear relationship between poverty and financial instability is exhibited in the added variable plot (Note 13) (figure 1) below. It shows that the slope coefficient of financial instability is significantly different from zero, meaning that the variable plays an important role in the model. Moreover, as tables A5 and A6 in the appendix reveal, t-values (in absolute terms) and R-squared increase while the standard error of the estimate decreases when both the level of financial development and financial instability are integrated in a model. This implies a strong correlation between the level of financial development and financial instability, suggesting financial development helps the poor to a larger extent in countries with stable financial system. The Wald test results (shown in the appendix under table A5) with regard to model that considers both financial development and instability suggest that we can reject the null hypothesis that population coefficients for these variables are zero, implying joint significance of these variables.

We introduce a measure of economic instability namely the standard deviation of per capita GDP growth in all specification with a view to investigating whether the detrimental impact of financial instability is channelled through the instability of economic growth as the cost of economic crises might be borne disproportionately by the poor. As we can see in table 1, this variable appear with moderate statistical significance and minus sign in all specifications. The chain of the relationship is clear: the more the financial service, the more the economic activity, hence the less the poverty but the more the overall economic volatility.

Among the other variables, as we can see in the table 1, inflation appears with a positive sign and statistical significance. Whereas corruption and political stability appear with negative sign. Economists view inflation as general rises in commonly accepted price indices. It is held that the rate of growth in economic activity is a key factor in determining the rate of increases in price indices. Thus strengthening in activity leads to higher prices and hence higher inflation while weaker activity causes lower inflation. By this point of view, inflation is desirable to the extent it is inevitable for growth. But if it exceeds that threshold, the sustainability of growth becomes uncertain. In context of finance poverty relationship, inflation may not be a threat if the return on investment can sufficiently offset the rate of inflation. But in many countries, inflation just escalates uncertainty and threatens sustainability of the success of financial development in the fight against poverty. Consider the case of poor people in developing countries who base their tiny business on fund borrowed at a higher rate. Return from their businesses is relatively stable compared to the rate of inflation. As a result, if inflation goes up and up, their business becomes vulnerable; it becomes difficult for them to come back to the same level of business as they start with. Furthermore, because their access to insurance is very limited, and they do not have sufficient trade independent security (the ability to survive loss with own funds), their business could not survive unexpected economic hazards. The only way they can survive is to borrow again and again and of course, with a promise to pay a more exorbitant rate for each subsequent borrowing. The burden of loans never ends.

Our analysis identifies corruption as an impediment to poverty alleviation through financial services. This reminds us of an instance cited in the Economist: in two poor states in India where the financial system is largely controlled by the government, borrowers paid bribes to officials amounting to between 8% and 42% of the value of their loans (Easton 2005). Our results provide empirical support for the fact that corruption raises the cost of every financial transaction, allows undesirable transactions to take place, undermines consumer confidence in institutional finance, and eventually impedes economic growth. Our findings also support the idea that corruption causes a social segmentation which is detrimental to private investment. By means of bribes, some people get more connected to the bureaucrats or the administrators, while the poor stay afar. Thus corruption causes the poor and unconnected members of society to feel insecure in investing in resources such as human or physical capital. Unlike the well connected, the poorer members of society are discouraged from investing in their resources. Therefore, even if private investment coexists with high rates of corruption, the poor and unconnected members of society will unlikely engage transactions that allow them to reap the benefits of the funds that flow from large scale private investments. Moreover, when corruption is high, substantial amount of funds that are generated from private investments do not necessarily flow down to the other members of society. These funds that would otherwise be directed to productive use in society are usurped by corrupt government officials for private gain.

The index of political stability appears with expected negative sign in all specification though it loses statistical significance in the lagged models and FGLS estimates (see table 2). Briefly, our results in regard to the relationship between poverty and political stability support the conventional wisdom that good governance is a necessary condition in order for the financial development to help poverty alleviation.

Among the indicator variables considered, regional identity and legal origin appear with statistical significance in almost all specifications. Statistical significance of these variables indicates their degree of influence in explaining heterogeneity in the finance-poverty relationship across countries. The fifty four developing countries we considered here are grouped under four broad regional identities namely Asia (the base region), America (region-1), Europe (region-3) and Africa (region-4). Coefficients of these regions are positive even when a lagged dependent variable is introduced in the model and the Prais-Winsten AR (1) version of FGLS is implemented. The highest positive coefficient of region-4 (Africa) indicates that the poverty reduction in response to a given change in financial development would be the least in an African country compared to countries belong to the other region.

With respect to legal origin, counties are divided into four categories: the English legal origin (the base), French legal origin (legalorg-2), German legal origin (legalorg 3), and the Russian legal origin (legalorg-4). All these regions come up with negative coefficient, meaning more poverty reduction for a given increase in financial development in countries with French, German, and Russian legal origin compared to the English legal origin.

With respect to government type, countries under considerations are classified into five groups namely republic (the base), democracy (govt-2), dictatorship (govt-3), communist (govt-3), and constitutional monarchy (govt-5). In both original FEVD and FGLS estimates democracy appears with a negative sign, though statistically insignificant, meaning that financial development is more beneficial for poverty alleviation in this form of government. For the other forms of government the results are not clear enough to make a precise conclusion. For instance, dictatorship appears with a negative sign in the original models but fails to fit in FGLS. Furthermore, results are different for different government types under the original FEVD and FGLS. Reasons for these differences are autocorrelation and the fact that we consider a small sample with number of countries under groups such as dictatorship, communist and monarchy is very few. Hence we cannot make an exhaustive conclusion about the influence of government type on the finance-poverty nexus. We leave the issue for future research.

5. Conclusion

This paper considers a panel data model where poverty is explained by a set of time-varying, time-invariant, and rarely changing variables. Parameters of the models are estimated by a technique, called fixed effect vector decomposition (FEVD), using panel data on 54 developing countries. The FEVD technique helps us extracting the impacts of such time-invariant and rarely changing factors as corruption, political stability, and legal system from the finance-poverty linkage. Even after controlling for the impact these variables, we cannot reject the null hypothesis that on average financial development is conducive for poverty reduction but the instability accompanying financial development is detrimental to the poor. Our results also point to the conventional wisdom that while corruption is a constraint, political stability is a catalyst in fighting against poverty by means of financial development.

Our results indicate a strong correlation between the level of financial development and financial instability, suggesting financial development helps the poor to a larger extent in countries with stable financial system. Our results also show barriers that may limit the impact of financial development on poverty alleviation. The most likely limit is the instability that accompanies financial development. Incomplete and erratic regulation of financial institutions has also undermined the confidence of the poor in the financial services that are available. The lack of confidence causes a great majority of the population to be excluded from financial services and consequently retards economic growth and increase poverty and inequality.

These results have important relevance for policy makers involved in the alleviation of poverty. We hope our research will invite relevant agencies into the finance-poverty nexus and encourage responsible institutions to direct their energies toward recognising the importance of financial development in the alleviation of poverty.

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Notes

Note 1. We found financial development to help, while financial instability to hurt the poor. These findings are identical to those of other studies e.g. Beck *et al* 2004, and Jeanneney and Kpodar 2005.

Note 2. See chapter 13, Wooldridge (2006) for an introduction of panel data models.

Note 3. See Beck et al (2006) for a description of various barriers.

Note 4. This section largely draws on Plümper and Troeger (2007).

Note 5. We follow standard practice by this notation. However, from equation (4) it follows that the FE estimate of the unit effects propels much more to the estimated unit effects. To avoid confusion and maintain consistence with standard textbooks, we stick to this notation-needless to say that it does not make much sense.

Note 6. Note that the estimated coefficients of the time-varying variables remain unbiased even in the presence of correlated unit effects. However, the assumptions underlying a FE model must be satisfied (no correlated time-varying variables may exist).

Note 7. See Baum (2006, 159-160) for description.

Note 8. *PovcalNet* is an interactive computational tool that allows researchers to replicate the calculations made by the World Bank's researchers in estimating the extent of absolute poverty in the world, including the $1 a day poverty measures. [Online] Available: http://iresearch.worldbank.org/PovcalNet/jsp/index.jsp

Note 9. CPI scores. [Online] Aavailable: http://www.transparency.org/policy_research/surveys_indices/cpi

Note 10. See and Kaufmann et al (2005) for methodology, [Online] Available: http://info.worldbank.org/governance/wgi2007/resources.htm downloadable data.

Note 11. [Online] Available: https://www.cia.gov/library/publications/the-world-factbook/geos/af.html

Note 12. Table A5 in the appendix presents the beta coefficients of the regressors in the model which are defined as $\partial y^* / \partial x_j^*$ where x and y are the explanatory and the response variables respectively. The starred quantities are z-transformed or standardized values of these variables. For instance, $y^* = (y_i - \overline{y}) / s_y$, where $\overline{y}$ is the sample mean and s_y is the sample standard deviation of the response variable (Baum 2006). Thus the beta coefficient for M3-GDP tells us that the poverty index would decrease by approximately 0 .062 standard deviations for a 1-standard deviation increase in M3-GDP.

Note 13. See Baum (2006, p 119) for description.

Table 1. Fixed Effect Vector Decomposition (FEVD) Models

Dependent variable: Percentage of population under $1 income a day

Variable	Model1	Model2	Model3	Model4
logpci	-.3126***	-.3081***	-.3066***	-.311***
m3gdp	-.04868***	-.0371**		
instabm3gdp	.3815***			
stdvgdpgrow	-.2459**	-.1973*	-.2361**	-.2113**
inflation	.01315***	.00999**	.01015**	.00944**
corrupt	-.00857***	-.00645**	-.00873***	-.00639**
polstab	-.01419***	-.01491***	-.01234**	-.01408***
trade	.01224	.00972	.00228	.00289
region_1	.1418***	.1425***	.1424***	.1456***
region_3	.03837***	.0427***	.03784***	.04413***
region_4	.2734***	.2757***	.273***	.2758***
legalorg_2	-.05773***	-.05406***	-.05376***	-.0497***
legalorg_3	-.02635**	-.0344***	-.02251*	-.02949**
legalorg_4	-.04604***	-.04433***	-.0393***	-.03865***
govt_2	-.00961	-.00903	-.00574	-.00707
govt_3	-.07361***	-.07355***	-.08011***	-.07956***
govt_4	.03077*	.03057*	.03211**	.02693**
govt_5	.00416	.01362	.04214**	.03404*
cgdp			-.07006***	-.04188***
instabcgdp			.2035***	
_cons	1.101***	1.086***	1.096***	1.098***
r2_a	.9687	.9686	.9684	.9685
rmse	.03007	.03013	.03022	.03016

legend: * p<0.05; ** p<0.01; *** p<0.001

Table 2. Lagged and FGLS Models

Dependent variable: Percentage of population under $1 income a day

Variable	L_Model1	L_Model2	FGLS1	FGLS2
L.hci	.00627	-.01567	.02661	.01357
logpci	-.3262***	-.3199***	-.3158***	-.3067***
m3gdp	-.06662		-.0682*	
instabm3gdp	.2114		.2079	
stdvgdpgrow	-.2487	-.2666	-.2954*	-.315*
inflation	.01372**	.00755	.01347	.00851
corrupt	-.00807*	-.01029**	-.00834	-.01018*
polstab	-.00792	-.00544	-.00757	-.0053
trade	-.00106	-.01148	-.0004	-.01091
region_1	.1513***	.1555***	.1452***	.1481***
region_3	.04778**	.0465**	.04635***	.04507***
region_4	.27***	.2782***	.2627***	.2668***
legalorg_2	-.05544***	-.05275***	-.05265***	-.04932**
legalorg_3	-.03414*	-.02434*	-.03414	-.02393
legalorg_4	-.0468***	-.03895**	-.04637**	-.03774*
govt_2	-.00427	-.00413	-.00407	-.0038
govt_3		dropped		
govt_4	.047	.0454**	.04773	.04326
govt_5	.03048	.06925*	.03295	.06969
cgdp		-.0951***		-.09156***
instabcgdp		.2298***		.2089**
_cons	1.158***	1.162***	1.126***	1.117***
r2_a	.8887	.8863	.8632	.8588
rmse	.02562	.02591	.02521	.0255
rho			.2253	.2334
dw (original)			.9916	.9657
dw (transformed)			1.249	1.186

legend: * p<0.05; ** p<0.01; *** p<0.001

Table A1. Summary of Panel Data Descriptive Statistics 1980 - 2004

Variable		Mean	Std. Dev.	Min	Max	Observations
hci	overall	12.39958	16.41162	0	79.35	N = 430
	between		17.1687	.102	70.584	n = 68
	within		6.931503	-12.84042	80.07958	T-bar = 6.32353
logpci	overall	3.234381	.2830776	2.487421	3.811028	N = 430
	between		.2782029	2.572309	3.6547	n = 68
	within		.1092266	2.655425	3.735311	T-bar = 6.32353
cgdp	overall	40.65244	28.60905	2.728468	146.1481	N = 433
	between		24.64284	4.174426	115.6307	n = 68
	within		13.04356	-24.34943	91.19223	T-bar = 6.36765
Instab-	verall	5.318948	7.912336	.4422445	111.4181	N = 439
cgdp	between		6.194112	1.247873	45.44027	n = 68
	within		5.595512	-29.10763	71.29676	T-bar = 6.45588
m3gdp	overall	37.33651	21.57917	7.118877	131.2097	N = 435
	between		19.76472	7.977093	107.8741	n = 68
	within		9.778911	-10.1296	93.18751	T-bar = 6.39706
Instab-	overall	2.771136	2.749052	0	20.07871	N = 440
m3gdp	between		2.018951	.3576512	13.35264	n = 68
	within		1.856562	-7.374862	11.2186	T-bar = 6.47059
Infla-	overall	.1446322	.2257527	-.0003332	1.498168	N = 449
tion	between		.13672	.0043073	.5794414	n = 68
	within		**.1692261**	-.3730157	1.115143	T-bar = 6.60294
Stdvgdp-	overall	3.673535	2.888598	.3176078	23.38795	N = 449
grow	between		1.787006	1.052037	8.401389	n = 68
	within		2.286595	-3.226379	18.6601	T-bar = 6.60294

Description of the Variables and Sources of Data:

hci : Head count index: Percentage of population under $ 1 daily income. Source: PovcalNet (A World Bank Poverty Database): Available: http://iresearch.worldbank.org/PovcalNet/jsp/index.jsp

logpci : Log of per capita yearly income. Source: Ibid

cgdp : The ratio of credit by the banks (to the private sector) to GDP Source: World Development Indicator (WDI) 2006.

instbcgdp : Financial instability measured in term of the credit-GDP ratio. Estimated from the time series of CGDP as described in section 3.3.

m3gdp: The Ratio of M3 to GDP. Source: WDI 2006.

instbm3gdp : Financial instability measured in terms of M3-GDP ratio. Calculated from the time series of M3GDP as described in section 3.3.

inflation : Log (1+ rate of inflation expressed in decimal). Source: (rate of inflation measured from CPI) WDI 2006

stdvgdpgrow : Standard deviation annual growth of GDP per capita. Source: (GDP Per Capita growth): WDI 2006

Table A2. Summary of the Panel Datatime Period: 1993-2004

Variable		Mean	Std. Dev.	Min	Max	Observations
hci	overall	.1180752	.1699273	.0002	.8794	N = 258
	between		.1918411	.001175	.8504667	n = 54
	within		.0344009	-.0117915	.2893419	T-bar = 4.77778
logpci	overall	3.239738	.2637668	2.5115	3.7079	N = 258
	between		.2722678	2.5708	3.63875	n = 54
	within		.0552702	3.060821	3.395313	T-bar = 4.77778
m3gdp	overall	.3679626	.2155051	.071189	1.312097	N = 258
	between		.2052909	.0804	1.066641	n = 54
	within		.0641836	.0992389	.6134186	T-bar = 4.77778
ins~3gdp	overall	.0278861	.0256013	0	.189264	N = 258
	between		.0182677	.0076776	.101566	n = 54
	within		.0181598	-.0416139	.1155841	T-bar = 4.77778
cgdp	overall	.3843031	.2828017	.042794	1.461481	N = 258
	between		.2640287	.0521757	1.237154	n = 54
	within		.1053993	-.2046244	.8498868	T-bar = 4.77778
ins~cgdp	overall	.0536576	.0904549	.004422	1.114181	N = 258
	between		.0693959	.0068447	.4544027	n = 54
	within		.0632097	-.2906081	.713436	T-bar = 4.77778
stdvgd~w	overall	.0361196	.0281816	.003176	.212261	N = 258
	between		.0186262	.0064483	.0754892	n = 54
	within		.0213299	-.0174117	.1808318	T-bar = 4.77778
inflat~n	overall	1.2173	.5984864	.01	3.3217	N = 258
	between		.4149335	.3177667	2.05425	n = 54
	within		.4270793	.0792503	3.06396	T-bar = 4.77778
trade	overall	.7219253	.3568841	.167698	1.938305	N = 258
	between		.3373858	.2034208	1.691308	n = 54
	within		.0929717	.2772555	1.012098	T-bar = 4.77778
polstab	overall	-.2904884	.7321932	-2.123	1.105	N = 258
	between		.6891094	-1.752667	.9178	n = 54
	within		.2731016	-1.674988	.4251783	T-bar = 4.77778
corrupt	overall	3.222209	1.069459	1.4	7.5	N = 258
	between		1.004319	1.633333	5.633333	n = 54
	within		.344704	2.105543	5.305543	T-bar = 4.77778

Description of the Variables and Sources of Data (continued from table A1):

trade: Export plus import as a percentage of GDP

Source: WDI 2006

polstab: Political stability: The perceptions of the likelihood that a government will be destabilized or overthrown by unconstitutional or violent means, including

political violence and terrorism.

Source: http://info.worldbank.org/governance/wgi2007/resources.htm for data &

Kaufmann et al (2004) for how the index is constructed.

corrupt: Corruption perception Index (CPI): Perceptions of the degree of corruption as seen by business people and country analysts.

Source: Transparency International (TI).

Available at: http://www.transparency.org/policy_research/surveys_indices/cp

Table A3. Fixed Effets (Within) Regression: 1993-2004

Dependent variable: Percentage of population under $1 income a day

```
                                        Number of obs      =       258
                                        Number of groups   =        54
R-sq:  within  = 0.2750                 Obs per group: min =         3
       between = 0.5562                                avg =       4.8
       overall = 0.5040                                max =        10
                                           F(5,199)          =     15.09
corr(u_i, Xb)  = 0.2981                    Prob > F          =    0.0000
------------------------------------------------------------------------------
         hci |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      logpci |  -.3155478   .0393602    -8.02   0.000    -.3931643   -.2379312
       m3gdp |  -.0074706   .0344565    -0.22   0.829    -.0754173    .0604762
 instabm3gdp |  -.1444913   .1305554    -1.11   0.270     -.401941    .1129583
 stdvgdpgrow |  -.0254113   .1069852    -0.24   0.812    -.2363814    .1855589
   inflation |   .0101588   .0058528     1.74   0.084    -.0013828    .0217003
       _cons |   1.135697   .1261334     9.00   0.000     .8869674    1.384426
-------------+----------------------------------------------------------------
     sigma_u |  .13945748
     sigma_e |  .03328829
         rho |  .94609439   (fraction of variance due to u_i)
```

Table A4. Fixed Effets (Within) Regression: 1980-2004

Dependent variable: Percentage of population under $1 income a day

Variable	model 1	model 2	model 3	model 4	model 5	model 6
lnpi	-.3812***	-.384***	-.3837***	-.4187***	-.4194***	-.4198***
m3gdp	-.08537**	-.07884*	-.07852*			
inflation	.00418	.01202	.01444	.00298	.00331	.00968
instabm3gdp		-.1745	-.1754			
stdgdpp			-.05885			-.1197
cgdp				.00646	.00675	.00844
instabcgdp					-.00195	-.01111
_cons	1.388***	1.398***	1.4***	1.475***	1.477***	1.482***
sigma_u	.09482	.09523	.09494	.0946	.09461	.09427
sigma_e	.05711	.0571	.05708	.05753	.05766	.05761
rho	.7338	.7355	.7345	.73	.7291	.7281

legend: * p<0.05; ** p<0.01; *** p<0.001

Table A5. Ols Estimates of Fevd Model 1

Dependent variable: Percentage of population under $1 income a day

```
                    Number of obs =    258
                    F( 19,   238) =  345.54
                    Prob > F      =  0.0000
                    R-squared     =  0.9710
                    Root MSE      =  .03007
------------------------------------------------------------------------------
                          |            Robust
         hci |      Coef.   Std. Err.      t    P>|t|                     Beta
-------------+----------------------------------------------------------------
      logpci |  -.3126199    .013607   -22.97   0.000                -.485259
       m3gdp |  -.0486838   .0123797    -3.93   0.000               -.0617418
 instabm3gdp |     .38154   .0751772     5.08   0.000                 .057483
 stdvgdpgrow |  -.2459097   .0773618    -3.18   0.002               -.0407829
   inflation |    .013149   .0037694     3.49   0.001                .0463111
     corrupt |  -.0085691   .0024492    -3.50   0.001               -.0539305
     polstab |  -.0141887   .0041961    -3.38   0.001                -.061137
       trade |   .0122366   .0070643     1.73   0.085                .0256996
------------------------------------------------------------------------------
                          WALD TEST
                      ( 1)  m3gdp = 0
                      ( 2)  instabm3gdp = 0
                      F(  2,   238) =   19.84
                      Prob > F =    0.0000
```

Table A6. Ols Estimates Of Fevd Model 2 (Variable Financial Instability Is Dropped)

Dependent variable: Percentage of population under $1 income a day

Number of obs = 258
F(18, 239) = 332.38
Prob > F = 0.0000
R-squared = 0.9708
Root MSE = .03013

hci	Coef.	Robust Std. Err.	t	P>|t|	Beta
logpci	-.3080907	.0135651	-22.71	0.000	-.4782287
m3gdp	-.0370996	.0126778	-2.93	0.004	-.0470504
stdvgdpgrow	-.1973129	.0785959	-2.51	0.013	-.0327233
inflation	.0099864	.0032258	3.10	0.002	.0351721
corrupt	-.0064476	.0023696	-2.72	0.007	-.0405789
polstab	-.0149111	.0041452	-3.60	0.000	-.0642498

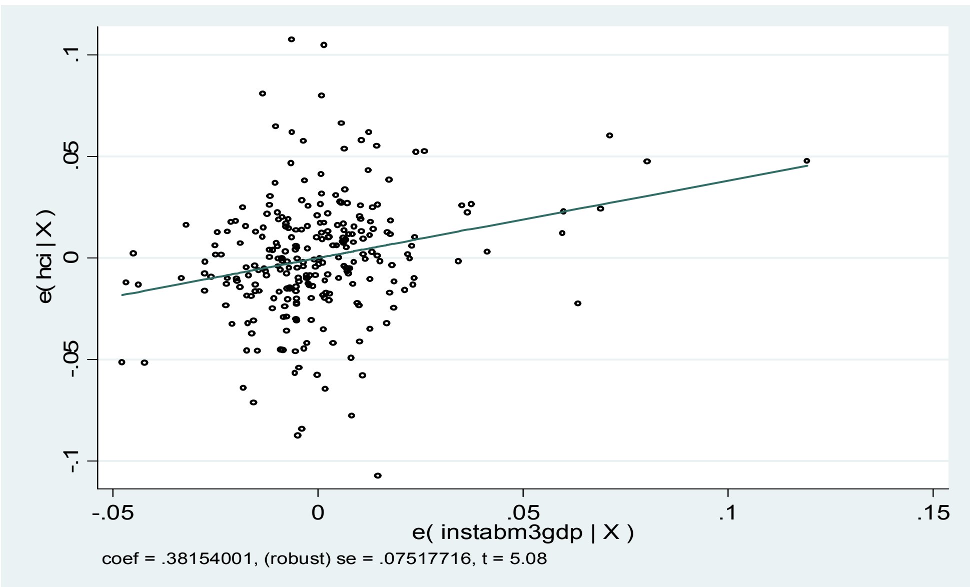

Figure 1. Relative Contribution of Financial Instability in the Model 1

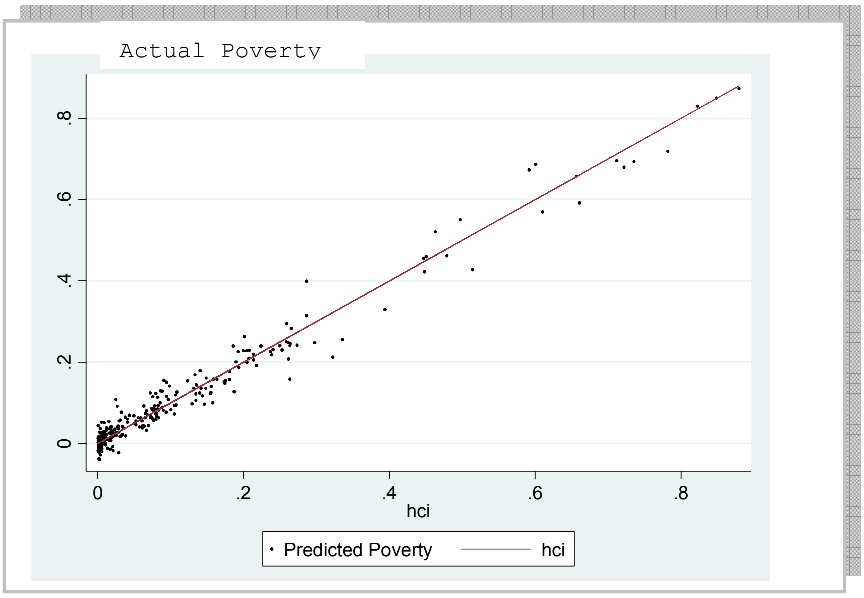

Figure A1. Actual versus Predicted: FEVD Model 1

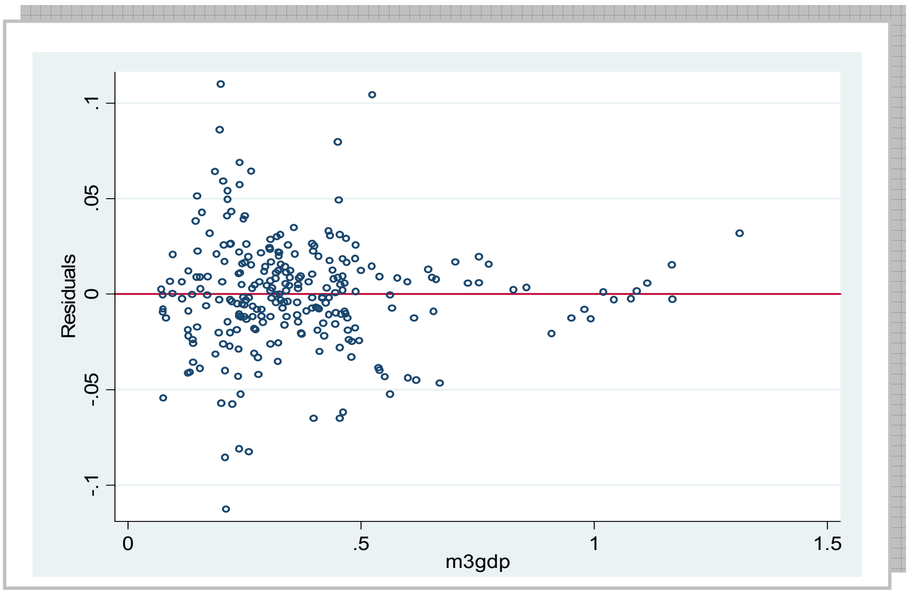

Figure A2. Residual Plot: FEVD Model 1