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Food Price Shocks and Household Consumption in Developing Countries: The Role of Fiscal Policy

by Carine Meyimdjui and Jean-Louis Combes

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Food Price Shocks and Household Consumption in Developing Countries: The Role of Fiscal Policy

Prepared by Carine Meyimdjui, Jean-Louis Combes[1]

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Abstract

This paper studies whether fiscal policy plays a stabilizing role in the context of import food price shocks. More precisely, the paper assesses whether fiscal policy dampens the adverse effect of import food price shocks on household consumption. Based on a panel of 70 low and middle-income countries over the period 1980-2012, the paper finds that import price shocks negatively and significantly affect household consumption, but this effect appears to be mitigated by discretionary government consumption, notably through government subsidies and transfers. The results are particularly robust for African countries and countries with less flexible exchange rate regimes.

Keywords: Import Food Price Shocks, Household Consumption, Fiscal Policy.

JEL codes: H5; Q02; Q54; R2

Authors E-Mail Addresses: Cmeyimdjui@imf.org; J-louis.combes@uca.fr

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I. INTRODUCTION

The early 2000s has been characterized by tremendous vulnerability concerns in developing countries. This was justified by a considerable increase of external risks due to climate change, the resurgence of the international financial crisis, food import prices volatility, and more recently the Covid-19 pandemic. Moreover, market integration has accelerated the international diffusion of risks. This environment has prompted increasing attention to factors that increase household vulnerability, defined as the probability to fall into poverty or to stay poor following a hazardous perturbation (Chambers, 1989; Essers, 2013). The rising of import food prices over the past decade has been more worrying in countries that rely on agricultural import and where households spend a significant portion of their budget on food expenditure. Undoubtedly, food insecurity, which has been worsening following these shocks, harms development patterns, especially in low-income countries.[2] In these countries indeed, the aggregate demand response to food price shocks is generally larger than those in other countries (Seale, Regmi, and Bernstein, 2003).

A handful of papers that examine the link between food price shocks and household consumption have provided evidence to suggest that food price shocks (or instability) are detrimental to consumption (Minot, 2009; Arezki and Bruckner, 2011; Combes et al., 2014). This is certainly a serious threat to food security, especially for low-income households with limited savings and financial tools to face bad times (Mitchell. 2008). Arezki and Bruckner (2011) highlight that socio-political instability that has followed food crises have generally been triggered by the shortage in consumption (lack of access to food) which households have been facing during those hard times. This then calls for appropriate mitigating tools to be deployed to protect consumption in times of adverse shocks.

While the literature has shown that remittances and various forms of official development assistance have helped improve consumption (Combes et al. 2014), little has been said about the role of governments and fiscal policies in smoothing household consumption in times of food crises. Research on fiscal policies in developing countries have mostly focused on income stabilization, notably on the degree of pro-cyclicality of the fiscal policy (Ilzetzki and Végh, 2008; Carmignani, 2010; Frankel, Vegh, and Vuletin, 2013; Fatas and Mihov, 2003). Against this background, this paper aims to close this gap by assessing whether fiscal policy mitigates the adverse effects of food price shocks on household consumption.

The purpose of this paper is to investigate whether government spending stabilizes household consumption when import food prices surge. To this end, due to severe statistical data constraints on food consumption, the research considers household consumption expenditure per capita as the dependent variable. The calculation of the discretionary government consumption variable uses the methodology developed by Fatas and Mihov (2003) to extract the exogenous (or discretionary) component of government consumption expenditure. A variable that captures government subsidies and other transfers is also considered as a fiscal policy measure. Using a sample of 70 low and middle-income countries over the period 1980 – 2012, the research finds that import

[2] For instance, the harmful effects of food insecurity on human capital may contribute to poor growth prospects (Moser, 1998).

food price shocks negatively and significantly affect household consumption.[3] Fortunately, the results suggest that discretionary government (consumption) expenditure mitigates the effect of import food price shocks on household consumption in time of shocks. However, this result is robust only in African countries and in countries with less flexible exchange rate regimes, as the negative impact of food price shocks on household consumption is significant for these countries while it is not in others.
The findings of this paper point out the fact that resorting to discretionary government expenditure should be considered by governments to sustain household consumption during adverse food price shocks. However, those measures should take fiscal constraints into account. Hence, countercyclical fiscal measures should be limited and priority given to vulnerable population. The rest of this paper is structured as follows: the second section presents a brief literature review. Section 3 presents data and the main stylized facts while the fourth section describes the econometric framework and comments on the results. The last section concludes.

II. LITERATURE REVIEW

The link between food price shocks and household consumption is widely studied in the literature. Minot (2009) points out that food price instability is problematic for households if it negatively affects their consumption. This point aligns with the results found by Combes et al. (2014), and Arezki and Bruckner (2011). The latter, using a large panel data of 120 countries covering the period 1970 – 2007, shows that food price shocks negatively affect private consumption when increasing income and consumption inequality. This is certainly a serious threat to food security, especially for low-income households who spend larger proportions of their budgets on food needs, (Mitchell, 2008, the World Bank 2019). In the same vein, based on survey data from Ethiopia between 2004 and 2008, Alem and Söderbom (2012) establish that larger food price shocks lead to a decrease in household consumption. This effect was particularly acute for households that are involved in the informal sector, as well as those with weak or no assets. A meta-analysis conducted by Green et al. (2013) shows that an increase in food price leads to a decrease in households' consumption. Indeed, these authors find that a one-percentage increase in cereals price (a deviation from its long-run trend) lowers food consumption by about 0.61 percent, with the poorest households being the most affected. Their analysis is based on 136 papers involving 162 countries. Such findings raise the question of how to mitigate the effects of adverse shocks on household consumption.

Based on a large sample of both developed and developing countries, Combes et al. (2014) find that migrant's remittances and official development assistance have significantly reduced the adverse impact of import food price shocks on household consumption.

Social wellbeing is also of concern to governments which have also been adopting measures to enable people to feed themselves and improving their consumption in bad times. Indeed, fiscal policies in times of crises may not only enable households to continue accessing basic needs but would also boost their demand and in that, boost economic growth in the near term. This could be even more pronounced in countries where households face liquidity constraints and cannot easily meet their basic needs in times of shocks. A very prominent example can be seen in many African countries that

[3] The studied period is determined by detailed food trade data availability.

are currently experiencing food security threats due to the Covid-19 crisis. Governments have stepped in to provide both cash transfers/food distribution to households that would be hard hit by the crisis.

Accordingly, Deaton (1989) supports the fact that consumption smoothing implies government stabilizing mechanisms, especially during food crises.[4] These tools are of utmost importance, as food crises have sometimes triggered political turmoil (Watson, 2013). Those stabilization tools generally take the form of food distribution or cash transfers. They are usually channeled by organizations that are assumed to target the neediest groups. A couple of these organizations include (the Productive Safety Net Program in Ethiopia, the National Food Security, and Nutrition Strategy in Liberia, the *Cellule de Lutte contre la Malnutrition* in Senegal, etc.).

Since early 2020, the spread in COVID-19 has resulted in various government support mechanisms aiming to improve access to food. Many governments have used discretionary fiscal policy to smooth the impact of the pandemic and attenuate the negative impact of the increase in prices of imported food products on household consumption. Governments in many countries distributed transfers to households through mobile phones, paychecks, and other means, (IMF, 2020). For instance, in April 2020, the Senegalese government launched a food distribution program to 1 million venerable households, this was part of the emergency fund the government projected to spend on emergency food distribution in response to the pandemic.

Many authors have resorted to microeconomic data to assess the role of cash transfers in coping with adverse shocks in developing countries, (Blank et al., 2010; Lawlord et al., 2019; Bhalla et al. 2018). Due to data unavailability, those studies are generally based on a small number of countries and years, making it impossible to have an idea of the impact of fiscal policy on household consumption in times of food crises at the macroeconomic level. An extensive strand of literature developed by (Feldstein, 1982; Schclarek, 2004; Furceri et Zdzienicka, 2012) has investigated the effect of a counter-cyclical fiscal policy on household consumption. However, they have remained silent on the relationship between fiscal policy and private consumption in time of food crises. This paper is attempting to fill that gap. Fiscal measures might take the form of fiscal stimuli and intend to improve consumption. Such fiscal stimulus could consist of tax cuts (import duties exemptions and/or Value-Added-Tax reduced rate or exemptions) and an increase of government expenditure (namely government consumption expenditure). This paper focuses only on government consumption expenditure, assuming that this is most likely used as a fiscal instrument to improve household access to food in the short run as the shock hit. Since those are generally unanticipated shocks, the assumption is that fiscal authorities would discretionarily increase government consumption to tackle the issue.[5] Government expenditure would take the form of government subsidies on food products, increased public wages, or various transfers (pensions and social safety nets).

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[4]The lag between the moment where the crisis is observed and when households benefit from government response leads to poor outcomes as the target groups that should be the most vulnerable do not necessarily benefit. The amount of the said subsidies is small and might not necessarily lead to an important effect (Jha and Ramaswami 2010).

[5] The research acknowledges that many other emergency measures such as price controls, taxes and tariff reductions, export restrictions, use of buffer stocks, are also generally considered by governments when facing food insecurity. However, as detailed data on those proved hard to obtain, the research focuses only on the impact of discretionary government expenditures.

III. DATA AND STYLIZED FACTS

3.1 Data and Sample

This section successively presents the outcome variable, the imported food price shocks, and the government consumption measures.

The outcome variable is household consumption expenditure per capita (whose data are available over a large sample of 70 low and middle-income countries during 1980 -2012, those data are extracted from the World Bank's World Development Indicators dataset). Although food consumption expenditure would have been more suitable for this analysis, data on it were not available, nor was it possible to obtain reliable information to separate food consumption from the total household consumption. Moreover, the household consumption variable used here is less prone to measurability issues than traditional food security measures.[6] Additionally, compared to households in other countries, households in poorer countries tend to spend a large share of their budget on foodstuff. For example, According to the World Economic Forum 2016, while Algeria, Azerbaijan, Cameroon, Nigeria, and the Philippines spend approximatively 40.1%, 42.5%, 45.6%, 56.4%, and 40.9% respectively on food, Australia, Canada, Singapore, and the US spend 9.8%, 9.1%, 6.7%, and 6.4% respectively.

Price shocks are calculated using the econometric approach developed by Deaton and Miller (1995) and used by Collier and Dehn (2001) and Combes et al. (2014).[7] For each country, the food price index is determined using the values of the most common imported food commodities, see (the joint report by FAO, IMF, and UNCTAD (2011)). Most of these commodities are cereals as their affordability plays a crucial role in food security in developing countries.[8] In other words, this indicator is the average commodity price, weighted by the average imported quantities of each commodity over the period of study. Since contemporaneous demanded quantities might be driven by contemporaneous prices. To overcome the endogeneity issue that could arise from that, contemporaneous prices are weighted by the period averages quantities.[9] Such commodities include wheat, sugar, soybeans, soybeans oil, maize, and rice.[10] Based on this food price index, three price shock indicators are calculated following the steps below.

Firstly, let $w_{i,j\bullet}$ be the relative value of commodity j imported by the country *i* at the constant base year. $w_{i,j\bullet}$ is specified as follows:

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[6] It would have been more informative to use food consumption (demand, diversity, quality, and quantity) but this information is barely available in the sample.

[7] All the methodology used to derived price shocks is directly borrowed from (Combes et al., 2014).

[8] Indeed, Horton, Kerr, and Diakosavvas (1988) find that higher cereal real prices are significantly associated with higher infant mortality in developing countries.

[9] In the previous versions of the paper, the results were almost the same when prices were weighted with annual imported quantities, however, it has been preferred to keep the average quantities for endogeneity issues.

[10] Unfortunately, detailed data on the share of the volume of each commodity on the entire country's basket are not available.

$$w_{i,j\bullet} = \frac{P_{j\bullet} Q_{i,j\bullet}}{\sum_{j=1}^{6} P_{j\bullet} Q_{i,j\bullet}} \qquad (1)$$

Where $Q_{i,j\bullet}$ is the total quantity of commodity j imported by the country i at the base year. Secondly, for each country and each year, the price index is given by

$$P_{i,t} = \prod_{j=1}^{6} P_{j,t}^{w_{i,j\bullet}} \qquad (2)$$

Where $P_{i,t}$ is the price index in the country i at year t, and $P_{j,t}$ is the price of the commodity j in the world market at time t (same price for all countries). 1995 is taken as the base year, this allows us to consider more countries as former Soviet countries' data were recorded more regularly from that year.

Thirdly, for each country, the paper regresses the normalized price index on an intercept, its long –term trend, and its first and second order lags' variables (this helps to control for the fact that the government can use the previous price variability to predict the current price level, thus this autocorrelation is removed here)[11]. By doing so, it attempts to extract food price residuals that are as unpredictable as possible. The regression is specified as follows:

$$\ln(P_{i,t}) = \alpha_{i,0} + \alpha_{i,1} time + \alpha_{i,2} * \sum_{p=1}^{3} \theta_{i,p} \ln(P_{i,t-p}) + \varepsilon_{i,t} \quad (3)$$

As the prices used in this study are measured at the international market and are differently transmitted in each country, the latter regression is run for each country separately. Three indicators of price shocks are then constructed.

The first indicator is the residual of this regression is taken as the shock variable, *Shock.*[12]

The second indicator is the number of positive values of the residual of equation (3) during a period of consecutive four non-overlapping years. This is a proxy of the frequency of positive food price shocks.[13] To obtain the third indicator (*Filter_Shock)*, the Hodrick-Prescott filter is applied to the import price index variable (the logarithm of the computed import food price index computed in equation (2)).[14] The trend component is separated from the cyclical component, which is considered as the exogenous price shocks.

Following Fatas and Mihov (2013) and Agnello and Sousa (2009), the discretionary component of government consumption is computed, assuming that fiscal policy is implemented in each country dependent on its own matter. Therefore, the following regression is run for each country separately:

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[11] The results remain robust when only one lag or three lags were introduced.

[12] While the pattern of the shock variable generated using the logarithm of the price index does not differ significantly from the one generated using the price index variable in level, the first one was preferred to erase the scale of the price index through years and countries.

[13] Combes et al. (2014) is followed to compute their food price shocks variables.

[14] Following Ravn and Uhlig (2002), $\lambda = 6.25$ was considered as the smoothing parameter. Since the price shock variable that was generated using this Hodrick-Prescott filter displays the same variation as the first price shock variable generated in equation (3), this research only focuses on this linear filter.

$$\Delta GOV_t = \beta_0 + \beta_1 * time + \beta_2 * \Delta GOV_{t-1} + \beta_3 * Z_t + \beta_4 * OUTGAP_t + \varepsilon_t \qquad (4)$$

Where: *time* represents the trend; ΔGOV is the differential term of the government expenditure as a share of GDP in time t minus its value in time $(t-1)$; Z is a vector of variables that are susceptible to affect government expenditure. This paper follows Fatas and Mihov (2003) and control for *Inflation* and *Inflation Square* in order to purge any effect that inflation episodes could have on fiscal government policies and production. The cyclical component of the GDP per capita (used here as a proxy of the output gap) is also controlled for.[15] To deal with the fact that this is a generated variable and could be biased by construction, the output gap coefficient is corrected using a bootstrap process with 250 replications in these country-by-country regressions. The regression is performed for each country separately. The residual term of this regression is considered as the exogenous component of government consumption.

The discretionary government consumption variable is the standardized variable of *Resid Gov* and is computed as follows:

$$\text{Discretionary Gov exp}_{i,t} = \frac{Resid\ Gov_{i,t} - \overline{Resid\ Gov_{\iota}}}{\sigma(Resid\ Goov_{i,t})} \qquad (5)$$

Where *Discretionary Gov exp* is the discretionary government expenditure, *Resid Gov* is the residual of the equation (4) while *Resid Gov* "bar" is the yearly average of Resid Gov for all country in the sample, while sigma is the standard error of *Resid Gov* for the entire sample.

The other fiscal policy variable used in this paper is government subsidies and other transfers, which might be the part of government consumption expenditure used to target household consumption to reach households.[16] These measures include transfers to workers (though wages), direct subsidies on certain basic foodstuff, etc. The paper recognizes the fact that government subsidies may not only apply to foodstuff, but also to other products such as fuel and energy. However, disaggregated data on those were not available. The paper assumes that food security-related subsidies might be quite important as a share of total subsidies and transfers.

3.2 Stylized Facts

Figure 1 shows the patterns of the mean of the two import price shocks (*Shock* and *Filter Shock*). It appears that the two variables are strongly correlated.

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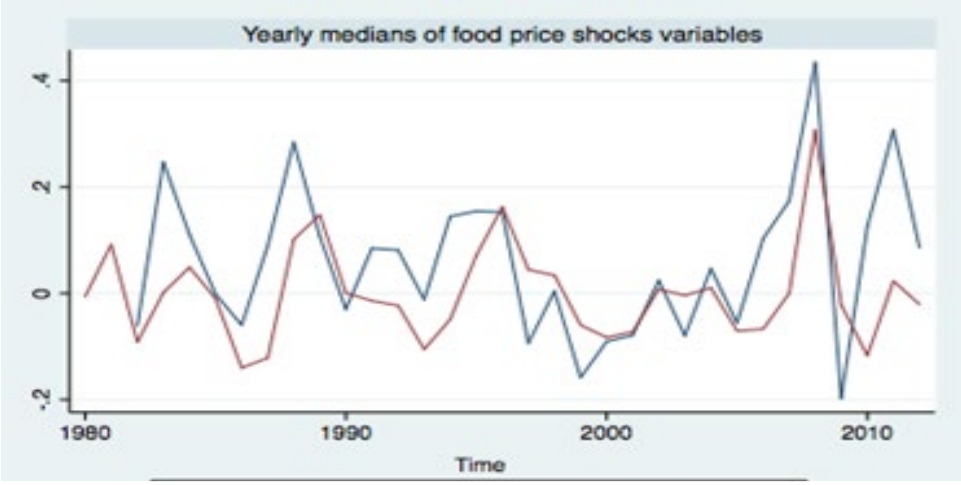
[15] The cyclical component is obtained using the Hodrick-Prescott filter on the GDP Per capita with a filter parameter λ of 6.25 (Mountford and Uhlig,2009). Indeed, while this value might seem arbitrary, the results did not change when λ=150 was used. Hence, the research sticks to 6.25 which has been quite used in the literature.

[16] Government subsidies and other transfers are part of individual government consumption expenditure.

Figure 1. Patterns Of Import Food Price Shocks Variables :

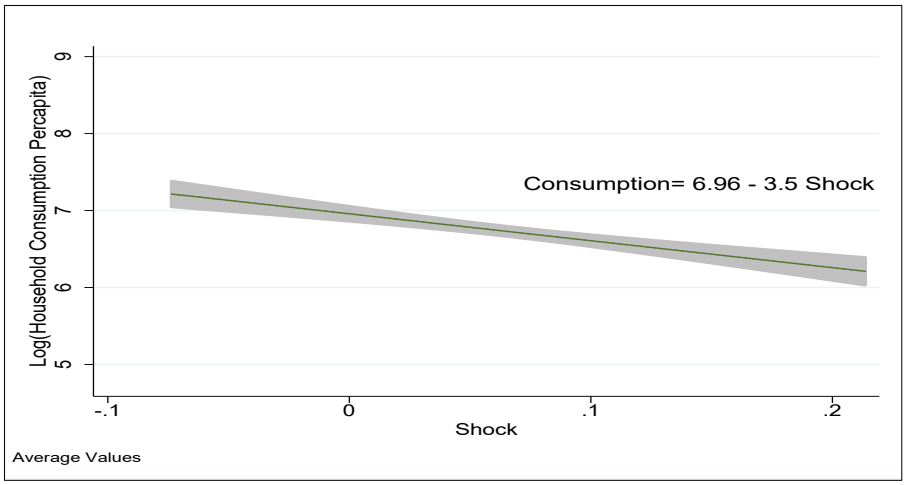


Source: Authors calculation using FAO and IMF data. Note: The blue line is *Shock*, and the red line is *Filter_Shock*

This chart shows that import price shocks have been frequent over the period (1980-2010), but an upward trend is seen from 2002 to 2011, with the highest values in 2006-2007 and then in 2011, materializing the 2006-2008, and 2011 surges in food price shocks. A fall is seen in 2009, and in earlier 2012.

Furthermore, as shown in figure 2, household expenditure per capita is negatively correlated with import food price shocks.

Figure 2. Food Price Shocks And Household Consumption Per Capita



Source: Authors, using WDI, FAO and WEO data. Notes: This figure uses data from developing countries (table 6 in the Appendix) during the period 1980-2012. This figure uses pooled time series cross section data.

Table 1 (see Appendix) shows the descriptive statistics of the variables used in this paper. The statistics are given by household consumption quartiles. Table 1 shows that countries with the lowest household consumption are associated with the highest food price shocks (on average 0.08 versus 0.05). This is also true when considering the positive shocks: on average, the countries that belong to the lowest household consumption quartile experience a 4.62 weigh of positive shocks versus 3.55 for the highest household consumption quartile. Surprisingly, discretionary government consumption expenditure has an average negative value for the lowest household consumption quartile (suggesting that countries that belong to this quartile tend to be those with most episodes of an unpredicted reduction in government consumption expenditures). Conversely, on average, countries from the highest household consumption quartiles experience a positive discretionary government consumption expenditure. In parallel, countries in the lowest household consumption quartile benefit fewer government transfers and subsidies (23% of expense) compared to 29% and 34% for the intermediate and the highest household consumption quartiles respectively. Even if those are purely descriptive analyses, they tend to support the point by del Granado, Coady, and Gillingham (2012), according to which government transfers and subsidies do not always benefit those who need them most, but only the richest benefit most of the time. From the same table, it also appears that while countries in the lowest household consumption quartile benefit fewer remittances per capita compared to others (3 against 7 and 4 for other quartiles), they receive more official development assistance than others (12 % of GDP against 5 and 1 for the intermediate and highest consumption quartiles), this is not surprising when considering the assumption that official development assistance is granted according to the level of difficulties experienced in a given country. It also appears that on average, countries with the lowest levels of household consumption have the lowest level of financial private credit, which could be one of their constraints. Regarding the flexibility of the exchange rate regime, there is no evidence that countries with the lowest or highest level of household consumption have more or less flexible exchange rate regimes respectively.

However, these patterns are purely descriptive and cannot speak about causality. For that reason, in the following section, the research calls to an econometric approach that allows not only to control for other variables in the model but also to investigate the causal relationship.

IV. ECONOMETRIC FRAMEWORK

4.1 The Model

The purpose of this paper is to highlight the dampening effect (if there is) of fiscal policy on household consumption in time of food price shocks. As mentioned above, the discretionary component of government consumption is considered. As for the robustness checks, government transfers (as a percentage of expense) is used as the fiscal policy variable. The model, which takes the inertia in the household consumption dynamic into account, is shown below:

$$House\ Cons_{i,t} = \alpha_1 House\ Cons_{i,t-1} + \alpha_2 \text{Shock}_{i,t} + \alpha_3 disGovexp_{i,t} + \alpha_4 \text{Shock}_{i,t} * Gdisovexp_{i,t} + \alpha_5 Z_{i,t} + v_i + w_t + \varepsilon_{i,t} \quad (6)$$

Where: *HCONS* is the household consumption per capita for the country *i* at period *t*, $HCONS_{i,t-1}$ is the first lag of consumption expenditures (in fact, a household might not be able to significantly modify their consumption habits in the short run, which would lead to inertia in this variable), *Shock* is the import food price shocks variable, *disGovexp* is the fiscal policy variable (which in this study is the discretionary component of consumption government expenditure, or the government transfers and other subsidies), *Z* is the vector of control variables used in the model (see definitions of variables in table 7 in Appendix); $\varepsilon_{i,t}$is the error term, v_i is the country fixed-effects (which control for countries invariant unobserved characteristics) and w is the year fixed-effects (which control for current global common phenomena). α_2 is expected to be negative whether α_4 is expected to be positive.

From the model on equation (6), the level of government expenditure (threshold) at which the negative effect of import food price shocks on household consumption is completely cleared can be calculated as follows:

$$\frac{\partial(\text{HCONS})_{i,t}}{\partial(\text{SHOCK})_{i,t}} = \alpha_2 + \alpha_4 * disGovexp_{i,t} = 0 \rightarrow disGovexp^* = -\alpha_2/\alpha_4 \quad (7)$$

The control variables are the following: *revenue (total fiscal revenue),* which depends on taxation and can negatively affect household consumption; Net remittances received per capita*)* and net official aid assistance (Per capita) which are used to control for the dampening role of remittances and external assistance on household consumption (Clark, 1992; Combes et al., 2014; Zhu et al., 2014); credit to the private sector, which is measured as the ratio of private credit over GDP and allows controlling for the fact that access to credit can enable households smooth shocks (Bacchetta and Gerlach, 1997); *GDP Per capita* (in constant term 2011 and measured in logarithm), which is used to control for the income effect. Trade openness, which is measured as the ratio of imports and exports over GDP captures the fact that trade openness could both improve the economic situation and also enhance economic instability with potential consequences on households' consumption (Nasreen and Anwar, 2014). Those variables are extracted from WDI, FAO STATISTIQUES, and the IMF's World Economic Outlook databases. Given that the effect of fiscal policy could also depend on flexibility of the exchange rate regime, (Ilzetzki, Mendoza, and Végh, 2013; Fatás and Rose, 2001) the *Exchange rate regime* is controlled for. This variable is borrowed from the exchange rate regime classification by Reinhart and Rogoff (2004) and is ranked between 1 and 15, that is, from the most fixed exchange regime to the most flexible.

To run the regression of equation (6), the OLS estimator with countries' fixed-effects may not be appropriate given the potential correlation between the first lag dependent

variable and the error term[17]. In fact, OLS estimates in the presence of both the lag variable and the error term are subject to a *Nickel* bias (Nickell 1981) which is particularly relevant in small samples as ours. Since suitable external instruments to address this bias are not available, the model is run using the GMM approach developed by Blundell and Bond (1998), which allows for instrumenting the endogenous variables with internal instruments. Several GMM estimators have been proposed and of all, the system-GMM is the most consistent. It proceeds by instrumenting variables in first difference with those in level and inversely; those in level are instrumented by the first difference variables. Its estimates are then robust and stable, as the process imposes average stability condition on the dependent variable. In the model, import food price shocks and the discretionary components of government consumption are considered as exogenous variables.

The model is validated by the rejection of the over-identification hypothesis, the presence of the first-order serial independence, and the absence of that second-order, (Arellano, 2003; Arellano and Bond, 1991).[18] The 33 years period is split into sub-periods of 4 years in order to obtain more consistent and asymptotically efficient estimators.[19] In fact, working with sub-period windows helps to neutralize high-frequency events that could be sources of noise and hinder the convergence of the estimates.[20] Furthermore, as pointed out by (Roodman, 2009), the issue of too many instruments generated by the GMM system approach have been tackled by limiting the fixed number of lags.[21]

4.2 Estimation Results

a) Baseline results: Household consumption, import food price shocks and fiscal policy

The results are validated by the relevant statistics concerning the system-GMM estimator. The first-order serial correlation (AR1) is not rejected, whereas that of the second-order (AR2) is rejected. Furthermore, the Hansen-statistics of over-identification rejects the over-identification hypothesis. Note that the number of observations or countries varies from one regression to the other depending on data availability.

Table 2 shows that import food price shocks significantly and negatively affect household expenditure (column 1). This result remains unchanged when remittances and official development assistance (column 2), and fiscal revenue and trade openness are added (column 3). Although the effects of these controls seem not to strongly affect household

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[17] Having an autocorrelation coefficient of about 80% between the current household consumption and the one of the previous period, any model would not consider the lag of the dependent variable as part of explanatory variables would lead to upward- biased estimates.

[18] Moreover, the Windmeijer correction is also applied in its second step version in order to correct standard errors (Windmeijer,2005).

[19] The last sub-period covers 5 years.

[20] It is acknowledged that working on sub-period may raise a concern as the paper is dealing with shocks that may bear more sense when data frequency is high. However, due to the inconsistency that the GMM estimates might present when using yearly data, sub periodic data are used, meaning that the paper is working on average shocks.

[21] As number of explanatory variables are extracted from estimations, their estimated standard deviations could be biased (Wooldridge, 2002). Unfortunately, these standard errors could not be bootstrapped as the number of observations does not allow the GMM estimator to be performed by considering the bootstrap option.

consumption, almost all regressions consistently show that the increase of financial credit to the private sector strongly and positively increases household consumption. Moreover, these results are still consistent when focusing on the frequency of positive shocks only (column 4). More specifically, positive shocks lead to a significant decrease in household consumption. This result is consistent with those by (Arezki and Bruckner, 2011; Combes et al., 2014), who also find that positive shocks decrease household consumption. Even if the discretionary government expenditure is not significant, the interactive term between import food price shocks variable and the former is positive and significant: discretionary government expenditure involved in time of positive import food price shocks smooths household consumption by mitigating the negative effect of these shocks. This result suggests that discretionary fiscal policy can be effectively used as a countercyclical tool when the discretionary policy amounts to 0.06- 0.09 points (deviation of the government consumption expenditure from its long-term trend).[22] The threshold at which discretionary government expenditure completely clears the negative effect of the price shock on household consumption is given in the table below.

Import food price shocks significantly lead to a decrease in household consumption in SSA countries as well as in African countries (columns 1 and 2). This negative effect is dampened by government discretionary expenditure involved in time of food price shocks when the deviation of government consumption expenditure from its long-term trend is around 0.07 points. Conversely, although food price shocks seem to significantly and negatively affect other developing countries, the interactive effect with fiscal policy is not statistically significant in that sub-sample. These results still hold when other measures of import food price shocks are used, namely the frequency of positive food price shocks and the shock variable computed using the Hodrick-Prescott filter (column 4-7). This result could be implying that African countries, as they are on average the most vulnerable to import food price shocks, are more likely to call on counter-cyclical fiscal instruments. Indeed, given that lower consumption levels (under which many African countries fall) would be more affected by positive food price shocks than higher consumption levels, government intervention would likely assist them to cope with adverse external shocks. Remittances also appear to positively affect household consumption.[23]

[22] However, it is cautious not to put any exact economic numbers here, even though estimates may be quite informative at least on the reflection regarding policy tools. For the same reason, is has been preferred not to assign any outcome (_in terms of GDP for example) equivalent.

[23] The fact that the effect of Official Development Assistance is negative is probably due to the low size of the sample used in this paper.

Table 2. Household Consumption, Food Price Shocks and Fiscal Policy

	(1)	(2)	(3)	(4)
Dependent Variable	Log (Household Consumption/Capita)			
L.Log(Household Consumption Per capita)	0.899***	0.830***	0.843***	0.879***
	(10.57)	(7.98)	(11.25)	(11.64)
Shock	-1.848**	-2.685***	-2.010***	
	(-2.27)	(-2.63)	(-2.62)	
Discretionary Gov Expenditure	-0.161	-2.747	-2.442	-2.739*
	(-0.19)	(-1.30)	(-1.50)	(-1.68)
Shock* Discretionary Gov Expenditure	29.06**	37.86**	22.04*	
	(2.07)	(2.14)	(1.92)	
GDP Per capita	0.630	-0.0521	0.332	1.101
	(0.46)	(-0.02)	(0.14)	(0.48)
Private Credit	0.205*	0.336**	0.233	0.221
	(1.91)	(2.23)	(1.36)	(1.58)
Remittances		0.298	0.276	0.292
		(0.38)	(0.65)	(0.57)
Official Development Assistance		0.255	0.00355	-0.0458
		(0.43)	(0.00)	(-0.07)
Fiscal Revenue			0.0173	-0.00604
			(0.04)	(-0.02)
Trade Openness			-0.402	-0.519**
			(-1.17)	(-2.04)
Positive Shock				-0.0737*
				(-1.71)
Positive Shock *Discretionary Gov Expenditure				1.180*
				(1.91)
Constant	0.518	1.325*	1.093*	0.993
	(0.86)	(1.65)	(1.72)	(1.55)
Number of Observation	400	368	294	294
Number of Country	70	68	66	66
Ar1(p-value)	0.0758	0.0515	0.0541	0.0645
Ar2(p-value)	0.370	0.108	0.128	0.162
Hansen(p-value)	0.356	0.373	0.265	0.167

The results are obtained by the two-step system-GMM with the *windmeijer correction* (Windmeijer, 2005) of standard errors. Data are averaged over eight non overlapping 4-years periods during 1980–2011. *t* statistics in parentheses. $^{*}p< 0.10$, $^{**}p< 0.05$, $^{***}p< 0.01$. Price shocks and the government discretion variables are considered exogenous. The lag of the dependent variable is considered as predetermined and all other control variables are considered contemporaneously endogenous. Official Development Assistance is the net official development assistance received Per capita. For scale reasons, Private credit, the logarithm of GDP per capita, remittances, ODA, Government revenue, and trade openness are divided by one hundred.

To assess whether this result is the same through all the geographical areas covered in this study, the sample is split into two sub-samples, namely: African and non-African countries. Within Africa, one regression is run on only sub-Saharan countries (SSA), as they are known to be the most vulnerable while presenting the most unstable fiscal policy outcomes (Fatas and Mihov, 2013). The results are shown in Table 3.

Table 3. Food Price Shocks, Household Consumption, Food Price Shocks and Fiscal Policy in Africa Versus Non-Africa

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Log (Household Consumption/Capita)						
Sample	SSA	Africa	Others	SSA	Others	SSA	Africa
L.Log(Household Consumption Per capita)	0.952***	0.907***	0.757***	0.900***	0.707***	0.895***	0.906***
	(3.95)	(6.82)	(6.69)	(3.36)	(4.41)	(4.31)	(5.10)
Shock	-1.844*	-2.031***	-1.807*				
	(-1.95)	(-3.05)	(-1.95)				
Discretionary Gov Expenditure	1.204	-1.454	0.162	4.713	0.583	-2.678	-0.790
	(0.71)	(-1.39)	(0.36)	(0.36)	(0.40)	(-0.55)	(-0.46)
Shock* Discretionary Gov Expenditure	24.56**	23.25*	-10.66				
	(2.44)	(1.85)	(-1.27)				
Private Credit	-0.0775	0.230	-0.129	-0.101	-0.0469	0.276	0.118
	(-0.16)	(0.43)	(-0.52)	(-0.23)	(-0.50)	(0.66)	(0.30)
GDP Per capita	2.325	1.097	-2.872	6.135	-2.290	1.940	-0.482
	(0.36)	(0.12)	(-0.57)	(0.70)	(-0.89)	(0.51)	(-0.13)
Remittances	0.278	0.0269	0.322	0.605**	-0.847	0.335**	0.190
	(1.07)	(0.11)	(0.29)	(2.06)	(-1.21)	(2.13)	(0.74)
Official Development Assistance	-0.0723	-0.237	-2.197	-0.490	-1.958	-0.209	-0.512
	(-0.16)	(-0.73)	(-1.35)	(-0.90)	(-1.59)	(-0.67)	(-0.77)
Fiscal Revenue	-0.427	-0.607	0.0509	-0.401	1.173*	-0.166	-1.659
	(-0.43)	(-0.79)	(0.09)	(-0.14)	(1.92)	(-0.18)	(-1.23)
Trade Openness	-0.149	-0.152	0.373*	-0.0962	0.550	-0.142	-0.124
	(-1.20)	(-1.18)	(1.83)	(-0.52)	(1.00)	(-1.32)	(-0.99)
Filter Shock				-6.097**	-2.298		
				(-2.29)	(-0.39)		
Discretionary Gov Expenditure_Filter Shock				91.99*	31.29		
				(1.89)	(0.60)		
Positive Shock						-0.144***	-0.160*
						(-2.78)	(-1.74)
Discretionary Gov Expenditure_Positive Shock						2.096**	2.096**
						(2.41)	(2.05)
Constant	-0.0336	0.687	2.206***	-0.410	2.079*	0.516	1.413
	(-0.02)	(0.57)	(3.19)	(-0.15)	(1.72)	(0.34)	(0.98)
Number of Observation	112	139	155	118	192	118	147
Number of Country	26	33	33	27	43	27	35
Ar2(p-value)	0.0623	0.0408	0.0190	0.0738	0.00662	0.0520	0.0749
Hansen(p-value)	0.366	0.160	0.918	0.923	0.276	0.121	0.682
Number of Observation	0.726	0.401	0.724	0.777	0.787	0.283	0.956

The results are given by the two-step system-GMM with the *windmeijer correction* (Windmeijer,2005) of standard errors. Data are averaged over eight non-overlapping 4-years periods during 1980–2011. *t* statistics in parentheses. $^{*}p< 0.10$, $^{**}p< 0.05$, $^{***}p< 0.01$. Price shocks and the government discretion variables are considered exogenous. The lag of the dependent variable is considered as predetermined and all other control variables are considered contemporaneously endogenous. Official Development Assistance is the net official development assistance received Per capita. For scale reasons, Private credit, the logarithm of GDP per capita, remittances, ODA, Government revenue, and trade openness are divided by one hundred. Others include Non-African countries. Refer to table 6 for the lists of countries considered in each regression.

b) Robustness check. Household consumption, food price shocks and government subsidies

The fiscal policy might most directly go through subsidies and other transfers to the workers or households. That is why the government transfers (as a share of GDP) is used as another fiscal policy variable.

Table 4 presents the effect of food price shocks on household consumption once fiscal government subsidies (and other transfers) are involved. Unfortunately, it was not possible to find data that compute government subsidies and other transfers separately. In column 1, import food price shocks negatively and significantly affect household consumption. Moreover, as found in Table 2, the interaction term between government

transfers and food price shocks is significant and positive: government subsidies mitigate the negative effect of food price shocks on household consumption.

Precisely, when focusing on the frequency of positive food shocks, the results in column 2 show that positive import price shocks rigorously decrease household consumption. Government subsidies undoubtedly play a mitigating role. The result remains unchanged when another measure of food price shock is used (column 3).[24]

Table 4. Food Price Shocks, Household Consumption and Government Transfers

	(1)	(2)	(3)
Dependent Variable	Log (Household Consumption/Capita)		
L.Log(Household Consumption Per capita)	0.789***	0.330**	0.573***
	(5.89)	(2.21)	(4.94)
Shock	-1.512*		
	(-1.90)		
Government Transfers	0.00377	-0.00335	0.00581
	(0.99)	(-1.24)	(1.53)
Shock*Government Transfers	0.0172**		
	(2.05)		
Private Credit	0.231	-0.155	0.00785
	(0.65)	(-0.65)	(0.03)
GDP Per capita	-1.048	57.11*	9.937
	(-0.08)	(1.96)	(0.88)
Remittances	-0.000857	0.503**	0.0112
	(-0.00)	(2.06)	(0.04)
Official Development Assistance	-0.527	0.301	-0.387
	(-0.56)	(0.69)	(-0.62)
Fiscal Revenue	0.582	1.357***	-0.662
	(0.31)	(3.83)	(-0.78)
Trade Openness	-0.0970	-0.148	0.0457
	(-0.50)	(-1.04)	(0.32)
Positive Shock		-0.0235**	
		(-2.15)	
Positive Shock*Government Transfers		0.00106***	
		(2.95)	
Filter Shock			-2.084**
			(-1.98)
Filter Shock*Government Transfers			0.0445**
			(2.08)
Constant	1.448	-2.049	1.814
	(0.63)	(-0.76)	(1.57)
Number of Observation	172	172	202
Number of Country	49	49	60
Ar1(p-value)	0.0916	0.0544	0.0950
Ar2(p-value)	0.177	0.0651	0.116
Hansen(p-value)	0.264	0.852	0.650

The results are given by the two-step system-GMM with the *windmeijer correction* (Windmeijer, 2005) of standard errors. Data are averaged over eight non-overlapping 4-years periods during 1980–2011. *t* statistics in parentheses. $^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$. Price shocks and the government discretion variables are considered exogenous. The lag of the dependent variable is considered as predetermined and all other control variables are considered contemporaneously endogenous. Official Development Assistance is the net official development assistance received Per capita. For scale reasons, Private credit, the logarithm of GDP per capita, remittances, ODA, Government revenue, and trade openness are divided by one hundred.

Hence, since both government subsidies and discretionary government consumption expenditure seem to smooth the adverse effect of positive food price shocks on household consumption, it can be concluded that discretionary measures likely pass through government transfers and subsidies. Though by switching from the discretionary

[24] It would have been good to see whether government save during negative food price shocks, however, this research could not find any effect of negative food price shocks on household consumption expenditure, that could be due to the fact that the negative values of shocks were generally very low (results are available upon request).

government consumption expenditure to government subsidies, not only government consumption measures that are involved in case of emergency are considered. While the results remained unchanged when food production was added as a control variable, the estimates did not seem consistent due to too missing data on the food production series.

c) Heterogeneity: Household consumption, food price shocks and fiscal policy depending the exchange rate regime.

According to Ilzetzki, Mendoza, and Végh (2013), the effect of fiscal policy generally depends on the exchange rate regime.[25] This hypothesis is tested as follows: Exchange regime data are recorded from 1984 to 2010 and the results are displayed in table 5.

Table 5. Food Price Shocks, Household Consumption and Fiscal Policy by Exchange Rate Regime

	(1)	(2)	(3)	(4)
Dependent Variable	Log (Household Consumption/Capita)			
Sample	Fixed Exchange Rate Regime		Flexible Exchange Rate Regime	
L.Log(Household Consumption Per capita)	0.853***	0.855***	0.599**	0.952***
	(7.52)	(7.80)	(2.04)	(13.51)
Shock	-1.156**		-1.762	0.539
	(-2.06)		(-1.38)	(1.06)
Discretionary Gov Expenditure	-0.139		0.174	
	(-0.25)		(0.21)	
Shock* Discretionary Gov Expenditure	9.762**		4.559	
	(2.05)		(0.59)	
Private Credit	0.340**	0.115	0.635**	0.0470
	(1.98)	(0.36)	(2.26)	(0.72)
GDP Per capita	1.591	0.822	9.172**	1.280
	(0.76)	(0.48)	(2.56)	(0.70)
Remittances	0.0830	-0.378	3.217	0.567
	(0.44)	(-0.30)	(1.25)	(0.66)
Official Development Assistance	-0.712	-0.819	-0.399	-0.321
	(-1.26)	(-0.39)	(-0.33)	(-0.37)
Fiscal Revenue	-0.331	0.946	0.520	-0.149
	(-0.54)	(1.36)	(0.44)	(-0.30)
Trade Openness	-0.0111	0.232	-0.0175	0.467***
	(-0.08)	(0.84)	(-0.09)	(2.71)
Positive Shock		-0.150*		
		(-1.81)		
Government Transfers		0.000967		0.00149
		(0.23)		(0.74)
Positive Shock*Government Transfers		0.00451**		
		(2.55)		
Shock*Government Transfers				0.00690
				(0.99)
Constant	0.832	0.865	1.334	0.158
	(1.31)	(0.92)	(0.58)	(0.27)
Number of Observation	153	101	133	82
Number of Country	48	39	42	30
Ar1(p-value)	0.0662	0.0799	0.0878	0.0458
Ar2(p-value)	0.380	0.188	0.122	0.896
Hansen(p-value)	0.673	0.770	0.611	0.668

The results are given by the two-step system-GMM with the *windmeijer correction* (Windmeijer, 2005) of standard errors. Data are averaged over eight non-overlapping 4-years periods during 1980–2011. *t* statistics in parentheses. $^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$. Price shocks and the government discretion variables are considered exogenous. The lag of the dependent variable is considered as predetermined and all other control variables are considered contemporaneously endogenous. Official Development Assistance is the net official development assistance received Per capita. For scale reasons, Private credit, the logarithm of GDP per capita, remittances, ODA, Government revenue

[25]Using quarterly data from 40 countries, they find that government expenditure expansion leads to an increase in economic activities under fixed exchange rate regimes, and no effect under flexible exchange rate regimes.

and, Trade openness are divided by one hundred.

The sample is split with regards to the flexibility of the exchange rate regime (less flexible exchange rate regimes are those with the exchange rate regime ranked from 1 to 6, while more flexible exchange rate regimes are those with the exchange rate regimes ranked between 7 and 15). Import food price shocks seem to affect household consumption only in countries with less flexible exchange rate regime, that supports the traditional wisdom according to which countries with fixed exchange rate regimes have less room to counter external shocks. Moreover, it is found that the dampened effects of discretionary government consumption expenditure and government transfers on household consumption in time of import price shocks is only significant in countries with less flexible exchange rate regimes. This result is interesting and aligns up with the literature that claims that government consumption multiplier is larger in countries with fixed exchange regimes while there is no effect or lesser effect of fiscal policy under the flexible exchange rate regime. This finding thus supports the fact that less flexible exchange rate regimes tend to have greater shock absorption capacity.

V. CONCLUSION AND DISCUSSIONS

This study relies on a panel of 70 developing countries covering the period 1980-2012 to assess the impact of discretionary fiscal policy, which is more likely to be implemented by the government in response to import food price shocks with the aim of stabilizing household consumption. In the height of import food price shocks which negatively and significantly impact household consumption, discretionary government consumption plays a resilient role. In parallel, the results show that government subsidies play a mitigating role on household consumption in time of positive import food price shocks (recall that by switching from the discretionary government consumption expenditure to government transfers and subsidies, government consumption measures that are involved in case of emergency are not the only consumption components considered). These results are robust only in African countries and in countries with less flexible exchange rate regimes, where import food price shocks lead to a decrease in household consumption. The results are robust regardless of the control variables that are included in the model. While these findings should be taken with caution due to certain limitations on data, a number of lessons could be drawn. The conclusion points out the fact that policymakers should not neglect the use of discretionary government expenditure, as it is helpful in improving household consumption in bad times.

Regarding the dampened effect of fiscal policy, the results are to be particularly emphasized, as countries have been consolidating their public finances since the last decade. Thus, this consolidation may be implemented in terms of composition, as one component like government subsidies is hugely important for short-run matters. However, this policy should be implemented carefully while ensuring that those who benefit from these transfers are those in need, (Besley and Kanbur,1988; del Granado, Coady, and Gillingham, 2012). Furthermore, the results establish the importance of financial deepening in these countries, as private credit positively affects household consumption in many cases. Any other measures aiming to reduce household consumption vulnerability to import food price shocks would be helpful, as they could substitute fiscal interventions while lowering the fiscal deficit.

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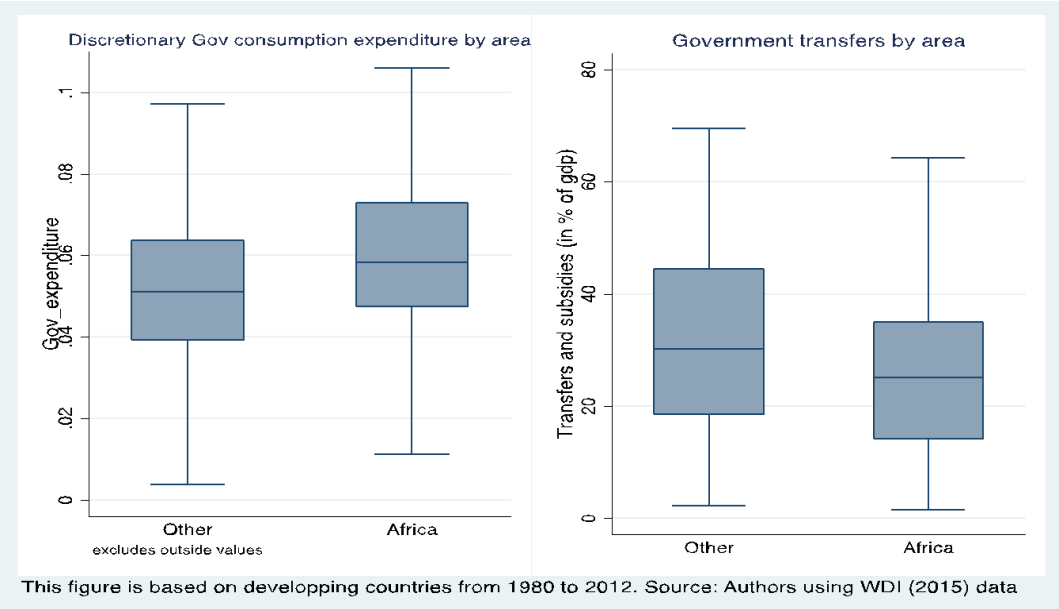
VI. APPENDIX

Figure 4. Fiscal Policy by Geographic Area



Note: On the y-axis of the figure at the left, gov-expenditure is the discretionary component of government consumption expenditure.

Table 1. Summary Statistics

	First quartile of Household Consumption					Second quartile of Household Consumption					Third quartile of Household Consumption				
Variable	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
Log(Household Consumption)	196	5,69	0,31	4,70	6,12	196	6,68	0,34	6,12	7,32	196	7,78	0,33	7,33	8,64
Shock	171	0,08	0,10	-0,15	0,32	164	0,07	0,09	-0,13	0,32	180	0,05	0,09	-0,18	0,27
Positive Shock	171	2,10	1,33	0,00	4,00	164	1,95	1,23	0,00	4,00	180	1,76	1,23	0,00	4,00
Filter Shock	196	0,00	0,04	-0,09	0,08	196	0,00	0,04	-0,08	0,07	196	0,00	0,03	-0,06	0,06
Discretionary Gov Expenditure	189	-0,06	1,51	-20,72	0,16	193	0,05	0,15	-1,32	0,76	194	0,03	0,26	-3,36	0,26
Government Transfers	61	23,72	15,80	1,48	65,04	100	29,53	16,58	2,28	66,75	105	34,00	15,18	6,27	69,51
Private Credit	182	15,99	14,15	1,77	100,81	189	30,09	24,29	2,43	148,48	182	42,20	30,34	3,68	151,92
GDP Per capita (Log)	196	11,03	2,64	2,40	16,56	189	11,09	2,68	5,18	17,18	184	10,54	2,58	6,70	17,13
Remittances	161	3,28	5,34	0,01	43,93	176	7,26	13,71	0,01	95,09	171	4,08	5,79	0,00	29,23
Official Dev Assistance	190	12,35	11,62	0,15	90,16	184	5,60	6,23	0,01	43,87	182	1,80	2,95	-0,07	26,01
Fiscal Revenue	159	17,99	6,82	1,19	44,16	140	25,42	9,35	10,82	59,77	137	24,79	8,48	5,49	59,92
Trade Openness	182	16,58	25,20	-41,49	171,64	184	13,42	14,85	-39,92	69,34	182	11,02	11,16	-21,11	50,67
Exchange Rate Regime	175	7,17	4,09	2	15	190	6,91	3,69	1	15	179	7,32	4,46	1	15

Table 6. Countries and Number Of Observations

Africa	Sub-Saharan Africa	Others
Algeria (6), Benin (6), Botswana (3), Burkina Faso (7), Burundi (2), Cameroon (3), Chad (1), Comoros (2), Congo (5), Gabon (5), Gambia (3), Guinea-Bissau (1), Kenya (7), Lesotho (7), Liberia (2), Madagascar (7), Malawi (2), Mali (3), Mauritania (1), Mauritius (3), Morocco (6), Mozambique (6), Namibia (6), Nigeria (3), Rwanda (4), Senegal (5), Sierra Leone (3), South Africa (3), Swaziland (6), Tanzania (5), Togo (6), Tunisia (6), Uganda (4)	Benin (6), Botswana (3), Burkina Faso (7), Burundi (2), Cameroon (3), Congo (5), Gambia (3), Guinea-Bissau (1), Kenya (7), Lesotho (7), Liberia (2), Madagascar (7), (2), Mali (3), Mauritius (3), Mozambique (6), Namibia (6), Nigeria (3), Rwanda (4), Senegal (5), Sierra Leone (3), South Africa (3), Sudan (6), Swaziland (6), Tanzania (5), Togo (6), Uganda (4)	Albania (3), Armenia (4), Azerbaijan (4), Bangladesh (7), Belarus (2), Belize (4), Bhutan(2), Brazil (4) , Cambodia (4), China (4), Colombia (7), Costa Rica (6), Dominican Republic (4), Ecuador (5), Egypt (4), El Salvador (6), Georgia (4), Guatemala (5), Honduras (6), India (6), Indonesia (7), Iran (5), Jordan (7), Kazakhstan (5), Kyrgyz Republic (5), Laos (2), Lebanon (3), Macedonia (4), Malaysia (6), Mexico (6), Moldova (4), Mongolia (1), Nicaragua (3), Pakistan (6), Panama (7), Paraguay (5), Peru (3), Philippines (6), Tajikistan (3), Thailand (5), Turkey (3), Ukraine (2), Vietnam (3)

Note: Number of observations in the parentheses.

Table 7. Variables, Definitions And Sources

Variables Price shocks	Definitions see section (3)	Sources WEO (2015)[25] FAOSTATISTIQUES (2016)
Household Consumption Per capita)	Total household consumption expenditure as % of GDP	WDI (2015)
Government Transfers	Government subsidies, grants, transfers, social security and assistances, and employer social benefits (as% of expense)	WDI (2015)
GOV	Government consumption expenditure, include all government current expenditure to purchase goods and services (including compensation of employees but excluding military expenditure) as % of GDP	WDI[26] (2015)
Discretionary Gov Expenditure	Current government expenditure (see section 2)	WDI (2015) and author's calculations
Exchange Rate Regime	Categorical variable ranking from 1(lowest flexibility) to 15 (highest flexibility)	(Reinhart and Rogoff 2004; Ilzetzki,Reinhart,and Rogoff 2017)
GDP Per capita	logarithm of GDP per Capita in constant term 2011	WDI (2015)
Trade Openness	trade openness, measured as the sum of goods and services import and export over the total GDP	WDI (2015)
Private Credit	ratio of the credit addressed by the financial and bank sectors to the private sector in % of GDP	WDI (2015)
Remittances	Net remittances received par individual from abroad in % of GDP	WDI (2015)
Official Development Assistance	Net Official assistance received Per capita	WDI (2015)
Inflation	Inflation Deflator	WDI (2015)

Source: Authors