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When to Hit the Panic Button?  
Impact of Currency Crisis  
on Consumer Behaviors

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# **When to Hit the Panic Button? Impact of Currency Crisis on Consumer Behaviors**

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# **When to Push the Panic Button?**

## **Impact of Currency Crisis on Consumer Behaviors**

### Abstract

The promise of emerging and developing economies has created unprecedented interest from businesses in recent times. Yet, the reality of these economies, are levels of volatility that are unheard of in developed markets. For example, there have been 435 currency crises across 195 countries over the period 1960-2006 years. Recent events show that crises are no longer the preserve of developing economies alone.

Managers realize that there is little that they can do to influence the likelihood of a crisis. The real challenge for them is managing through the crisis. Unfortunately, there is little by way of academic insight to help them understand the implications of a crisis for their business. The focus of this paper is in highlighting the impact of a currency crisis on consumption in an economy.

We find that a crisis reduces both per capita consumption expenditures and per capita retail sales with the effect of the crisis manifesting itself over multiple years. There is little evidence for intertemporal consumption smoothing, especially in developing countries, with consumption declining by more than incomes during a crisis. Further, we show that consumer behavior in response to a crisis is characterized by rich patterns of consumption smoothing across and within different categories of products and services. In fact, the crisis impact on consumption smoothing is distinct and independent of the impact of income and prices on consumption. Additionally, we highlight the remarkable differences in patterns of consumption smoothing across developing and developed economies.

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# 1 Introduction

The dramatic impact of the current crisis on the performance of businesses across almost all sectors of the economy have been headlining the business press for the past few months. The most widely used definition of a crisis in the economic domain is a currency crisis. Currency crisis (also called a balance-of-payments crisis) wherein the value of a country's currency declines precipitously as measured against the US dollar occur with remarkable regularity across the world.<sup>1</sup>

Figure-1 illustrates the frequency of currency crises using one of the widely used currency crisis indicators - namely, more than a 20% annual depreciation in the country's exchange rate (See Frankel and Rose, 1996). It shows that there have been 435 currency crises events across 195 countries over the period 1960-2006, with the bulk of the crises in non-OECD (developing) countries. One of the more remarkable aspects of the current crisis is that it shows that such events are no longer the preserve of developing economies alone!<sup>2</sup> Currency crisis have a dramatic impact as evidenced by data from one of the largest packaged good manufacturer in the world which shows sales contractions as high as 30%. Recent headlines on the sales woes of companies (e.g., Toyota, General Electric, Nokia, Intel, Ikea, Linens n' Things, Walmart, Bulgari, etc.) show that painful contractions following a crisis are the norm rather than an exception.

Managers realize that there is little that a firm can do about the likelihood of a crisis. The real challenge facing them is how to manage through a crisis. Critical to their ability to manage the crisis is an understanding of the impact of a crisis on their business. Knowing that a crisis impacts their business by 3% versus 30% has drastically different implications for business decisions ranging from budgeting, human resource management, to marketing mix decisions such as

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<sup>1</sup> Such crisis are usually accompanied by a run on foreign exchange reserves, a sharp change in short-term interest rates and often times an international rescue by the IMF.

<sup>2</sup> By this definition, Iceland and Hungary have already experienced a crisis this year and likely indications are many more will follow in 2009.

pricing, promotions to business partnership issues such as supplier and distributor management. There is a large literature on the impact of a crisis on aggregate economic indicators such as GDP and GDP growth (Hutchison and Noy, 2005; Bordo et al 2001; Eichengreen et al 1995). Unfortunately, has been little work on the impact of crisis on indicators that matter to businesses like consumption, retail sales and category sales.

We focus in this paper on highlighting the impact of a crisis on consumption in an economy. We first characterize the impact of a crisis on aggregate consumption indicators such as per capita consumption expenditure and per capita retail sales. We find little evidence for intertemporal consumption smoothing, with consumption declining by more than incomes during a crisis. The core of the paper concentrates on highlighting how consumers react to a crisis. We show that consumer behavior in response to a crisis is characterized by rich patterns of consumption smoothing across and within different categories of products and services. In effect, our results reveal that potential consumption expenditures in different categories are treated as different asset classes within a consumer's internal capital market and the consumer lends and borrows across these in response to a crisis. We show that the crisis impact on consumption smoothing is distinct and independent of the impact of income and price on consumption. Additionally, we highlight the remarkable differences in patterns of consumption smoothing across developing and developed economies.

Moving to the details, our paper establishes a series of stylized facts about currency crises. First, currency crises result in significant reductions in per capita consumption expenditures that persist for many years after the event. Per capita consumption expenditures are impacted less severely than per capita retail expenditures. However, the duration of the impact of a crisis on per capita consumption expenditures lasts longer than on per capita retail expenditures. The magnitude of the impact of a crisis, as well as its duration, varies markedly across developed

and developing economies. We find that a crisis has a bigger immediate downward impact on consumption indicators and the effect persists longer in a developing economy in comparison to developed economies.

Second, we find that following a crisis, consumption expenditure declines even when we control for per capita incomes. This suggests a decline in the share of consumption in income and a greater weight given by consumers to the precautionary motive of saving, in the face of a crisis. Further, this pattern is confined mainly to developing countries. In developed countries, when we control for per capita GDP, there is no independent impact of the crisis on per capita consumption.

Third, consumers significantly alter their composition of consumption expenditures across categories in response to a crisis. This consumption smoothing is over and above any adjustments consumers make to consumption in response to changes in incomes, own-prices and prices of other goods. Further, some of these smoothing effects persist beyond the year of the crisis. We show that consumers reduce their expenditure shares on Durables and Semi-durables following a crisis and allocate these savings to consumption to the category of Non-durable goods. In contrast, the expenditure share of Services remains unchanged in response to a crisis. Once again, there are dramatic differences in the patterns of consumption smoothing across developed and developing economies. Reductions in the expenditure share of Durables in developed economies are channeled into increases in expenditure share of Services. Reductions in the expenditure share of Durables and Semi-durables in developing economies are channeled into increases in expenditure shares of Non-durables. In effect, our results identify Non-durables as a necessity in developing economy and Services as a necessity in a developed economy.

Fourth, focusing on the categories individually, we show that consumers actively smooth consumption within a category as well in response to a crisis. Within the Durables good category,

we find that expenditure shares of cars and motorcycles, audio-visual, photographic and information processing equipment fall significantly whereas expenditures on bicycles and medical equipment increase in the event of a crisis. In the case of Non-durables, expenditure share of food increases whereas shares of electricity, gas and other fuels, and tobacco decrease in response to a crisis. Within Services, expenditure shares of education, accommodation, and catering increases whereas shares of financial services, hospital services, and social protection services decrease following a crisis. As before, there are significant differences in the patterns of consumption smoothing across developed and developing economies. Overall, our results show a rich pattern of consumers' adjusting to a crisis, by shifting shares of expenditure across broad categories, and reallocating shares within each category.

Taken together, we believe these findings have important and interesting implications - for managers, policymakers, and academics alike. The rest of the paper is organized as follows. We provide a review of the related marketing and economics literature in Section 2. Section 3 provides a formal definition of a currency crisis. Section 4 details the impact of a crisis on aggregate consumption indicators such as per capita consumption and per capita retail sales. Section 5 works through a series of robustness tests. Section 6 uses a four-category classification of consumption expenditures and illuminates the patterns of consumption smoothing across categories undertaken by consumers in response to a crisis. It also analyzes the patterns of consumption smoothing within each of the four categories. Section 7 highlights the managerial implications of our results and concludes with suggestions for future research.

## **2 Related Literature**

The empirical work on currency crisis can be broadly classified into three categories. First, are papers that simply establish a set of stylized facts by examining how various macroeconomic

variables behaved prior to and immediately following a crisis (Hutchison and Noy, 2005; Bordo et al 2001; Eichengreen et al, 1995). Second, some papers estimate the probability of a currency crisis (in terms of a large devaluation) as a function of various macroeconomic indicators (Frankel and Rose, 1996; Sachs, Tornell and Velasco, 1996). A third set of papers use a non-parametric approach to evaluate the usefulness of several variables in signaling an impending crisis (Kaminsky et al, 1998). The focus of this empirical literature has been on broad macroeconomic aggregates such as GDP, current account, and GDP growth. Surprisingly, it is silent on the impact of a crisis on consumption expenditure and more disaggregate variables such as retail and product sales. The lack of research on the impact of crisis on consumption expenditure is puzzling since consumption expenditure is by far the biggest component of GDP and the fall in consumption expenditure has direct welfare implications. Theoretically, it may be argued that a crisis is a temporary event, and has no impact on consumption expenditures. This follows from the permanent income hypothesis theory of consumption (Friedman, 1957) according to which forward looking consumers base their consumption decisions on the expected discounted value of lifetime resources or their permanent income, and not on current income. Only changes to permanent income triggers changes in consumption. However, this is inconsistent with data which shows marked shifts in consumer expenditures following a crisis. This paper makes a contribution to the economic literature by highlighting the impact of a crisis on consumption behaviors of consumers.

Researchers in marketing have studied the marketing implications of a crisis. For instance, Rubel, Naik and Srinivasan (2007), Van Heerde, Helsen and Dekimpe (2007) and Klein and Dawar (2004) have focused on the implications of product-harm crisis. Pennings, Wansink and Meulenberg (2002) have focused on the implications of the mad-cow crisis. However, we have not been able to uncover any work that focuses on the marketing implications of an economic crisis. The closest work in spirit is the literature in marketing on the impact of business cycles on sales

evolution. Deleersnyder, Dekimpe, Sarvary and Parker (2004) show that consumer durables are more sensitive to business cycle fluctuations than general economic indicators. Additionally, they find that sales fall more quickly during contractions whereas they adjust upwards more slowly during expansions. Lamey, Deleersnyder, Dekimpe and Steenkamp (2007) examine the impact of business cycles on private labels (a fast moving consumer good versus the consumer durable context of their earlier work) and report largely similar results. Our focus in this paper is on economic crisis and not business cycles. Economic crisis impacts the periodicity of the business cycle and in that sense there is a relation to this stream of work. Additionally, our work is very different in terms of its focus on both developed and developing countries (amongst whom, the latter have experienced the majority of crisis) whereas the business cycle work has focused exclusively on developed markets.

### **3 Currency Crisis**

#### **3.1 Definition and Measurement**

A canonical currency crisis is one where investors flee a currency (sell the local currency in exchange for safer currencies such as US dollars or Euros) because they expect it to be devalued, and much of the pressure on the currency comes precisely because of this lack of confidence. This sort of circular logic is the defining feature of a currency crisis. While this is the broad and general feature of a currency crisis, it can manifest itself in various ways - a sharp depreciation of the exchange rate, a depletion of foreign exchange reserves, an increase in interest rates to shore up the currency, etc.

For purposes of this paper, we draw on the commonly accepted definition of currency crisis (Frankel and Rose, 1996; Hong and Tornell, 2003) - a country is said to experience a currency crisis if there is:<sup>3</sup>

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<sup>3</sup> Eichengreen et. al. (1996) define a currency crisis to include both the large depreciations that we consider here,

- at least a 20% nominal depreciation of its currency, and,<sup>4</sup>
- there is also at least a 10% increase in the rate of depreciation of the exchange rate.

Currency depreciation refers to change in the natural logarithm of the nominal bilateral dollar exchange rate (multiplied by 100) and all changes are expressed in annual rates of change. Since many countries, such as Argentina in the 1980s experienced changes in the exchange rate of 20 per cent or more – year after year, we also require that the change in the exchange rate, not only exceed 20 per cent, but exceed the previous year's change in the exchange rate by a margin of at least 10 per cent. This is a conservative specification and avoids counting the same crisis event multiple times.

Our data on exchange rates is from International Financial Statistics. It spans 195 countries over the period 1960-2006. Using the above definition of currency crisis, we obtain 435 episodes of currency crisis which is about 5.27% of the entire sample. However, 148 of these 195 countries have experienced at least one crisis testifying to the ubiquitous nature of currency crisis.<sup>5</sup>

## 4 Impact of Crisis

In this section, we analyze the impact of a crisis (both the magnitude and the duration of impact) on consumer expenditure. Data on consumption expenditures are from the World Development

Indicators and forms an unbalanced panel covering 144 countries over the period 1960-2004. For

and also speculative attacks that are successfully warded off by the authorities. Unsuccessful speculative attack are difficult to identify even ex-post and they use sharp falls in foreign exchange reserves and/or increases in interest rates to do this. But since the majority of the crises have historically been in developing countries, the sparse data on interest rates and foreign exchange reserves makes it difficult to use these variables to identify successful defense against speculative attacks. Reserve movements are notoriously noisy measures of exchange market intervention for almost all countries. And, few developing countries have market-determined short-term interest rates with long histories.

<sup>4</sup> Frankel and Rose (1996) use a 25% nominal depreciation of currency to identify a crisis. However, some of the ERM crisis countries such as Italy, Finland and Spain exhibit nominal depreciation of greater than 20% but less than 25%. Our cutoff of 20% allows us to include these countries in our sample of countries experiencing a crisis. We also experimented with cutoffs of 15, 25 and 30%. The results remain qualitatively unaffected.

<sup>5</sup> Table-A in the Appendix lists the variables, summary statistics and the data sources used.

all countries, this variable is converted to constant 2000 US dollars on a purchasing power parity (PPP) basis.<sup>6</sup>

The business cycle literature clearly shows that consumption indicators have a trend effect over time as well as a cyclical component. A visual examination of the data shows that a crisis may impact either or both of these components. The graphs in Figure-2 show the reaction of consumer expenditure to four major crisis: a) the debt crisis in Brazil in 1984; b) the ERM crisis in Sweden in 1992; c) the Tequila crisis in Mexico in 1994; and d) the Asian crisis in South Korea in 1997.<sup>7</sup> In all cases we see a significant drop in per capita consumption expenditure. Within these four cases we also see interesting variations. First, for both South Korea and Sweden, the impact of the currency crisis is moderate and short lived. Moreover the growth rate of per capita consumption (as shown by the slope of the lines) does not seem to have been affected by the crisis - for Korea the trend in the growth rate resumes shortly after the crisis, while in Sweden it accelerates about two years after the crisis. For Brazil and Mexico, during the Latin American debt crisis in 1984, the impact is more pronounced and recovery takes nearly a decade. The upward trend turns into a downward trend post-crisis. In the longer run, there seems to be a fall in the trend component of per capita expenditure (slope of the line is flatter once it resumes its upward trajectory). The Mexican tequila crisis leads to a sharp drop in consumption expenditure but recovery seems to have been quite quick, and the trend unaffected. Consequently, we (i) estimate not just the contemporaneous impact of a crisis but also the time horizon over which the impact persists, and (ii) disaggregate the indicators into a trend and cyclical component and highlight the impact of a crisis on both of these components.<sup>8</sup> We also divide our sample

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<sup>6</sup> Purchasing power parity conversion factor is the number of units of a country's currency required to buy the same amount of goods and services in the domestic market as a U.S. dollar would buy in the United States. It assumes a constant real exchange rate, which facilitates comparisons across countries and over time.

<sup>7</sup> The graphs present an index of log of per capita consumption expenditure with base year 2000 set to 100.

<sup>8</sup> Comparing the drop in consumption expenditure from crises with the drops during recessions in which no crises occurred is an interesting question. Such an exercise requires data dating recessions worldwide. While these dates

into OECD and non-OECD countries to understand if the magnitude and length of impact varies significantly across samples of developed and developing countries.<sup>9</sup>

#### 4.1 Impact on Per Capita Consumer Expenditure

The log of per capita consumption expenditure ( $C_{it}$ ) is our dependent variable while our independent variable of interest is a dummy variable for the *crisis* (at various lags). We estimate

$$C_{it} = \delta_1 crisis_{it} + \dots + \delta_k crisis_{it-k} + \mathbf{X}_{it}\boldsymbol{\beta} + \boldsymbol{\eta}_i + \tau_t + \epsilon_{it} \quad (1)$$

where  $\mathbf{X}$  is a vector of variables that potentially affect per capita consumption,  $\boldsymbol{\eta}_i$  are the country-specific fixed effects and  $\tau_t$  are time dummies. The country dummies should control for unobserved and time-invariant country-specific effects while the time dummies should capture global trends and cycles in per capita consumption. All crisis lags that were significant and resulted in improvement of model fit are included - in general no lags higher than four years turn out to be significant.

Table-1 presents these results where all estimates are within-estimates. The first column regresses per capita consumption expenditure on the contemporaneous crisis dummy as well as four lags of this variable. We see that all four of the crisis variables significantly reduce per capita consumption expenditure. Our results suggest that on average, the impact of a currency crisis lasts at least four years - there is an immediate and significant contemporaneous decline in consumption expenditure, and the impact lasts three years into the future. In terms of magnitude of the effects, the results in Column-1 of Table-2 imply that a crisis event reduces per capita consumption expenditure by about 6.6% in the year of the crisis, by 7.4% one year later, by 6.1% two years later, are available for the U.S. from the NBER which dates recessions, similar dates are not available for other countries.

<sup>9</sup> Originally the OECD members consisted of only rich countries. However, over time, it added middle income and developing countries such as Mexico, Poland, Korea. Since we are interested in distinguishing the crisis impact along the developed/developing country dimension, we restrict the OECD sample to the 24 countries who joined the OECD prior to 1973. Mexico, Korea, Poland, Hungary, Slovakia and Czech Republic, all of whom joined the OECD in the 1990s are classified as non-OECD.

by 5.4% three years later and by 4.8% four years later.

To highlight the disaggregate impact of a crisis on consumer expenditure, we decompose per capita consumption expenditure into a trend and a detrended component. Pollock (2009, 2000) argues that commonly used linear filters such as the Hodrick-Prescott filter (Hodrick and Prescott, 1997) are not sufficiently flexible in the context of common features of economic data such as a sharp break in the underlying trend of a series. He advocates the use of a rational square-wave filter, known to engineers as the digital Butterworth filter. This is especially relevant in our context since a crisis is an example of a sharp break. The filter involves fitting a polynomial trend of a limited degree over the entire span of data<sup>10</sup> and a smoothing operation which is applied both forwards and backwards via a recursive filtering process to each time series to be filtered. The Butterworth filter has two adjustable parameters, and is a more flexible device than the H-P filter.<sup>11</sup>

Columns 2 and 3 show how the two decomposed terms are affected by a crisis event. First, there is a contemporaneous fall in both the trend and detrended components. However, the negative impact on the detrended component persists for only one more year (the crisis dummy lagged one year is significant, while higher lags are not) while its impact on the trend component lasts 4 additional years. In other words, managers should recognize that a crisis is more than a deeper cyclical downturn - it actually induces a break in the trend component.

It is widely recognized that per capita GDP contracts following a crisis (Bordo et al, 2001). However, it is unclear whether the impact of a crisis on per capita consumption expenditure ex-

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<sup>10</sup> We use a fourth degree polynomial which adheres well to the entire data and helps easily identify the structural breaks surrounding a currency crisis.

<sup>11</sup> This filter is implemented in the frequency domain. The trend of a time series is the component which comprises its noncyclical elements together with the cyclical elements of lowest frequency. The Butterworth filter for isolating such a trend consists of a passband which admits to the estimated trend all elements of frequencies less than a cut-off value and a stopband which impedes all elements of frequencies in excess of that value. For each country, we chose the parameters such that a Bartlett's periodogram-based test for white noise fails to reject that cyclical component is in fact white noise. See Pollock (2000) for further details.

ceeds the impact on per capita GDP. We examine this by adding per capita GDP to the specifications in Columns 3-6. To mitigate potential omitted variable bias, we also add the real interest rate (defined as the nominal interest rate less inflation) as an additional regressor. Countries usually respond to a crisis by increasing their interest rates in an attempt to defend the currency peg or to mitigate the ongoing depreciation in the exchange rate. The subsequent rise in the interest rate is likely to deter borrowing for consumption spending. In effect, we are estimating a traditional consumption function with income and interest rate as arguments. Data on per capita GDP are from the Penn World Tables and for real interest rates are from the International Finance Statistics. We observe two main differences when we compare Column 1 and Column 4. First, the crisis affects per capita consumption expenditure over a smaller time horizon once we control for per capita GDP. The crisis dummy is significant contemporaneously and at lags 1 and 2. Second, the magnitude of the significant coefficients in Column 4 decline considerably, falling by at least 27%, as compared to Column 1. Not surprisingly, per capita GDP has a positive and significant coefficient while the real interest rate has a negative and significant coefficient. These results indicate that consumption declines by more than income so that the share of consumption in GDP declines.<sup>12</sup> If we think of a crisis as a transitory shock then consumption smoothing would dictate a *rising* share of consumption in GDP. The fact that we find the opposite indicates that there is no strong evidence for intertemporal consumption smoothing (See Campbell and Mankiw 1990 for a similar result). In fact, this behavior is best explained by a precautionary motive for saving where consumers reduce consumption and increase savings as a fraction of income.

Columns 5 and 6 show the effect of the crisis on the trend and detrended component respectively, after adding the two controls. Here we decompose per capita GDP as well with the rational square wave filter and use the trend component of per capita in Column 5 and the detrended

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<sup>12</sup> We get similar results if we regress consumption as a share of GDP on the crisis dummies. The crisis dummy at lags 0, 1 and 2 are significant.

component in Column 6. Fewer lags are now significant for the trend component in Column 4 (compared to Column 2) and the magnitude of effect declines as before. For the detrended component we observe only a decline in the magnitude of the coefficients. In both columns, the respective trend and detrended components of per capita GDP strongly and significantly impact the trend and detrended components of per capita consumption. Interest rates negatively influence the trend component of consumption but positively influence the detrended component. This could be simply due to the fact that governments world over primarily rely on monetary policy to smoothen business cycles fluctuations, through pro-cyclical movements in interest rates. Finally, all models as a whole are significant and our variables inclusive of controls explain 17-85% of per capita consumption expenditure.

#### **4.1.1 OECD vs. Non-OECD countries**

We next examine whether there are differences in the impact of a crisis on consumption indicators between developed and developing economies. We split the sample into two non-overlapping subsamples and provide the results in Table 2. The first is a sample of 24 OECD countries (shown in Columns 1-4) and the second is a sample of 117 non-OECD countries (shown in Columns 5-8). Except Columns 1 and 5, all columns include per capita GDP and the interest rate as controls. Comparing Columns 1 and 5, we see that a crisis induces a significant fall in non-OECD countries and that the impact lasts 5 years (contemporaneous crisis dummy and all 4 lags are significant). In contrast, Column 1 shows that in OECD countries, the crisis engenders a fall in per capita consumption expenditure only the year following the crisis.<sup>13</sup> Comparing the magnitude of effects, Column 5 shows a 6.5% fall in the year of the crisis and a 7.1% fall in the next in non-OECD countries. The comparable magnitudes of the fall are only 1.6% (insignificant) and 3.7%

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<sup>13</sup> Note this may simply be a contemporaneous impact, since we are dealing with annual data. For instance, the ERM crisis happened in the third quarter of 1992 and reactions to the crisis is more likely to be revealed in the data for 1993.

(significant) for OECD countries. In other words, a crisis results in a smaller fall in per capita consumption expenditure and its effect is limited to one or two years at most in OECD countries. The fall is almost twice as high for non-OECD countries and the impact persists for multiple years.

Next, we add controls for per capita GDP and interest rate. For OECD countries, we observe in Columns 2-4, that the crisis has almost no impact - the crisis dummy is not significant either contemporaneously or at higher lags when we use either per capita consumption expenditure (Column 2) or the trend component (Column 2) as the dependent variable. The only significant finding is that the crisis dummy lagged one year is negative and significant for the detrended component of consumption expenditure. Therefore, for OECD countries, the decline in per capita consumption expenditure can simply be linked to a decline in per capita GDP in response to the crisis. Moreover, crisis does not induce a trend break; instead, there is only a deeper cyclical downturn.

The non-OECD countries, on the other hand are significantly impacted by a currency crisis, even when we add the two control variables. Both overall consumption and the trend component fall significantly in the year of crisis as well as one and two years into the crisis. The detrended component is impacted only contemporaneously as well as one year after the crisis. Therefore for middle-income and low-income countries (who comprise the non-OECD sample) the crisis induces both a trend break and a deeper downturn in terms of the cyclical component, and the impact persists for a period of three years.

These results suggest that in OECD countries, consumers do not change the share of income devoted to consumption during crisis periods but that there is a significant decline in this share in non-OECD countries. Therefore, the precautionary motive for saving is further enforced in non-OECD countries during crisis periods. This is not surprising since financial and credit markets

that facilitate consumption smoothing are less developed in these countries, and consumers react to a crisis by saving more out of current income.

## **4.2 Impact of a Crisis on Retail Sales**

Next, we examine the impact of a crisis on retail sales. For retail sales, we use data from two sources: one is the OECD database “Main Economic Indicators” which provides data on a volume based retail sales index for 27 countries over the period 1972-2004. The second is the Euro Monitor database that provides data on retail sales in constant US dollars for 45 countries over the period 1999-2003. Neither dataset is comprehensive - the OECD data covers only OECD countries who have had fewer crisis incidents while the Euro monitor spans only 5 years with 12 crisis events.

The retail sales index from OECD has a common base year (the year 2000). Our dependent variable is the log of this index and we include country fixed effects in all our estimates. Since this is equivalent to demeaning all the variables in the data, the base value of retail sales for each country is eliminated, making the estimates comparable across countries. Euro Monitor reports retail sales in constant US dollars and we calculated per capita retail sales by simply dividing this variable by population. Data on population is from the World Development Indicators. The OECD retail sales index declines by 3% in the year of the crisis while the Euro Monitor per capita retail sales declines by thrice that (9%) in a crisis year.

Since different methodologies are used in the construction of the two retail sales series, we present separate estimates of the impact of the crisis in Table 3 - Columns 1 and 2 for the OECD retail sales index and Columns 3 and 4 for the Euro Monitor per capita retail sales. Lags higher than 3 years failed to be significant and were dropped for the sake of parsimony in both data sets. Columns 1 and 2 uses only the crisis dummies as well as country and time fixed effects, while Columns 2 and 4 adds per capita GDP and the real interest rate.

We find a big impact of crisis on retail sales - the impact lasts for at least 3 years for the OECD data and for 4 years for the Euro Monitor data. When we add per capita GDP and the real interest rate, the number of significant lags declines to two and three lags respectively. Comparing the coefficients in Columns 2 and 4, we see that the coefficient estimates on the crisis dummy (at various lags) are bigger in magnitude for the Euro Monitor data than that for the OECD data. A first potential explanation for this is that the crisis episodes are simply longer and deeper in the Euro Monitor data, especially since the latter has a heavier representation of developing countries. A second potential explanation for this is that the crisis episodes in the Euro Monitor data are confined to developing countries where the retail sector tends to be underdeveloped and where official statistics often fail to comprehensively measure sales in the rural areas or informal sector in urban areas. Therefore our estimates in column 4 may tend to overstate the true impact of a crisis, with sales shifting from the formal to the informal sector in the event of a crisis. Retail sales data in OECD countries on the other hand, are much more reliable.<sup>14</sup> Finally, many countries such as Bolivia and Indonesia experienced a sharp increase in barter trade following the currency crises. This would entail a bigger impact on retail sales.

Comparing the decline in retail sales to the decline in per capita consumption expenditure (compare Column 4 in Table 1 to Columns 2 and 3 in Table 3), we observe a much bigger impact of a crisis on retail sales. Our estimates imply that a crisis triggers a contemporaneous decline in OECD retail sales that is 1.8 times the size of decline in per capita consumption expenditure. For the Euro Monitor retail sales data, our estimates imply a contemporaneous impact which is 2.3 times the impact on consumption expenditure. Therefore, the impact of a crisis on retail sales, while shorter lived, is nearly twice the size of the impact on consumer expenditure.

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<sup>14</sup> Currency crisis in developing countries tend to put the banking sector under great strain (e.g., Indonesia and Thailand in 1997). This may close off lines of credit to consumers and lead to a bigger impact on consumer spending and retail sales.

## 5 Robustness Checks

In this section, we perform a series of robustness checks to assure ourselves of the validity and robustness of our results.

### 5.1 Alternate Measure of Crisis

To estimate the impact of a crisis, we have used a dummy variable that takes the value 1 in the event of a crisis. However, such a specification does not distinguish between severe and mild crisis - any exchange rate changes that crosses the thresholds of 20% for the exchange rate and 10% for the depreciation rate is treated in a symmetric fashion. Second, unsuccessful speculative attacks on the currency which may trigger a near-crisis but which may fail to cross the 20% nominal depreciation threshold in the definition of a crisis, would be treated equivalently to a tranquil episode where there was no pressure on the exchange rate which is clearly not the case. Therefore, as a first robustness check, we experimented with alternate thresholds for exchange rate movements, none of which significantly altered our results.

Next, we predict the probability of a currency crisis and use this predicted probability instead of the 0-1 categorical classification. The predicted probability is a continuous measure - it admits greater variation and is potentially helpful in capturing the severity of a crisis.<sup>15</sup> As a first step, we estimate a probit model with the crisis event as a discrete dependent variable as a function of a vector  $\mathbf{W}$  of explanatory variables that are potential predictors of a currency crisis.<sup>16</sup> We predict the probability of a crisis conditional on  $\mathbf{W}$  as  $\hat{p}_{it} = P(\text{crisis}_{it} = 1 | \mathbf{W}_{it}) = \Phi(\mathbf{W}_{it}\gamma)$  and use  $\hat{p}_{it}$  in lieu of the crisis dummy in equation (1). In choosing the variables in  $\mathbf{W}$ , we draw

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<sup>15</sup> It also allows us to incorporate events in countries where by conventional wisdom, the country did experience a crisis but where the currency depreciation failed to cross the 20% threshold. An example would be UK and France during the ERM crisis.

<sup>16</sup> It may be argued that rather than using big discrete jumps in exchange rates to define crisis events, we could simply use the exchange rate itself and capture all changes in exchange rates, big or small. However, much research has underscored the inadequacy of models linking macroeconomic variables to the exchange rate (Meese and Rogoff, 1983 is the classic reference).

on the extant literature on currency crises (see Jeanne 2000 for a survey). Our choice is also guided by two additional criteria: first, these variables should affect the probability of a crisis and second, they should not directly influence per capita consumer expenditure. In other words, while emphasizing the alternate (continuous) measure of a currency crisis we also pick variables in  $\mathbf{W}$  such that, at least in theory, are plausible exclusion restrictions (may be excluded from equation (1)).<sup>17</sup> We also include time dummies in  $\mathbf{W}$  and estimate the probability of a crisis using a random-effects probit specification. Apart from the time dummies, all variables in  $\mathbf{W}$  are lagged by one year.

Early models of currency crisis (Krugman, 1979) emphasize loose fiscal and monetary policies as key triggers of a currency crisis. However, both measures may affect consumer expenditures directly - monetary policy by reducing interest rates and fiscal policy through tax cuts and/or government subsidies. One common underlying characteristic of all countries that experienced a crisis, was the vulnerability of the country to a speculative currency attacks. Later models of currency crisis (Obstfeld, 1996) emphasize that such vulnerability shifts perceptions of economic agents regarding the exchange rates and may trigger a crisis. To capture the vulnerability of countries to such self-fulfilling speculative attacks we include in  $\mathbf{W}$  the ratio of reserves to imports, the current account surplus as a percentage of GDP, and the degree of over-valuation of the exchange rate. All of these variables should affect only the composition of consumer expenditure, between spending on imports and domestic goods, and not the level of expenditures per se. Data on these variables are from the International Finance Statistics and the World Development Indicators. We also include two variables as measure of institutions in our model. Our choice of these variables are guided by prior research (Dutt and Mobarak 2007; Acemoglu et al, 2003; Persson

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<sup>17</sup> In Table 1, we also added controls for per capita GDP and interest rates. However, it may be plausibly argued that we continue to have an omitted variable problem - an omitted variable is driving both the likelihood of a crisis and the magnitude of fall in consumption expenditures. This procedure should help in alleviating the omitted variable critique as well.

et al, 1997; La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1998) that shows these institutions influence the likelihood of adoption of sound macroeconomic policies and hence the likelihood of a crisis. The first is the Political Constraints measure of Henisz (2000), which captures the checks and balances on executive decision making and on policy formulation. The second is the legal tradition in a country - we use a dummy variable that equals one for countries based on a common law tradition.<sup>18</sup>

The first stage regression yields

$$\begin{aligned} \hat{p}_{it} = & -1.15 - 0.236 (\textit{political constraints}) - 0.101 * (\textit{common law}) \\ & -0.04 * (\textit{reserves}) - 0.011 * (\textit{current account}) + 0.001 (\textit{overvaluation}) \end{aligned}$$

All coefficients are significant at the 5% level of significance. Next we use the predicted probabilities of the crisis, at various lags from the above regression to estimate equation (1). Since the predicted probabilities are constructed regressors and are measured with error, the resultant standard errors may be biased. To account for this, we use the procedure advocated in Murphy and Topel (1985) and correct the standard errors of the estimates.

Columns 1 and 2 of Table 4 present the results with the predicted probability of crisis. Column 1 shows how the predicted probability contemporaneously and at lags 1-4 affects consumer expenditure, while Column 2 adds interest rate and per capita GDP as explanatory variables. Both columns include year and country fixed effects. In Column 1, we find that the probability of a crisis affects per capita expenditure at lags 0-4. When we add the two controls in Column 2, the only change is that probability of crisis at lags 3 and 4 are no longer significant. The coefficient estimates in Column 1 imply that a one standard deviation increase in the probability of crisis

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<sup>18</sup> The common law tradition originates in the laws of England, and through conquest and colonization spread to England's colonies, including the United States, Australia, Canada, and many countries in Africa and Asia. The civil law tradition has its roots in the Roman law, and was adopted by several continental states, including France. See Glaeser and Shleifer (2002) for a historical perspective.

reduces consumption expenditure by 1.8% in the year of the crisis. These results are very similar to the ones in Table-1 where we use the crisis dummy. In both cases, the impact of the crisis persists for five years when we do not control for per capita GDP and interest rate, and for only three years once these controls are added.

## 5.2 Lagged Dependent Variables as Regressor

The permanent income hypothesis implies that consumption should evolve over time as a martingale (Hall, 1978). While the literature rejects this contention (see Campbell and Mankiw 1990), it is plausible that per capita consumption expenditure depends on its past values.<sup>19</sup> Therefore, we examine how our estimates are affected when we add lagged values of per capita consumption as regressors. GMM estimates suggest that only one lag of the dependent variable should be included. Therefore, we estimate the following dynamic specification:

$$C_{it} = \alpha_1 C_{it-1} + \delta_1 crisis_{it} + \dots + \delta_k crisis_{it-k} + (\eta_i + \tau_t + v_{it}); \quad i = 1, 2, \dots, N; \quad t = 2, 4, \dots, T \quad (2)$$

where  $C_{it}$  is per capita consumption in country  $i$  at time  $t$ ;  $C_{it-1}$  is lagged per capita consumption in country  $i$ ;  $crisis_{it-k}$  is the crisis dummy at lag  $k$ ;  $\eta_i$  is a time invariant country-specific effect;  $\tau_t$  is the time dummy, and  $v_{it}$  the error term.<sup>20</sup>

Column 3 of Table 4 shows the estimates of equation (2). First, the lagged dependent variable is strongly significant and has a coefficient of 0.664. A test of the hypotheses that  $\alpha_1 = 1$  is easily rejected. In effect, there is lagged dependence in consumer expenditure, but consumption does not evolve as a martingale. Second the crisis dummy is significant in the year of the crisis as is the crisis dummy lagged by one year, where the coefficient on both is negative. Compared

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<sup>19</sup> Theories of habit-persistence in consumption for example, can also generate such lagged dependence. See Fuhrer (2000).

<sup>20</sup> Measurement error in per capita consumption is a serious concern with the presence of the lagged dependent variables on the right hand side. However, if this error is driven by country-specific characteristics and vary little over time, they will be subsumed within the country specific effect  $\eta_i$ .

to Column 4 in Table 1, the addition of the lagged dependent variable renders the coefficient on the crisis dummy at lag 2 insignificant. This is not surprising since the lagged dependent variable ( $C_{it-1}$ ) is positively correlated with  $C_{it}$  and negatively correlated with  $crisis_{it-2}$ .

In the presence of lagged dependent variables as regressors, the fixed-effects estimator is consistent only in panels where  $T$  is large - the transformed lagged dependent variables are correlated with the transformed error term but this correlation goes to zero as  $T$  gets large. Since  $T = 20$  for the majority of countries when we use per capita consumption and even lower with retail sales data, this correlation does not vanish and the fixed-effects estimator is likely to be inconsistent. Therefore, we employ a generalized method of moments (GMM) procedure developed by Arellano and Bond (1991) to generate consistent estimates of the parameters of interest and their asymptotic variance-covariance. Estimation proceeds by first differencing the data - this eliminates the country-specific effects  $\eta_i$  from the model - and instrumenting the lagged dependent variable by appropriately lagged levels of  $C_{it}$ . The instruments are based on the following moment conditions:

$$E [C_{it-s} \Delta v_{it}] = 0 \text{ for } s \geq 2; t = 3, 4, \dots T$$

The GMM estimator is consistent provided the error term  $v_{it}$  is not serially correlated and provided the lagged values of the explanatory variables are valid instruments. We perform two specification tests suggested by Arellano and Bond (1991). The first examines serial correlation in the error term. It tests whether the differenced error term (the residuals from the regression in differences) is first- and second-order serially correlated. First order serial correlation of the differenced error term is expected even if the original error term (in levels) is uncorrelated, unless the latter follows a random walk. Second-order serial correlation of the differenced residual indicates that the original error term is serially correlated, which means that the moment conditions are invalid. The second specification test is a Hansen test of over-identifying restrictions, which

tests the null hypothesis of overall validity of the instruments (see the moment conditions) by analyzing the sample analog of the moment conditions used in the estimation process ( $p$ -values for these tests are reported in the last three rows of table 4). Finally, to control for heteroskedasticity we report results using the two-step GMM estimator and employ a finite-sample correction to the two-step covariance matrix.

Columns 4-6 in Table 4 presents the GMM-difference estimates for per capita consumption expenditure, retail sales index from OECD and per capita retail sales from Euro Monitor. The lagged dependent variable in each column is strongly significant and has a coefficient close to 1 for the retail variables in Columns 5 and 6, but significantly different from 1 for consumer expenditure. In Column 4, we see that the crisis dummy at time of crisis and lagged 1 year, negatively affect per capita consumption expenditure. Higher lags are not significant. Neither the number of lags nor the magnitude of the coefficient changes dramatically as compared to Column 3. Columns 5 and 6 shows that both the OECD retail sales index and the Euro Monitor per capita retail sales are affected only contemporaneously in the year of the crisis. In all case, adding the lagged dependent variable renders one or more of the lagged crisis terms insignificant as compared to the estimates in Table 3. Finally, the last few rows in Table 4 show that our results are supported by the specification tests - our instruments are valid and there is no evidence for serial correlation in  $v_{it}$ .

## **6 Impact of Crisis on Category Shares of Consumption Expenditure**

Our earlier results reveal a sharp contraction in aggregate indicators of consumption in response to a crisis. Further, there was no evidence of intertemporal consumption smoothing. Our focus in this section is in moving from understanding the impact of a crisis on aggregate market indicators to highlighting its impact on disaggregate consumer behavior indicators. We examine whether

there is evidence of category-level consumption smoothing - whether and how consumers adjust the expenditure shares devoted to various categories of goods and services. In short, this section is about understanding how consumers change their expenditure allocation decisions during crisis periods.

Previous research has shown that during times of cyclical downturns, consumers can resort to various means to smooth consumption - drawing down on their savings (Paxson, 1992), taking loans from the formal financial sector to carry them through difficult times (Udry, 1994), selling assets (McKenzie, 2006) etc. However, such choices may be infeasible in the case of a currency crisis, especially for crises concentrated in developing countries. Savings and assets may be inadequate to compensate for loss of income, and financial markets may be thin and/or missing during times of crisis. In such a scenario, consumers are likely to respond by altering the *composition* of consumption in response to the crisis. For example, they are likely to reduce expenditure on luxury goods, postpone durable and semi-durable consumption, and substitute these categories by increasing expenditure shares on staples and necessities.

We use the Almost Ideal Demand System (AIDS) methodology of Deaton and Muellbauer (1980) to understand how consumers change their expenditure allocations due to a crisis. The methodology estimates a system of demand equations defined in terms of expenditure shares. It starts from a specific class of preferences to define a system of demand equations that satisfies the axioms of consumer choice. The AIDS model represents a flexible demand system of the Translog and PIGLOG family and can be considered as a first-order approximation to any demand system. An important advantage of this methodology is that it is compatible with aggregation over consumers. It can thus be interpreted in terms of economic models of consumer behavior when estimated with aggregated (macroeconomic) or disaggregated (in terms of households and/or sub-categories) data (Glewwe, 2001). In the AIDS model, the budget share of each good is expressed

a linear function of the logarithm of total expenditure and of the logarithm of prices (both own prices and prices of all other goods). The system of equations is specified as

$$w_{jt}^i = \alpha_j^i + \sum_{k=1}^n \gamma_{jk} \ln p_{kt}^i + \beta_j \ln \left( \frac{E}{P} \right)_t^i + \delta_1 crisis_{it} + \delta_2 crisis_{it-1} + \tau_t \quad (3)$$

where,  $w_{jt}^i$  is the budget (expenditure) share of the  $j^{th}$  good in country  $i$  at time  $t$ ;  $p_{kt}^i$  is the nominal price of the  $k^{th}$  good in county  $i$  at time  $t$ ;  $E_t^i = \sum_{k=1}^n p_{kt}^i x_{kt}^i$  is the total expenditure in country  $i$  at time  $t$ ;  $n$  is the number of categories;  $\alpha_j^i$  is the constant coefficient in the  $j^{th}$  share equation for country  $i$ ;  $crisis_{it}$  is the crisis dummy at time  $t$  and  $crisis_{it-1}$  is the crisis dummy lagged by one year. Finally,  $P_t^i$  is a translog price index defined by

$$\ln P_t^i = a_0 + \sum_{j=1}^n \ln p_{jt}^i + \frac{1}{2} \sum_{j=1}^n \sum_{k=1}^n \ln p_{jt}^i \ln p_{kt}^i \quad (4)$$

Deaton and Meulbauer (1980) recommend replacing this price index with Stone's price index, defined as

$$\ln P_t^i = a_0 + \sum_{j=1}^n w_{jt}^i \ln p_{jt}^i \quad (5)$$

Since the shares are used as the dependent variable and are present in the Stone's price index as well, this gives rise to a simultaneity problem. Following Eales & Unnevehr (1988) we use the lagged share  $w_{jt-1}^i$  in equation (5). We also impose the following conditions on the coefficients

$$\text{Adding Up:} \quad \sum \alpha_j^i = 0, \sum_{j=1}^n \beta_j = 0, \sum_{k=1}^n \gamma_{jk} = 0$$

$$\text{Symmetry:} \quad \gamma_{jk} = \gamma_{kj}$$

$$\text{Homogeneity} \quad : \quad \sum_{k=1}^n \gamma_{jk} = 0 \text{ for all } j$$

The system of equations is estimated using iterated seemingly unrelated regression as the estimation method. Since budget shares always sum to 1 in the system, one of the share equations is deleted to deal with the singularity problem. Whichever one is eliminated should not have any

effect on the results. The parameters associated with the share equation that is deleted can be recovered through the parameter restrictions implied by the homogeneity, symmetry, and conservation properties. Our variables of interest are  $\delta_1$  and  $\delta_2$ .<sup>21</sup> The signs and significance of the  $\delta'_s$  allow us to examine if there is a direct impact of the crisis, over and above that dictated by movements in incomes and prices. If the  $\delta'_s$  prove to be significant, then an immediate implication is that income and price adjustments following a crisis are insufficient, and consumers smooth their consumption patterns directly in response to a crisis.

## 6.1 Impact of Crisis on Consumption Smoothing Across Categories

We use data from Euro Monitor to study the impact of crises on category shares. Euro Monitor provides data on consumer expenditures for various categories, at various levels of disaggregation as well as price indices for these categories over the period 1990-2006 for 54 countries. Euro Monitor, first classifies goods into 4 broad categories: Durables, Non-durables, Semi-durables and Services. The share equation for Semi-durables is deleted from the system but we recover the parameter estimates and report them in Table 5. The system of equations specified in equation (3) includes country and time fixed effects. However, since consumption patterns may widely vary across countries, following Deaton and Muellbauer (1980), we incorporate a host of demographic variable at the country-level. These include work force size (share of population between the ages 15-64), the urbanization rate (percentage of population living in urban areas), the median age in the population and the unemployment rate. Finally, total consumer expenditure is converted to constant 1990 dollars using the PPP exchange rate and the consumer price index in each country for 1990.

If we examine the fall in expenditures in the year of the crisis, we find a 20% decline for Durables, a 14.6% decline in Services; a 9.5% decline in Semi-durables and a 7% decline in

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<sup>21</sup> We experimented with higher lags of the crisis dummy but these were not significant.

Non-durables. Such a ranking is reasonable since it is likely that the income elasticity of demand is the highest for Durables and lowest for Non-durables. These changes hint at the traditional Engel effect where the direct effect of the fall in income caused by the crisis leads consumers to reduce their expenditure shares on luxuries and consume relatively more of necessities. If all adjustment is through relative price and income changes then the crisis dummies should turn out to be *insignificant*. To check this, we add the contemporaneous crisis dummy and the dummy lagged by one year in the specification shown in equation (3)<sup>22</sup>

Table 5.1 presents estimates of the AIDS model for four categories. Examining the crisis dummies, we observe that after controlling for price and income effects, the expenditure share of Durables falls significantly in the year of the crisis and one year after. At the same time, the expenditure share of Non-durables increases significantly both in the year and the year following the crisis. The expenditure share of Services remains unchanged while that of Semi-durables decreases only in the year of the crisis. Since we control for changes in real income/expenditure and for relative price changes, our results imply that consumers made additional adjustments in expenditure shares in an attempt to mitigate and smooth the effects of the crisis. On average, in countries that experience a crisis, consumers cut back on consumption of Durables and Semi-durables more than predicted through direct income and price effects. Simultaneously, the consumption smoothing that channels money from Durables and Semi-Durables to Non-durables implies a drop in consumption of Non-durables that is less than predicted through direct income and price effects. Overall, this consumption smoothing reveals that firms operating in Durable goods will be worst impacted by a crisis, followed by firms in Semi-durables and Services, whereas firms in Non-durables will be impacted least severely. The shift in shares highlight the fact that demand for products/services in a crisis event are significantly impacted by the unfolding of consumption

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<sup>22</sup> Higher lags were not significant.

in other seemingly unrelated categories.

As an aside, we estimate the income elasticity of demand for the category  $j$  in country  $i$  as  $\frac{\beta_j}{\bar{w}_j^i} + 1$  where  $\bar{w}_j^i$  denotes the average expenditure share in country  $i$  on category  $j$ . We average the shares over time for each country leaving out the crisis year.<sup>23</sup> The last row of Table 5.1 shows the income elasticity of demand *averaged* across all countries. The income elasticity of demand is the highest for durable goods for all countries (equal to 2.42 across countries) where we see the biggest decline in the crisis year, second highest for services (equal to 1.64) where we witness the second biggest decline and the lowest for non-durable goods (equal to 0.98) where we see the smallest decline. It is reassuring that the crisis induces an increase in the expenditure share of the good with the income inelastic demand and the biggest decline in the expenditure share of the good with the most income elastic demand.

In terms of the demographic controls, we see that countries with a greater urbanization rate, lower unemployment, and an older population spend a larger fraction of incomes on Durable goods and smaller fraction on Non-durable goods. Countries with greater urbanization, higher unemployment, and an older population spend a larger fraction of incomes on Services and smaller fraction on Semi-durable goods. Finally, a larger work force size implies a greater fraction of income spent on Durables and Semi-durables.

### 6.1.1 OECD vs. Non-OECD Countries

Next we do a similar sample decomposition by estimating equation (5) separately for 22 OECD countries<sup>24</sup> and 32 non-OECD countries.<sup>25</sup> The estimates are shown in Table 5.2, where as

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<sup>23</sup> For the AIDS model, income elasticity will mechanically rise for any good whose share declines. To counter the expenditure shifts in crisis years, we averaged the category expenditure shares over time but dropped the crisis year in the averaging procedure.

<sup>24</sup> Data on Iceland and Luxembourg are missing, so we have only 22 OECD countries as compared to 24 in Table 2.

<sup>25</sup> For the two sub-samples, the fall in total expenditure on Durables and Non-durables in the year of crisis is very similar - equal to 11% and 2% respectively. The biggest difference is in Services, where the expenditure falls by 5% for non-OECD countries but remains unchanged for OECD countries. Expenditure on Semi-durables falls by 7% in

before, all equations include country and time specific fixed effects. The pattern of adjustment for OECD (Columns 1-4) vs. non-OECD countries is remarkably different (Columns 5-8). In OECD countries, we observe a fall in the share of Durables and an increase in the share of Services in the year of the crisis; the shares of Non-durables and Semi-durables are not affected. In non-OECD countries, the pattern of adjustment is very different - we observe a significant fall in the share of Durables as well as Semi-durables and a significant rise in the share of Non-durables.

For OECD countries, the Non-Durable share is approximately 28%. In non-OECD countries, the share equals 44%. For Services, the pattern is reversed - 50% share for OECD and only 38% for non-OECD. In a sense, Services are the essential category in OECD countries and Non-durables the essential category in non-OECD countries.<sup>26</sup> Therefore, consumption smoothing manifests itself as an increase in the share of Services in the year of the crisis for OECD countries and an increase in the share of Non-durables in the crisis year for non-OECD countries. The share of Durables equals 11% in OECD countries and 9% in non-OECD countries. The fact that the share of Durables falls in both sets of countries in the crisis year shows that postponement of the consumption of Durables is the main mechanism through which consumers smooth consumption. Non-durable and Services are necessities in developing and developed economies respectively, and hence benefit from consumption smoothing relative to Durables in a crisis.

The share of Semi-durables in both samples is approximately 9%. However, a stark difference that we see is that there is a significant drop in Semi-durables share in non-OECD countries (both in the year and the year following the crisis), but no change in OECD countries. This difference could arise due to the differences in liquidity constraints between the two sets of countries. In the presence of liquidity constraints, Browning and Crossley (2008) suggest that consumers may postpone their purchases of clothing and other small durable goods in order to finance current

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OECD countries and by 10% in non-OECD countries.

<sup>26</sup> This is supported by our estimates of income elasticity of demand as well - demand for Services is income inelastic in OECD countries (equal to 0.95) and income elastic in non-OECD countries (equal to 1.72).

non-durable consumption. Consumers in developing economies, to borrow their terminology use their internal capital market of Semi-Durables to borrow from themselves.<sup>27</sup>

Moving to the duration of the impact, the crisis has an impact on the relative shares only in the year of the crisis for OECD countries. The reaction in non-OECD countries is longer - it persists an extra year as the crisis dummy lagged by one year is significant in all share equations, apart from Services. The fact that crisis dummy is significant for the shares only in the year of the crisis in OECD countries, but affects share for both the year and the year following the crisis in non-OECD countries indicates that consumers in developing countries use their internal capital markets to smooth consumption for a longer span of time.

## 6.2 Impact of Crisis on Consumption Smoothing Within Categories

So far we observe a significant pattern of consumption smoothing across the four broad aggregates of expenditure on Durables, Non-durables, Semi-durables and Services. As a next step, we further disaggregate each of these four categories and analyze the patterns of consumption smoothing *within* each of these categories. We estimate the following system:

$$w_{jt}^{ih} = \alpha_j^h + \sum_{k=1}^n \gamma_{jk} \ln p_{kt}^{ih} + \beta_j \ln \left( \frac{E^h}{P^h} \right)_t + \delta crisis_{it} + \tau_t \quad (6)$$

separately for each category  $h \in (Durables, Nondurables, Semidurable, Services)$ .  $w_{jt}^{ih}$  is the share of good  $j$  in category  $h$ ,  $n^h$  is the number of sub-categories in category  $h$ ,  $E^h$  is the expenditure on category  $h$  and

$$\ln P_t^{hi} = a_0^h + \sum_{j=1}^n w_{jt}^i \ln p_{jt}^{hi} \quad (7)$$

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<sup>27</sup> Empirically Browning and Crossley (2001) find evidence for this substitution between clothing and food during periods of unemployment in Canada. In Mexico, McKenzie (2006) finds that consumers shifted from clothing and other durables to basic foods in response to the 1994 Peso crisis.

is the Stone's price index for category  $h$ . Data on all variables are again from Euro Monitor. The results for these four specifications are shown in Table 6. A footnote in Table 6 lists the individual goods that Euro Monitor uses to classify the aggregate categories of Durables, Non-durables, Semi-durables and Services. Instead of presenting estimates for every coefficient in (6), we present a parsimonious and easy to read summary of our results. We simply list the individual goods in each of the four broad categories where  $\delta$  is significantly different from zero. We list the goods where  $\delta > 0$  as well as the goods where  $\delta < 0$ . We also estimate (6) separately for OECD and non-OECD countries separately to examine if the patterns of adjustment vary across developed vs. developing countries.

For the sample of all countries (shown in Column 1 of Table 6) we find that within Durables, the expenditure share of "Cars and Motorcycles" falls significantly as do the share of "Audio-visual, photographic and information processing equipment." If we calculate the elasticities of demand with respect to Durable Goods, then the goods with the highest income elasticities of demand are "Audio-visual, photographic and information processing equipment" at 1.74 and "Cars and Motorcycles" at 1.29. At the same time, there is an increase in the expenditure share of "Bicycles" and in "Medical Equipment" within Durables in the overall sample - these are also the goods where demand is inelastic with respect to expenditure in the Durable goods category. These results along with the results for the broad category aggregates in Table 5.1 and 5.2 suggest that Durables are a significant component of consumers' adjustment pattern in a crisis - not only does the share of Durables fall in overall consumer expenditure, but there is significant reallocation of consumer expenditure within the category itself.

For Semi-durables, there are hardly any significant changes in response to the crises. As Table 6 shows, of the 9 items that constitute Semi-durables, we observe a significant rise only in the share of "Footwear" for the overall sample. For all categories within Semi-durables, the elasticity

of demand with respect to expenditure on Semi-durables is not significantly different from one. These results in conjunction with the results in Table 5.1 and 5.2 suggest that consumers' adjustment to crises take the form of reducing the expenditure share of Semi-durables as a whole, (and increasing the share of Non-durables in non-OECD countries and Services in OECD countries) but with very little adjustment within the Semi-Durable category itself.

For Non-durables, we find that the share of "Food" rises, while the share of "Tobacco", "Household electricity, gas and other fuels" and "Fuel for Transport" falls in the overall sample. In the Non-Durable category the highest elasticity of demand with respect to Non-Durable expenditure are for "Fuel for transport" at 1.6 and "Tobacco" at 1.2 while the lowest is for "Food" at 0.52. Again, while Non-durable share rises in total consumption, within the category itself, the income inelastic category "Food" takes a larger share in the crisis year while the income elastic ones experience a fall in share.

Finally, for the Services category, we observe an increase in the share devoted to "Accommodation", "Catering", and "Education". At the same time, expenditure share in "Financial services", "Hospital services", and "Social protection services" decline. The highest elasticity of demand with respect to expenditure on Services is for "Social protection services" at 3.33 and the lowest for "Education" and "Accommodation" at 0.66 and 0.7 respectively.<sup>28</sup>

### **6.2.1 OECD vs. Non-OECD countries**

Columns 2 and 3 in Table 6 show that within each of the four categories, there are significant differences in consumption smoothing for OECD vs. non-OECD countries. For Durables, the overall fall in the share of "Cars and Motorcycles" may be attributed to OECD countries, given that there is no significant change in non-OECD countries. Consumers in OECD countries, reduce

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<sup>28</sup> We do not claim that these adjustments can be explained by simply looking at the income elasticity of demand. In fact, the significance of the crisis dummies, even when we control for income (and price) indicates that the income elasticity of demand fails to account for the full magnitude of shifts. Rather, the shift patterns are consistent with a rank ordering of income elasticities of various goods and services.

the expenditure share of “Cars and Motorcycles”, substituting them with “Bicycles”. Similarly, the fall in “Audio-visual, photographic and information processing equipment” is confined to non-OECD countries. The rise in expenditure shares of “Medical Equipment ” in the overall sample can be traced to non-OECD countries where they are likely deemed essential goods. Bicycles are the only sub-category where the expenditure share increases in both subsamples. Within each of the sub-samples, we find significant adjustments in additional categories that were not identified in the overall sample. We find a significant fall in the expenditure share of “Jewelry, silverware, watches and clocks, travel goods” in non-OECD countries and a rise in the share of “Telecommunications equipment” in OECD countries.

For the Semi-Durable category in OECD countries, only the share of “Glassware” falls, while for non-OECD countries there are no significant shifts in the shares of any of the sub-categories.<sup>29</sup> So while Table 5.2 indicates a significant decline in the overall share of Semi-durables for non-OECD countries, there are no significant patterns of adjustment within the category itself.

For Non-durables, we find that the share of “Food” rises, while the share of “Tobacco” falls in each of the two subsamples. The decline in the share of “Household electricity, gas and other fuels” in the overall sample is mainly confined to OECD countries. “Fuel for transport” sees a decline in the overall sample, but no significant changes in any of the subsamples. However, for the OECD sub-sample,  $\delta < 0$  and marginally insignificant while for the non-OECD sample  $\delta > 0$  so this decline may be attributed to the OECD countries. Finally, the share of “Non-alcoholic beverages” rise in non-OECD countries but fall in OECD countries, which adds up to an insignificant shift in the overall sample.

For Services, the increase in “Accommodation” and “Catering” can be attributed to consumer responses in non-OECD countries while the increase in expenditure share of “Education” orig-

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<sup>29</sup> Footwear for non-OECD countries has a positive sign for  $\delta$  but is marginally insignificant ( $p - value = 0.2$ )

inates in OECD countries. The overall decline in the expenditure share in “Financial services”, “Hospital services” and “Social protection services” is concentrated in non-OECD countries. In the latter, we also observe a significant decline in “Insurance services” and “Household and domestic services”. Overall the pattern of adjustment in OECD countries, is a rise in the share of Services in overall consumer expenditures and very little adjustment within the Services category, with only a rise in the share of Education.<sup>30</sup> In non-OECD countries, while we did not observe a major shift either towards or away from the Services sector, there are major adjustments made by consumers within the category itself.

## **7 Managerial Implications and Conclusion**

The genesis of this paper was in the tremendous spike in interest in developing and emerging markets in recent times. As firms target consumers in these markets, they must face the stark reality that economic volatility in developing economies is significantly higher than in developed economies. Not surprisingly, figuring out how to cope with the impacts of economic volatility is very high on the agenda of managers in developing economies. Interestingly, events in recent times highlight that economic volatility is no longer a monopoly of developing economies. Developing an effective strategy for managing economic volatility requires an understanding of its impact in the first place. We see this paper as a beginning in the development of a framework for understanding the implications of a crisis.

Our results (i) identify a series of stylized descriptive facts about the impact of a crisis on aggregate consumption indicators, (ii) illuminate the consumer behavior implications of a crisis with regard to allocation of expenditures across and within categories, and (iii) identify significant

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<sup>30</sup> This conforms to commonly held notions of a rise in college applications in times of crisis in rich countries. Note also that expenditure on “Social protection services” refers to private consumer expenditure and not expenditures by the state. It covers assistance and support services provided to persons who are: elderly, disabled, having occupational injuries and diseases, survivors, unemployed, destitute, homeless, low-income earners, indigenous people, immigrants, refugees, alcohol and substance abusers, etc.

differences in impact and consumers' patterns of adjustment across developed and developing countries. A series of implications follow from these results and we elaborate below:

First, in developing countries, consumption falls even when we control for per capita GDP. The fall in consumption share in income is the opposite of what intertemporal consumption smoothing would predict. Plausibly, this is due to thin or missing credit markets that facilitate smoothing across time in these economies and consumers react to the crisis by saving more and consuming less out of income. Managers in these economies need to realize that they will suffer larger contractions and the effects of the downturn will last longer than for their counterparts in developed economies. In effect, the contraction in the banking sector that typically occurs in a crisis in a developing economy creates a significant negative externality on their business performance. Clearly, this could be mitigated somewhat by provision of lines of credit to consumers by the firm itself but this is a difficult strategy to implement since consumer bankruptcies also increase following a crisis in developing economies. A more realistic possibility is formation of industry-wide alliances that work with the financial sector to develop more targeted credit programs. Efforts in this regard can be seen in the housing and durable sectors in India in recent times (Business Line, January 3, 2008).

Second, crises result in greater contemporaneous reduction in per capita retail sales than per capita consumption but the duration of the impact is shorter. Aggregate consumption expenditure is the sum of consumer and business expenditures (i.e., B2C as well as B2B consumption expenditures). In contrast, retail expenditure is largely about B2C consumption. Our results suggest that B2C firms will experience larger contractions in their sales following a crisis than B2B firms. However, B2C firms should also be mindful that their sales will recover faster from a crisis than B2B firms. Conversely, B2B firms need to be careful that a smaller short term contraction in consumption does not lull them into a false sense of security. The contraction in consumption in B2B

sectors will be longer. Our results also imply that global firms with operations across developed and developing economies need to make sure that they tailor their responses to a crisis event accordingly. Their developing economy subsidiaries will suffer larger contractions and be affected for a longer duration than their developed economy subsidiaries. A one-size-fits-all response to crisis events will be a mistake.

Third, our results reveal the multi-faceted consumption smoothing that consumers engage in response to a crisis. Section 6 reveals the extent of consumption smoothing that occurs across categories. This implies that traditional estimates of demand based on income and price effects will be incomplete in times of a crisis. Forecasting business performance in these times will require managers to understand the role of their category in the consumer's internal capital market. In other words, managers need to understand whether their product/category is a necessity or discretionary. If it is a necessity (discretionary) then they should realize that they will gain (lose) from the consumer's internal capital expenditure reallocations. These insights underscore the importance of conducting share-of-wallet analysis during a crisis. This can provide invaluable guidance on the direction and magnitude of consumption smoothing across categories. Managers need to understand competition for their share-of-wallet in a crisis includes the competitors in their categories as well as players in completely unrelated categories. Competition for Volkswagen in Hungary today is no longer just the other automakers, but also Universities, Insurers, and Healthcare providers. Finally, the results reiterate the need for managers to develop a localized understanding of consumption smoothing. The patterns in Hungary are going to be very different in comparison to Vietnam.

Fourth, Section 6 further illuminates the extent of smoothing that occurs within a category. The estimates reveal that managers need to understand that the extent of consumption smoothing varies from one category to another. In particular, businesses in Durables, Non-durables and Ser-

vices need to play careful attention since intra-category consumption smoothing is substantial. Businesses in Semi-durables will suffer an aggregate contraction from consumption smoothing across categories but there will be minimal impact of intra-category smoothing. The reallocation of expenditure within a category require managers to identify whether their firm's business is among the potential gainers or losers. For example, bicycle manufacturers gain whereas motorcycle makers lose from internal reallocation of durable goods expenditures following a crisis. Table 6 highlights these shifts in consumption within a category from an overall perspective as well as within developed and developing countries. We would like to caution that the results should not be viewed as a list of winning and losing categories following a crisis. They need to be viewed instead as highlighting which categories are over-exposed or under-exposed to the impact of a crisis.

## **7.1 Limitations and Future Research Directions**

This paper focuses attention on a currency crisis. However, much of the focus of our paper is at the aggregate level. We lack data on variables such as advertising, new product introductions etc. at the category level, across countries over time for us to model fine-grained managerial responses to the crisis. Analyzing firm level data on how marketing managers react to a crisis is a promising avenue for future research. This should provide us with a better understanding of the effectiveness of various strategies in a crisis situation. All our analyses is at the annual level due to data availability constraints. Moving from annual to quarterly or monthly data would enable a richer understanding of the dynamics of consumption smoothing across and within categories in response to a crisis. We also focus somewhat narrowly on currency crisis. However, there are other manifestations of crises - financial/banking crisis, debt crisis, twin crisis are some examples. Understanding the implications of these different forms of crises (e.g., currency crisis vs. banking crisis) is fundamental to developing a holistic understanding of the implications of a crisis for

managerial decision making. Finally, from a broader perspective, firms would be interested in understanding both the impact of a crisis as well as the recovery following a crisis. Research focusing on the dynamics of recovery and the underlying consumer behaviors would go a long way in furthering a holistic perspective on the impact of economic volatility.

## References

- Acemoglu, D., Johnson, S., Robinson, J. A. and Y. Thaicharoen (2003) "Institutional causes, macroeconomic symptoms: Volatility, crises and growth," *Journal of Monetary Economics*, vol. 50(1), pp. 49-123.
- Arellano, M., and S. Bond (1991) "Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations," *Review of Economic Studies* 58, pp. 277-297.
- Bordo, M., B. Eichengreen, D. Klingebiel, and M. Martinez-Peria (2001) "Is the Crisis Problem Growing More Severe?" *Economic Policy*, 16, pp. 51-82.
- Browning, M. and T.F. Crossley (2008) "Shocks, Stocks and Socks: Smoothing Consumption Over a Temporary Income Loss," *Journal of the European Economic Association*, forthcoming.
- Campbell, J.Y. and N. G. Mankiw (1990). "Permanent Income, Current Income, and Consumption," *Journal of Business & Economic Statistics*, 8, pp. 265-279.
- Deaton, A. S. and J. Muellbauer (1980) "An Almost Ideal Demand System," *American Economic Review*, 70(3), pp. 312-26.
- Deleersnyder, B., M. G. Dekimpe, M. Sarvary and P. M. Parker (2004) "Weathering Tight Economic Times: The Sales Evolution of Consumer Durables Over the Business Cycle", *Quantitative Marketing and Economics*, 2, 347-383.
- Dutt, P and A. Mobarak (2007) "Democracy and Policy Stability," INSEAD Working Paper N° 2007/50/EPS.

Eales, J. and L. Unnevehr (1988) "Demand for Beef and Chicken Products: Separability and Structural Change." *American Journal of Agricultural Economics* 70(3), pp. 521-532.

Eichengreen, B., A. Rose, and C. Wyplosz, (1996) "Contagious Currency Crisis", *Scandinavian Journal of Economics*, 98, No. 4, Financial Liberalization and Macroeconomic Stability, pp. 463-484.

Frankel, J. A. and A. K. Rose (1996) "Currency crashes in emerging markets: An empirical treatment," *Journal of International Economics*, 41, pp.351-366.

Friedman, M. (1957) *A Theory of the Consumption Function*, National Bureau of Economic Research Princeton, N.J.

Fuhrer, J. C. (2000) "Habit Formation in Consumption and Its Implications for Monetary-Policy Models," *American Economic Review*, 90, pp. 367-390.

Glaeser, E. L., and A. Shleifer (2002) "Legal Origins," *Quarterly Journal of Economics*, vol. 117, pp. 1193-1229.

Glewwe P. (2001) *Consumption Economics*. University of Minnesota, St. Paul.

Hall, R.(1978) "Stochastic implications of the life cycle-permanent income hypothesis," *Journal of Political Economy*, 86(6), pp. 971-87.

Henisz, W. (2000) "The Institutional Environment for Economic Growth," *Economics and Politics*, 12:1 pp. 1-31.

Hodrick, R. J., and E. C. Prescott (1997) "Postwar U.S. Business Cycles: An Empirical Investigation," *Journal of Money, Credit and Banking*, 29:1 (1997), 1-16.

Hong, K. and A. Tornell (2005) "Recovery from a currency crisis: some stylized facts," *Journal of Development Economics*, 76, pp. 71-96.

Hutchison, M. and I. Noy (2005) "How Bad Are Twins? Output Costs of Currency and Banking Crises," *Journal of Money, Credit and Banking*, 4, pp. 725-752.

- Jeanne, O. (2000) Currency Crisis: A Perspective on Recent Theoretical Developments,” Special papers in international economics; no. 20, Princeton University.
- Kaminsky, G. L., S. Lizondo, and C. M. Reinhart (1998) “Leading Indicators of Currency Crises,” *International Monetary Fund Staff Papers*, 45, pp. 1–48.
- Klein, J. and N. Dawar (2004) “Corporate social responsibility and consumers’ attributions and brand evaluations in a product-harm crisis,” *International Journal of Research in Marketing*, 21, pp. 203-217.
- Krugman, P. 1979. “A Model of Balance-of-Payments Crises,” *Journal of Money Credit and Banking*, 11, pp. 311-25.
- Lamey, L., B. Deleersnyder, M. G. Dekimpe and J. B. Steenkamp (2007) “How Business Cycles Contribute to Private Label Success: Evidence from the United States and Europe,” *Journal of Marketing*, 71, January, 1-15.
- La Porta, R. F. Lopez-de-Silanes, A. Shleifer and R. W. Vishny (1998) “Law and Finance,” *Journal of Political Economy*, Vol. 106, pp. 1113-1155.
- McKenzie, D. J. (2006) “The Consumer Response to the Mexican Peso Crisis,” *Economic Development and Cultural Change*, 55(1), pp.139-72.
- Meese, R., and K. Rogoff (1983) “Empirical Exchange Rate Models of the Seventies.” *Journal of International Economics*, 14, pp. 3-24.
- Murphy, K. M. and R. H. Topel (1985) “Estimation and inference in two-step econometric models,” *Journal of Business and Economic Statistics*, 3(4), pp. 370–379.
- Paxson, C. (1992) “Using Weather Variability to Estimate the Response of Savings to Transitory Income in Thailand,” *American Economic Review*, 82, pp. 15-33.
- Pollock, D.S.G. (2009) “Investigating Economic Trends and Cycles,” in Tereence C. Mills and Kerry Patterson(ed.) *Palgrave Handbook of Econometrics Volume 2: Applied Econometrics*. Macmillan Publishers Limited U.K.

Pollock, D.S.G. (2000) "Trend Estimation and De-Trending via Rational Square Wave Filters," *Journal of Econometrics*, 99, pp. 317–334.

Obstfeld, M. (1996) "Models of Currency Crises with Self-Fulfilling Features," *European Economic Review*, 40, pp. 1037–1047.

Pennings, J. M. E., B. Wansink, and M. T. G. Meulenberg (2002) "A Note on Modeling Consumer Reactions to a Crisis: The Case of the Mad Cow Disease," *International Journal of Research in Marketing*; 19, p91-100.

Persson, T., G. Roland and G. Tabellini (1997) "Separation of Powers and Political Accountability", *Quarterly Journal of Economics*, 112, pp. 1163-1202.

Rubel, O., A. N. Prasad and S. Srinivasan (2007) "Optimal Crisis Management", Working Paper, Krannert School of Management, Purdue University.

Sachs, J., A. Tornell, and A. Velasco (1996) "Financial Crises in Emerging Markets: The Lessons from 1995," *Brookings Papers on Economic Activity*, Vol. 1996, No. 1, pp. 147-215.

Udry, C. (1994) "Risk and Insurance in a Rural Credit Market : An Empirical Investigation in Northern Nigeria," *Review of Economic Studies*, 61, pp. 495-526.

Van Heerde, H., K. Helsen and M. G. Dekimpe (2007) "The Impact of a Product Harm Crisis on Marketing Effectiveness", *Marketing Science*, 26(2), pp. 230-245.

Table 1: Impact of Currency Crisis on Per Capita Consumption Expenditure (logged)<sup>+</sup>

|                              | (1)                                      | (2)  | (3)  | (4)                                      | (5)  | (6)  |
|------------------------------|--|--|--|--|--|--|
|                              | per capita<br>consumption<br>expenditure | per capita<br>consumption<br>expenditure<br>(trend<br>component) | per capita<br>consumption<br>expenditure<br>(detrended<br>component) | per capita<br>consumption<br>expenditure | per capita<br>consumption<br>expenditure<br>(trend<br>component) | per capita<br>consumption<br>expenditure<br>(detrended<br>component) |
| <i>Crisis event (t)</i>      | -0.066***<br>(0.014)                     | -0.058***<br>(0.013)   | -0.009***<br>(0.003)   | -0.018**<br>(0.007)                      | -0.012*<br>(0.006)   | -0.007**<br>(0.003)  |
| <i>Crisis event (t - 1)</i>  | -0.074***<br>(0.014)                     | -0.065***<br>(0.012)   | -0.009***<br>(0.003)   | -0.017**<br>(0.007)                      | -0.013**<br>(0.006)  | -0.006*<br>(0.003)   |
| <i>Crisis event (t - 2)</i>  | -0.061***<br>(0.014)                     | -0.063***<br>(0.013)   | 0.003<br>(0.003)   | -0.012*<br>(0.007)                       | -0.012**<br>(0.006)  | 0.002<br>(0.003)   |
| <i>Crisis event (t - 3)</i>  | -0.054***<br>(0.013)                     | -0.055***<br>(0.013)   | 0.001<br>(0.003)   | -0.004<br>(0.007)                        | -0.006<br>(0.006)  | 0.002<br>(0.002)   |
| <i>Crisis event (t - 4)</i>  | -0.048***<br>(0.014)                     | -0.054***<br>(0.013)   | 0.006**<br>(0.003)   | -0.002<br>(0.007)                        | -0.004<br>(0.006)  | 0.003<br>(0.002)   |
| <i>Per capita GDP</i>        |  |  |  | 0.825***<br>(0.013)                      | 0.832***<br>(0.010)  | 0.532***<br>(0.067)  |
| <i>Interest rate</i>         |  |  |  | -0.001***<br>(0.000)                     | -0.002***<br>(0.000)   | 0.001***<br>(0.000)  |
| <i>Observations</i>          | 4144                                     | 4144   | 4144   | 4144                                     | 4144   | 4144   |
| <i>Number of countries</i>   | 141                                      | 141  | 141  | 141                                      | 141  | 141  |
| <i>R-squared (within)</i>    | 0.33                                     | 0.34   | 0.02   | 0.82                                     | 0.85   | 0.17   |
| <i>Overall model test</i>    | 7.27***                                  | 7.00***  | 2.06***  | 286.28***                                | 379.57***  | 4.32***  |
| <i>Country fixed effects</i> | Yes                                      | Yes  | Yes  | Yes                                      | Yes  | Yes  |
| <i>Year fixed effects</i>    | Yes                                      | Yes  | Yes  | Yes                                      | Yes  | Yes  |

<sup>+</sup>Robust standard errors in parentheses; \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

All columns include year and country-fixed effects. The decomposition of per capita expenditure into a trend and detrended component is performed using the rational square-wave filter of Pollock (2008). The filter is especially useful for decomposition in the presence of sharp breaks in the underlying trend of a series. In column 5 and 6, we use the trend and detrended component of per capita GDP where decomposition is done using the rational square wave filter.

Table 2: Impact of Currency Crisis on Per Capita Consumption Expenditure (logged)<sup>+</sup>

|                              | (1)  | (2)  | (3)  | (4)  | (5)  | (6)  | (7)  | (8)  |
|------------------------------|--|--|--|--|--|--|--|--|
|                              | per capita<br>consumption<br>expenditure<br><br>(OECD) | per capita<br>consumption<br>expenditure<br><br>(OECD) | Trend<br>component per<br>capita<br>consumption<br>expenditure<br>(OECD) | Detrended<br>component per<br>capita<br>consumption<br>expenditure<br>(OECD) | per capita<br>consumption<br>expenditure<br><br>(non-OECD) | per capita<br>consumption<br>expenditure<br><br>(non-OECD) | Trend<br>component per<br>capita<br>consumption<br>expenditure<br>(non-OECD) | Detrended<br>component per<br>capita<br>consumption<br>expenditure<br>(non-OECD) |
| <i>Crisis event (t)</i>      | -0.018<br>(0.016)                                      | 0.006<br>(0.010)                                       | 0.004<br>(0.009)   | 0.002<br>(0.004)   | -0.065***<br>(0.016)                                       | -0.019**<br>(0.008)  | -0.012*<br>(0.007)   | -0.008**<br>(0.003)  |
| <i>Crisis event (t - 1)</i>  | -0.037**<br>(0.017)                                    | -0.011<br>(0.010)                                      | -0.001<br>(0.009)  | -0.010***<br>(0.003)   | -0.071***<br>(0.015)                                       | -0.017**<br>(0.008)  | -0.013*<br>(0.007)   | -0.005*<br>(0.003)   |
| <i>Crisis event (t - 2)</i>  | -0.021<br>(0.015)                                      | -0.000<br>(0.010)                                      | -0.002<br>(0.009)  | 0.002<br>(0.003)   | -0.058***<br>(0.014)                                       | -0.012*<br>(0.007)   | -0.012*<br>(0.007)   | 0.001<br>(0.003)   |
| <i>Crisis event (t - 3)</i>  | -0.023<br>(0.014)                                      | -0.001<br>(0.009)                                      | -0.001<br>(0.008)  | -0.000<br>(0.003)  | -0.048***<br>(0.015)                                       | -0.002<br>(0.008)  | -0.005<br>(0.007)  | 0.002<br>(0.003)   |
| <i>Crisis event (t - 4)</i>  | -0.018<br>(0.016)                                      | 0.002<br>(0.009)                                       | 0.001<br>(0.008)   | 0.001<br>(0.003)   | -0.042***<br>(0.015)                                       | -0.000<br>(0.008)  | -0.002<br>(0.007)  | 0.004<br>(0.003)   |
| <i>Per capita GDP</i>        |  | 0.774***<br>(0.029)                                    | 0.773***<br>(0.028)  | 0.673***<br>(0.054)  |  | 0.816***<br>(0.014)  | 0.824***<br>(0.011)  | 0.527***<br>(0.024)  |
| <i>Interest rate</i>         |  | -0.079*<br>(0.041)                                     | -0.087**<br>(0.035)  | 0.010<br>(0.013)   |  | -0.001***<br>(0.000)                                       | -0.002***<br>(0.000)   | 0.001***<br>(0.000)  |
| <i>Observations</i>          | 930  | 930  | 930  | 930  | 3214   | 3214   | 3214   | 3214   |
| <i>Number of countries</i>   | 24   | 24   | 24   | 24   | 117  | 117  | 117  | 117  |
| <i>R-squared (within)</i>    | 0.90   | 0.96   | 0.97   | 0.45   | 0.19   | 0.77   | 0.81   | 0.17   |
| <i>Overall model test</i>    | 125.56***  | 361.54***  | 376.37***  | 10.08***   | 11.91***   | 150.62***  | 212.03***  | 12.95***   |
| <i>Country fixed effects</i> | Yes  | Yes  | Yes  | Yes  | Yes  | Yes  | Yes  | Yes  |
| <i>Year fixed effects</i>    | Yes  | Yes  | Yes  | Yes  | Yes  | Yes  | Yes  | Yes  |

+Robust standard errors in parentheses; \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

The first three columns restrict the sample to 24 OECD countries. The last three columns restrict the sample to non-OECD countries. Only countries that joined the OECD prior to 1973, were classified as OECD countries. Countries who joined after 1973 such as Mexico, Korea, Poland, Hungary, Slovakia and Czech Republic are classified as non-OECD. All columns include year and country-fixed effects. The decomposition of per capita expenditure into a trend and detrended component is performed using the rational square-wave filter of Pollock (2008). Columns 2 and 5 use the trend component of per capita GDP while columns 3 and 6 use the detrended component of per capita GDP. This decomposition is done using the rational square wave filter.

Table 3: Impact of Currency Crisis on Per Capita Retail Sales (logged)<sup>+</sup>

|                              | (1)                     | (2)                     | (3)                                  | (4)                                  |
|------------------------------|-------------------------|-------------------------|--------------------------------------|--------------------------------------|
|                              | OECD retail sales index | OECD retail sales index | Euro Monitor per capita retail sales | Euro Monitor per capita retail sales |
| <i>Crisis event (t)</i>      | -0.078**<br>(0.035)     | -0.033*<br>(0.017)      | -0.102***<br>(0.020)                 | -0.042**<br>(0.018)                  |
| <i>Crisis event (t – 1)</i>  | -0.081**<br>(0.033)     | -0.033*<br>(0.017)      | -0.091***<br>(0.020)                 | -0.054***<br>(0.018)                 |
| <i>Crisis event (t – 2)</i>  | -0.065**<br>(0.031)     | -0.007<br>(0.016)       | -0.036*<br>(0.020)                   | -0.037**<br>(0.017)                  |
| <i>Crisis event (t – 3)</i>  | -0.043<br>(0.030)       | -0.008<br>(0.012)       | -0.032*<br>(0.019)                   | -0.014<br>(0.016)                    |
| <i>Per capita GDP</i>        |                         | 0.785***<br>(0.095)     |                                      | 0.904***<br>(0.106)                  |
| <i>Interest rate</i>         |                         | -0.013<br>(0.025)       |                                      | -0.167**<br>(0.085)                  |
| <i>Observations</i>          | 805                     | 781                     | 225                                  | 220                                  |
| <i>Number of countries</i>   | 27                      | 27                      | 45                                   | 44                                   |
| <i>R-squared (within)</i>    | 0.48                    | 0.75                    | 0.26                                 | 0.50                                 |
| <i>Overall model test</i>    | 4.47***                 | 13.65***                | 7.59***                              | 16.47***                             |
| <i>Country fixed effects</i> | Yes                     | Yes                     | Yes                                  | Yes                                  |
| <i>Year fixed effects</i>    | Yes                     | Yes                     | Yes                                  | Yes                                  |

+ Robust standard errors in parentheses; \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

All columns include country and year fixed effects. The OECD provides data on a retail sales index (2000=100) for 27 countries. The Euro Monitor provides data on per capita retail sales in constant dollars for 45 countries.

Table 4: Impact of Currency Crisis: Robustness Checks<sup>+</sup>

|                                       | (1)                                      | (2)                                      | (3)                                      | (4)                                      | (5)                       | (6)                               |
|---------------------------------------|--|--|--|--|---------------------------|-----------------------------------|
|                                       | per capita<br>consumption<br>expenditure | per capita<br>consumption<br>expenditure | per capita<br>consumption<br>expenditure | per capita<br>consumption<br>expenditure | OECD retail<br>sales data | Euro Monitor retail<br>sales data |
| <i>Lagged dependent variable</i>      |  |  | 0.644***<br>(0.035)                      | 0.204***<br>(0.066)                      | 0.771***<br>(0.083)       | 0.900***<br>(0.123)               |
| <i>Crisis (t)</i>                     | -0.352***<br>(0.152)                     | -0.600***<br>(0.229)                     | -0.026***<br>(0.005)                     | -0.016***<br>(0.003)                     | -0.026*<br>(0.014)        | -0.037**<br>(0.019)               |
| <i>Crisis (t - 1)</i>                 | -0.542***<br>(0.106)                     | -0.781***<br>(0.138)                     | -0.009*<br>(0.005)                       | -0.009**<br>(0.004)                      | -0.012<br>(0.011)         | -0.004<br>(0.014)                 |
| <i>Crisis (t - 2)</i>                 | -0.333***<br>(0.104)                     | -0.229*<br>(0.127)                       | 0.007<br>(0.006)                         | -0.003<br>(0.005)                        | -0.012<br>(0.014)         | 0.016<br>(0.017)                  |
| <i>Crisis (t - 3)</i>                 | -0.239**<br>(0.104)                      | 0.178<br>(0.150)                         | 0.004<br>(0.004)                         | 0.001<br>(0.004)                         | -0.003<br>(0.013)         | -0.000<br>(0.009)                 |
| <i>Crisis (t - 4)</i>                 | -0.467***<br>(0.106)                     | 0.073<br>(0.093)                         | 0.007<br>(0.005)                         | 0.003<br>(0.003)                         |                           |                                   |
| <i>Per capita GDP</i>                 |  | 0.733***<br>(0.020)                      | 0.310***<br>(0.029)                      | 0.666***<br>(0.048)                      | 0.163**<br>(0.074)        | 0.371***<br>(0.129)               |
| <i>Interest rate</i>                  |  | -0.0003<br>(0.0004)                      | 0.000<br>(0.000)                         | -0.003***<br>(0.000)                     | -0.510***<br>(0.152)      | -0.302***<br>(0.099)              |
| <i>Observations</i>                   | 2323                                     | 2134                                     | 4144                                     | 3842                                     | 736                       | 127                               |
| <i>Number of countries</i>            | 115                                      | 110                                      | 141                                      | 141                                      | 27                        | 44                                |
| <i>Joint significance test</i>        | 20.86***                                 | 51.08***                                 | 0.91                                     | 107.71***                                | 90.96***                  | 71.13***                          |
| <i>OID test</i>                       |  |  |  | 0.37                                     | 1.0                       | 0.86                              |
| <i>Serial correlation: AR(1) test</i> |  |  |  | 0.0                                      | 0.0                       | 0.04                              |
| <i>Serial correlation: AR(2) test</i> |  |  |  | 0.98                                     | 0.18                      | 0.44                              |

+Robust standard errors in parentheses; \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Columns (1) and (2) use the predicted probability of a crisis instead of the crisis event dummy. The probability of a crisis is predicted using a probit model that regresses the crisis dummy on macroeconomic and institutional variables. The standard errors in columns (1) and (2) are the Murphy-Topel corrected standard errors. Columns 3-6 add the lagged dependent variable as an additional regressor. Column 4-6 presents estimates using Arellano-Bond GMM difference estimator. Columns 1-3 include country and year fixed effects. In columns 4-6, all variables are in first-differences which remove all country-specific effects.

Table 5.1: Almost Ideal Demand System (AIDS) Model; 4 Categories

|                                    | (1)                  | (2)                  | (3)                  | (4)                  |
|------------------------------------|----------------------|----------------------|----------------------|----------------------|
|                                    | Durables             | Non-durables         | Services             | Semi-durables        |
| <i>Crisis event (t)</i>            | -0.007***<br>(0.002) | 0.013***<br>(0.004)  | -0.004<br>(0.004)    | -0.002*<br>(0.001)   |
| <i>Crisis event (t - 1)</i>        | -0.005***<br>(0.002) | 0.012***<br>(0.004)  | -0.005<br>(0.004)    | -0.002<br>(0.001)    |
| <i>Price (Durables)</i>            | -0.005<br>(0.004)    | 0.011**<br>(0.005)   | -0.003<br>(0.004)    | -0.004<br>(0.003)    |
| <i>Price (Non-durables)</i>        | 0.011**<br>(0.005)   | 0.033**<br>(0.015)   | -0.038***<br>(0.011) | -0.006<br>(0.005)    |
| <i>Price (Services)</i>            | -0.003<br>(0.004)    | -0.038***<br>(0.011) | 0.056***<br>(0.010)  | -0.015***<br>(0.004) |
| <i>Price (Semi-durables)</i>       | -0.004<br>(0.003)    | -0.006<br>(0.005)    | -0.015***<br>(0.004) | 0.025***<br>(0.004)  |
| <i>Expenditure</i>                 | 0.001**<br>(0.000)   | -0.006***<br>(0.001) | 0.003***<br>(0.001)  | 0.002***<br>(0.000)  |
| <i>Urbanization</i>                | 0.001***<br>(0.000)  | -0.002***<br>(0.001) | 0.003***<br>(0.001)  | -0.001***<br>(0.000) |
| <i>Unemployment rate</i>           | -0.001***<br>(0.000) | 0.001*<br>(0.000)    | 0.001***<br>(0.000)  | -0.001***<br>(0.000) |
| <i>Median population age</i>       | 0.001**<br>(0.001)   | -0.011***<br>(0.002) | 0.013***<br>(0.001)  | -0.004***<br>(0.000) |
| <i>Work force size</i>             | 0.001**<br>(0.000)   | -0.001<br>(0.001)    | -0.001<br>(0.001)    | 0.001***<br>(0.000)  |
| <i>Observations</i>                | 833                  | 833                  | 833                  | 833                  |
| <i>Number of countries</i>         | 54                   | 54                   | 54                   | 54                   |
| <i>R-square</i>                    | 0.95                 | 0.97                 | 0.96                 | 0.96                 |
| <i>Income elasticity of demand</i> | 2.42                 | 0.98                 | 1.64                 | 1.02                 |

Standard errors in parentheses; \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. We estimate the Almost Ideal Demand System (AIDS) model of Deaton and Muellbauer (1980). We estimate a three equation system by iterated SURE with expenditure shares in Durables, Non-Durables and Services as dependent variables. Since budget shares sum to 1 in the system, one of the share equations (Semi-durables) is deleted to deal with the singularity problem. However, given that we impose symmetry and homogeneity the parameter estimates for Semi-durables are recovered and shown for convenience. All columns also include time and country fixed-effects.

Table 5.2: Almost Ideal Demand System (AIDS) Model; 4 Categories (Non-OECD vs. OECD)

|                                    | (1)                  | (2)                    | (3)                  | (4)                     | (5)                    | (6)                        | (7)                    | (8)                         |
|------------------------------------|----------------------|------------------------|----------------------|-------------------------|------------------------|----------------------------|------------------------|-----------------------------|
|                                    | Durables<br>(OECD)   | Non-durables<br>(OECD) | Services<br>(OECD)   | Semi-durables<br>(OECD) | Durables<br>(non-OECD) | Non-durables<br>(non-OECD) | Services<br>(non-OECD) | Semi-durables<br>(non-OECD) |
| <i>Crisis event (t)</i>            | -0.006**<br>(0.003)  | 0.002<br>(0.003)       | 0.008*<br>(0.004)    | -0.003<br>(0.002)       | -0.004**<br>(0.002)    | 0.013**<br>(0.006)         | -0.006<br>(0.005)      | -0.004**<br>(0.002)         |
| <i>Crisis event (t - 1)</i>        | -0.003<br>(0.003)    | 0.002<br>(0.003)       | 0.003<br>(0.005)     | -0.002<br>(0.002)       | -0.003*<br>(0.002)     | 0.013**<br>(0.006)         | -0.006<br>(0.005)      | -0.004**<br>(0.002)         |
| <i>Price (Durables)</i>            | -0.018***<br>(0.007) | 0.011*<br>(0.006)      | -0.023***<br>(0.007) | 0.030***<br>(0.004)     | -0.015***<br>(0.004)   | 0.025***<br>(0.007)        | -0.002<br>(0.005)      | -0.009***<br>(0.003)        |
| <i>Price (Non-durables)</i>        | 0.011*<br>(0.006)    | 0.134***<br>(0.010)    | -0.114***<br>(0.009) | -0.031***<br>(0.005)    | 0.025***<br>(0.007)    | -0.010<br>(0.021)          | -0.022<br>(0.015)      | 0.007<br>(0.006)            |
| <i>Price (Services)</i>            | -0.023***<br>(0.007) | -0.114***<br>(0.009)   | 0.115***<br>(0.014)  | 0.023***<br>(0.006)     | -0.002<br>(0.005)      | -0.022<br>(0.015)          | 0.050***<br>(0.013)    | -0.026***<br>(0.005)        |
| <i>Price (Semi-durables)</i>       | 0.030***<br>(0.004)  | -0.031***<br>(0.005)   | 0.023***<br>(0.006)  | -0.022***<br>(0.005)    | -0.009***<br>(0.003)   | 0.007<br>(0.006)           | -0.026***<br>(0.005)   | 0.028***<br>(0.005)         |
| <i>Expenditure</i>                 | 0.043***<br>(0.006)  | -0.028***<br>(0.007)   | -0.019*<br>(0.010)   | 0.004<br>(0.004)        | 0.001<br>(0.001)       | -0.004***<br>(0.001)       | 0.003**<br>(0.001)     | 0.001**<br>(0.000)          |
| <i>Urbanization</i>                | -0.002***<br>(0.000) | 0.002***<br>(0.000)    | -0.000<br>(0.001)    | 0.001***<br>(0.000)     | 0.002***<br>(0.000)    | -0.003***<br>(0.001)       | 0.003***<br>(0.001)    | -0.002***<br>(0.000)        |
| <i>Unemployment rate</i>           | -0.001***<br>(0.000) | 0.002***<br>(0.000)    | -0.000<br>(0.000)    | -0.000<br>(0.000)       | -0.000<br>(0.000)      | -0.002**<br>(0.001)        | 0.002***<br>(0.001)    | 0.000<br>(0.000)            |
| <i>Median population age</i>       | -0.008***<br>(0.001) | -0.001<br>(0.001)      | 0.013***<br>(0.001)  | -0.004***<br>(0.001)    | 0.005***<br>(0.001)    | -0.016***<br>(0.002)       | 0.015***<br>(0.002)    | -0.004***<br>(0.001)        |
| <i>Work force size</i>             | 0.001**<br>(0.001)   | -0.007***<br>(0.001)   | 0.006***<br>(0.001)  | 0.000<br>(0.000)        | 0.001<br>(0.000)       | -0.002<br>(0.001)          | -0.002<br>(0.001)      | 0.003***<br>(0.000)         |
| <i>Observations</i>                | 352                  | 352                    | 352                  | 352                     | 481                    | 481                        | 481                    | 481                         |
| <i>Number of countries</i>         | 22                   | 22                     | 22                   | 22                      | 32                     | 32                         | 32                     | 32                          |
| <i>Income elasticity of demand</i> | 1.51                 | 0.92                   | 0.95                 | 1.05                    | 1.82                   | 0.99                       | 1.72                   | 2.11                        |

Standard errors in parentheses; \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Columns (1)-(3) present the AIDS model. Columns 1-4 present the AIDS estimates for OECD countries; columns 5-8 show it for non-OECD countries. Estimation is done using iterated SURE technique. Each share equation includes country and time fixed-effects. The table shows the average income elasticity of demand for each category evaluated at the average share for each country across time.

Table 6: Almost Ideal Demand System (AIDS) Model Applied to Each of Durables, Non-durables, Services, and Semi-durables Categories

|                           | (1)   | (2)  | (3)  |
|---------------------------|---|--|--|
| <i>Durable Goods</i>      | <i>Overall</i>  | <i>OECD countries</i>  | <i>Non-OECD countries</i>  |
| Significant increase      | Medical equipment; Bicycles   | Telecommunication equipment; Bicycles  | Bicycles; Medical equipment  |
| Significant decrease      | Cars and motorcycles; Audio-visual, photographic and information processing equipment | Cars and motorcycles   | Audio-visual, photographic and information processing equipment; Jewellery, silverware, watches and clocks, travel goods |
| <i>Semi Durable Goods</i> | <i>Overall</i>  | <i>OECD countries</i>  | <i>Non-OECD countries</i>  |
| Significant increase      | Footwear  | None   | None   |
| Significant decrease      | None  | Glassware  | None   |
| <i>Non-Durable Goods</i>  | <i>Overall</i>  | <i>OECD countries</i>  | <i>Non-OECD countries</i>  |
| Significant increase      | Food  | Food   | Non-alcoholic Beverages; Food  |
| Significant decrease      | Household electricity, gas and other fuels; Tobacco; Fuel for transport               | Non-alcoholic Beverages; Household electricity, gas and other fuels; Tobacco | Tobacco  |
| <i>Services</i>           | <i>Overall</i>  | <i>OECD countries</i>  | <i>Non-OECD countries</i>  |
| Significant increase      | Accommodation; Catering; Education  | Education  | Accommodation; Catering  |
| Significant decrease      | Financial services; Hospital services; Social protection services                     |  | Financial services; Hospital services; Social protection services; Household and domestic services; Insurance services   |

Goods whose share in each category significantly increases or decreases is shown; Column 1 uses all countries; Column 2 applies the AIDS specification to only OECD countries; Column 3 applies the AIDS specification to only non-OECD countries.

**Durable Goods:** Audio-visual, photographic and information processing equipment; Furniture and furnishings, carpets and other floor coverings; Household appliances; Jewellery, silverware, watches and clocks, travel goods; Medical appliances and equipment; Cars and motorcycles; Bicycles; Other major durables for recreation and culture; Telecommunications equipment.

**Semi-Durable Goods:** Clothing; Footwear; Glassware, tableware and household utensils; Hardware and DIY goods; Household textiles; Books and stationery; Recreational items and equipment for gardens and pets; Personal care items.

**Non-durables:** Alcoholic drinks; Food; Non-alcoholic beverages; Tobacco; Household electricity, gas and other fuels; Household maintenance and repair of dwellings; Fuel for personal transport equipment; Water.

**Services:** Accommodation; Catering services; Education; Financial services; Hospital services; Household and domestic services; Insurance services; Outpatient services; Social protection services; Telecommunications services; Transport services; Recreational and cultural services

Figure 1: Number of Currency Crisis per Year

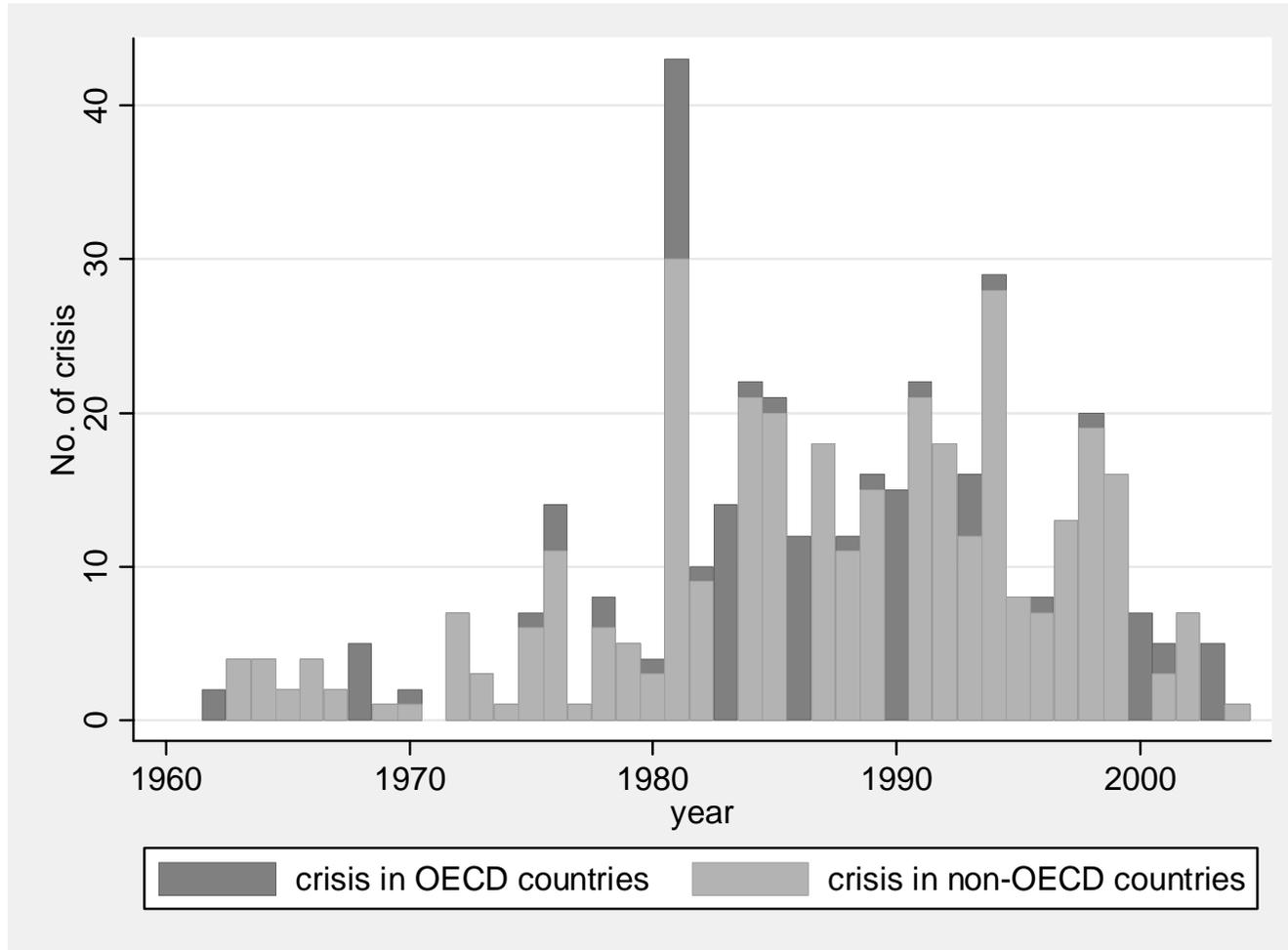
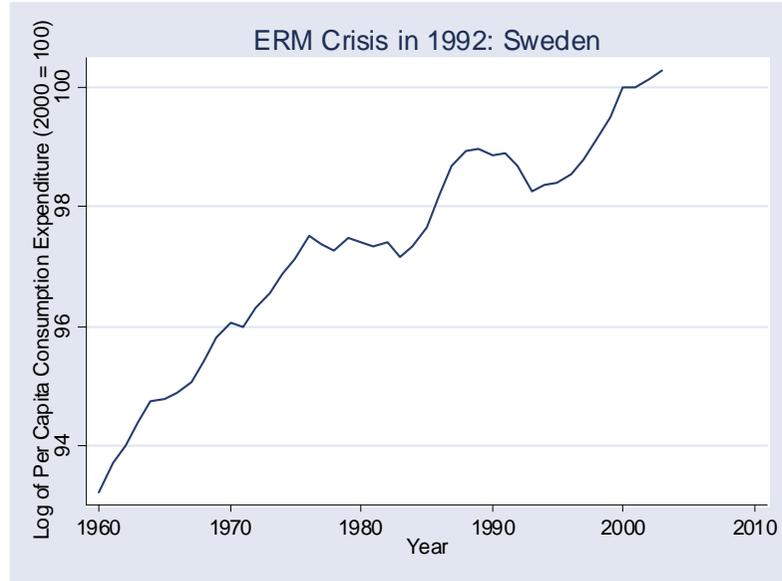


Figure 2: Consumer Expenditure Index and Currency Crisis



## Appendix

Table A: Variable Description and Summary Statistics

| Variable  | N    | Mean  | Description  |
|---|------|-------|--|
| <b>Crisis Measure and Probability of a Crisis</b> |      |       |  |
| <i>Crisis Event</i>                               | 8281 | 0.054 | Dummy variable equal to 1 if nominal depreciation of currency $\geq 20\%$ in a year and increase in the rate of depreciation from previous year $\geq 10\%$ . Source: Date on exchange rates from International Finance Statistics   |
| <i>Predicted probability of crisis</i>            | 2891 | 0.085 | Predicted probability of a crisis from probit estimates with institutional and macroeconomic variables as regressors. Own calculations.  |
| <i>Political constraints</i>                      | 2891 | 0.4   | Captures the number of veto points that provide a check on the power of the executive (President or Prime Minister). These include the existence of an upper chamber, a lower chamber in the legislature, an independent judiciary, and a federal structure, where power is shared between center and states. The variable is adjusted for the ideological alignment across these veto points, and the fact that there is a diminishing marginal effect of veto points on policy outcomes. Source Henisz (2000). |
| <i>Common law dummy</i>                           | 2891 | 0.35  | Dummy equal to 1 for common law countries. Source: La Porta et al (1997)   |
| <i>Reserves/imports</i>                           | 2891 | 3.43  | Number of months of imports of goods and services which could be paid for by foreign reserves. Total reserves comprise holdings of monetary gold, special drawing rights, reserves of IMF members held by the IMF, and holdings of foreign exchange under the control of monetary authorities. Source: International Finance Statistics  |
| <i>Current account/GDP</i>                        | 2891 | -3.46 | Measures current account balance as percentage of GDP. Current account is the sum of net exports of goods, services, net income, and net current transfers. Source: International Finance Statistics   |
| <i>Overvaluation of exchange rate</i>             | 2891 | 0.03  | Percentage deviation of nominal exchange rate from PPP exchange rate. Source: International Finance Statistics   |

| <b>Variable</b>                                 | <b>N</b> | <b>Mean</b> | <b>Description</b>   |
|---|----------|-------------|--|
| <b>Consumption Expenditure and Retail Sales</b> |          |             |  |
| <i>Per capita consumption expenditure (log)</i> | 6227     | 7.89        | Log of per capita private consumption expenditure in constant 2000 dollars. Source: World Development Indicators |
| <i>OECD Retail Sales Index (log)</i>            | 885      | 4.36        | Log of seasonally adjusted volume index for retail sales (2000 = 100). Source: OECD Main Economic Indicators     |
| <i>Per capita retail sales(log)</i>             | 230      | 7.93        | Log of per capita retail sales in constant 2000 dollars. Source: Euro Monitor                                    |
| <i>Per capita GDP(log)</i>                      | 7335     | 8.28        | Log of per capita GDP in constant 2000 dollars. Source: World Development Indicators                             |
| <i>Real interest rate</i>                       | 5444     | 0.17        | Nominal interest rate less rate of inflation. Source: International Finance Statistics                           |
| <b>Category Data</b>                            |          |             |  |
| <i>Durable goods share</i>                      | 833      | 0.10        | Share of Durable goods in total expenditure. Source: Euro Monitor  |
| <i>Non-durable goods share</i>                  | 833      | 0.37        | Share of Non-durable goods in total expenditure. Source: Euro Monitor  |
| <i>Services share</i>                           | 833      | 0.44        | Share of Services in total expenditure. Source: Euro Monitor   |
| <i>Semi-durable goods share</i>                 | 833      | 0.09        | Share of Semi-durable goods in total expenditure. Source: Euro Monitor   |
| <i>Durable goods price</i>                      | 833      | 4.73        | Price index for Durable goods (logged). Source: Euro Monitor   |
| <i>Non-durable goods price</i>                  | 833      | 4.82        | Price index for Non-durable goods (logged). Source: Euro Monitor   |
| <i>Services price</i>                           | 833      | 4.77        | Price index for Services. (logged). Source: Euro Monitor   |
| <i>Semi-durable goods price</i>                 | 833      | 4.84        | Price index for Semi-durable goods (logged). Source: Euro Monitor  |
| <i>Expenditure</i>                              | 833      | 20.34       | Total expenditure (logged)   |
| <i>Urbanization rate</i>                        | 833      | 68.20       | Percentage of population living in urban areas. Source: World Development Indicators                             |
| <i>Unemployment rate</i>                        | 833      | 7.68        | Number of unemployed as percentage of working age population (ages 15-64). Source: World Development Indicators  |
| <i>Median age in population</i>                 | 833      | 30.72       | Median age of population. Source: World Development Indicators   |
| <i>Work force size</i>                          | 833      | 65.03       | Population between the ages 15-64 as percentage of total population. Source: World Development Indicators        |

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