

An Assessment of Price Rigidity in Barbados

Roland Craigwell *

Winston Moore*

DeLisle Worrell**

*Department of Economics, University of the West Indies,
Cave Hill Campus, Barbados

**Central Bank of Barbados

Motivation

- Inflation is a continuous expansion in the general price level.
- It is an important area to study because of its potential adverse effects on the economy.
 - inflation can cause the cost of living to increase
 - reduce the real returns on investment
 - average household now needs to spend a larger amount of money to purchase some minimum basket of goods and services

Motivation (cont'd)

- In Barbados the desire to control inflation has been heightened by a relatively rapid rate of increase in food and fuel prices.
- Since the beginning of 2008, food prices have risen on average by 8.1 percent while fuel prices were up by 7.2 percent, this compares to 8 and 1.9 percent, respectively, in 2007.

Motivation (cont'd)

- Due to its importance to the economy, this study attempts to provide an assessment of the factors that have historically driven prices in Barbados.
- This research differs from previous research given that:
 - a product level database is employed to evaluate price formation in the island

Motivation (cont'd)

- Inflation is among the most heavily researched topics in Caribbean economics
 - see Coppin, 1993; Cumberbatch, 1997; Downes et al., 1993; Hamilton, 1994; Kwon and Robinson, 2006; McClean, 1997; Sun, 2005; Worrell and Scantlebury-Maynard, 1994
- Results of this research are not often reflected in policy initiatives to combat inflation
 - policies have been typically applied at disaggregated levels

Motivation (cont'd)

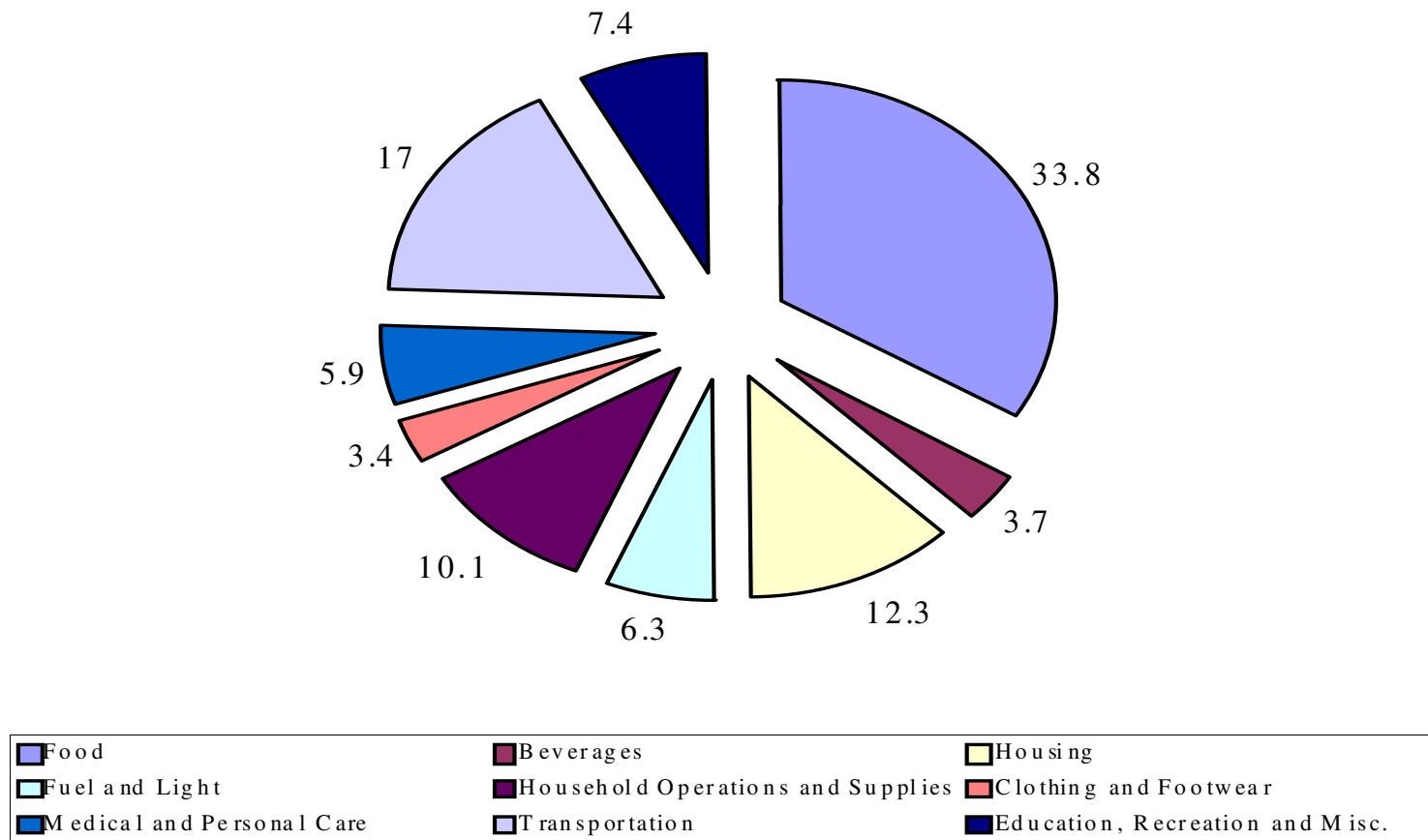
- Investigates the frequency and magnitude of price changes from input data for the construction of the monthly CPI over about 8 recent years.

A Look at Recent Price Trends in Barbados

- Price trends in Barbados are monitored through changes in an index of retail prices (RPI) calculated by the Barbados Statistical Services Department.
- The index is computed using a fixed list of commodities and services consumed by a representative consumer.
- The weights for the index are obtained from the Household Budget Survey which captures income as well as expenditure data for about 2,400 households or 2 percent of total households in the island.

A Look at Recent Price Trends in Barbados

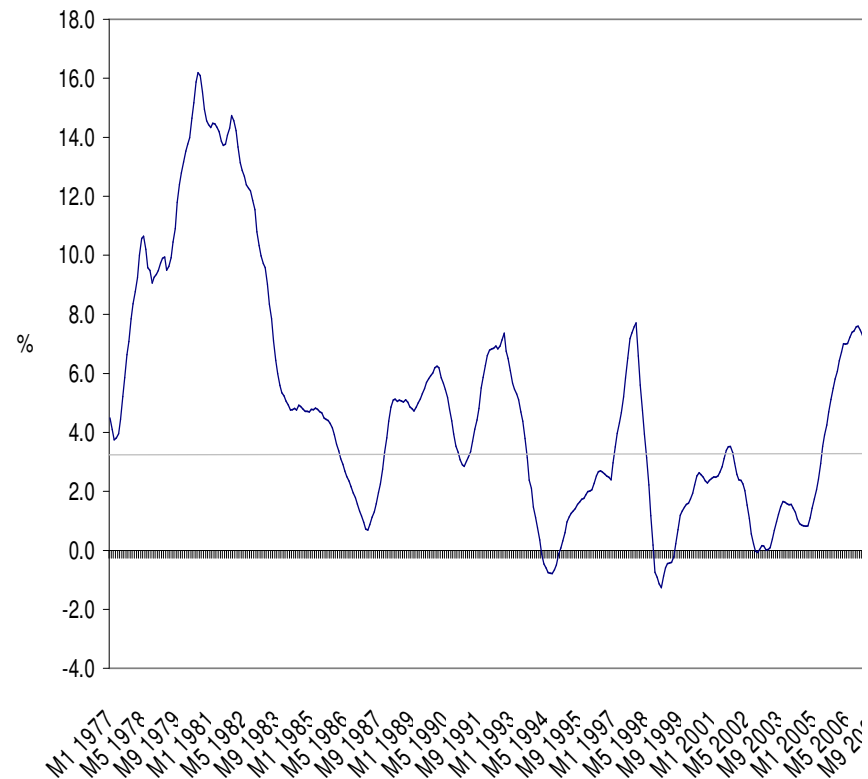
Figure 1: Major Groups of the Retail Price Index



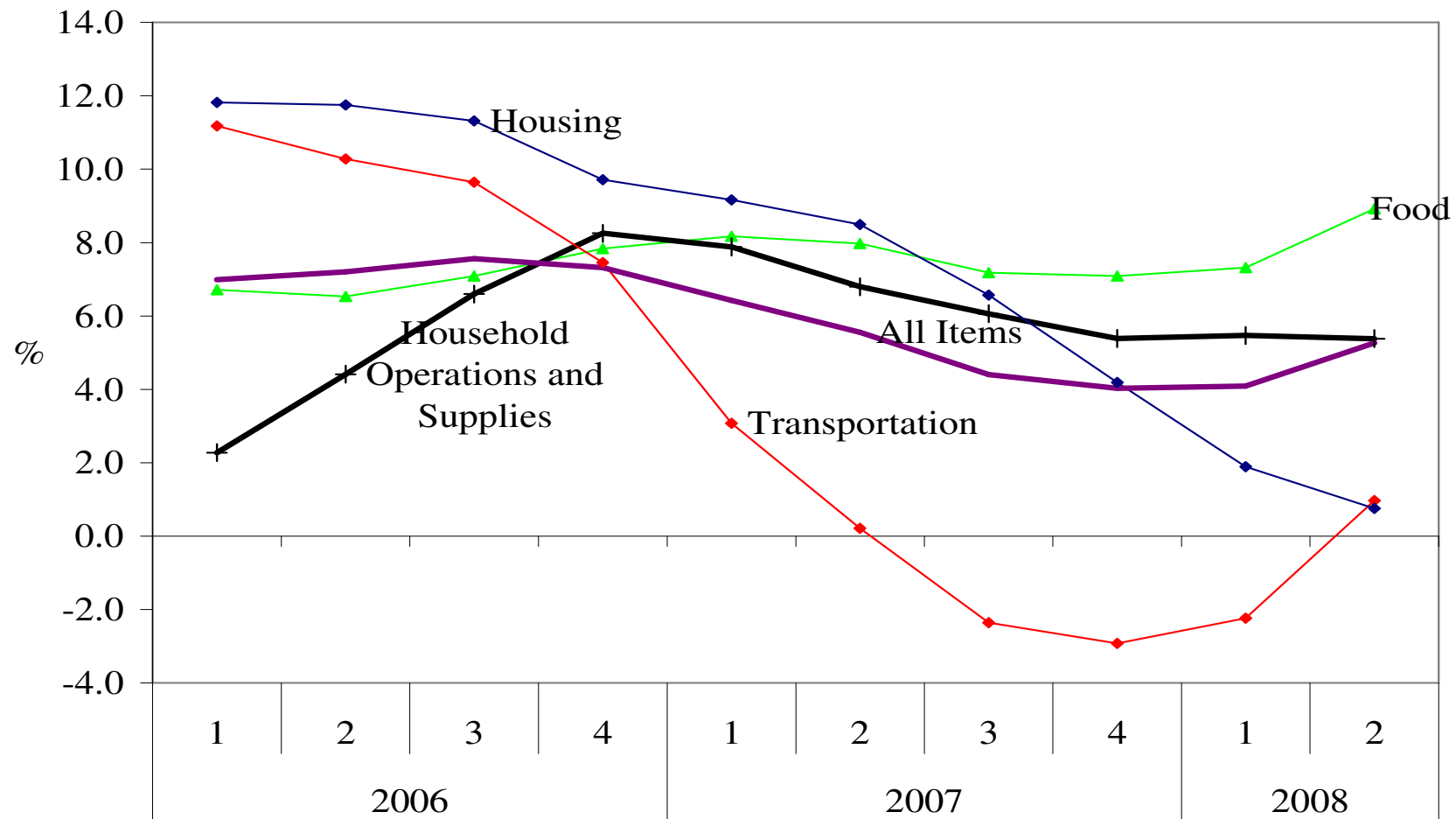
A Look at Recent Price Trends in Barbados

- Inflation in Barbados tends to be relatively low.
- Figure 2 shows that with the exception of the 1970s, as Barbados suffered from the effects of the oil crisis, inflation in the island has generally averaged just above 3 percent on a moving average basis.
- Since May 2005 inflation has been above its long-run average.

Figure 2: Retail Price Inflation, 1977M1 to 2008M6



A Look at Recent Price Trends in Barbados

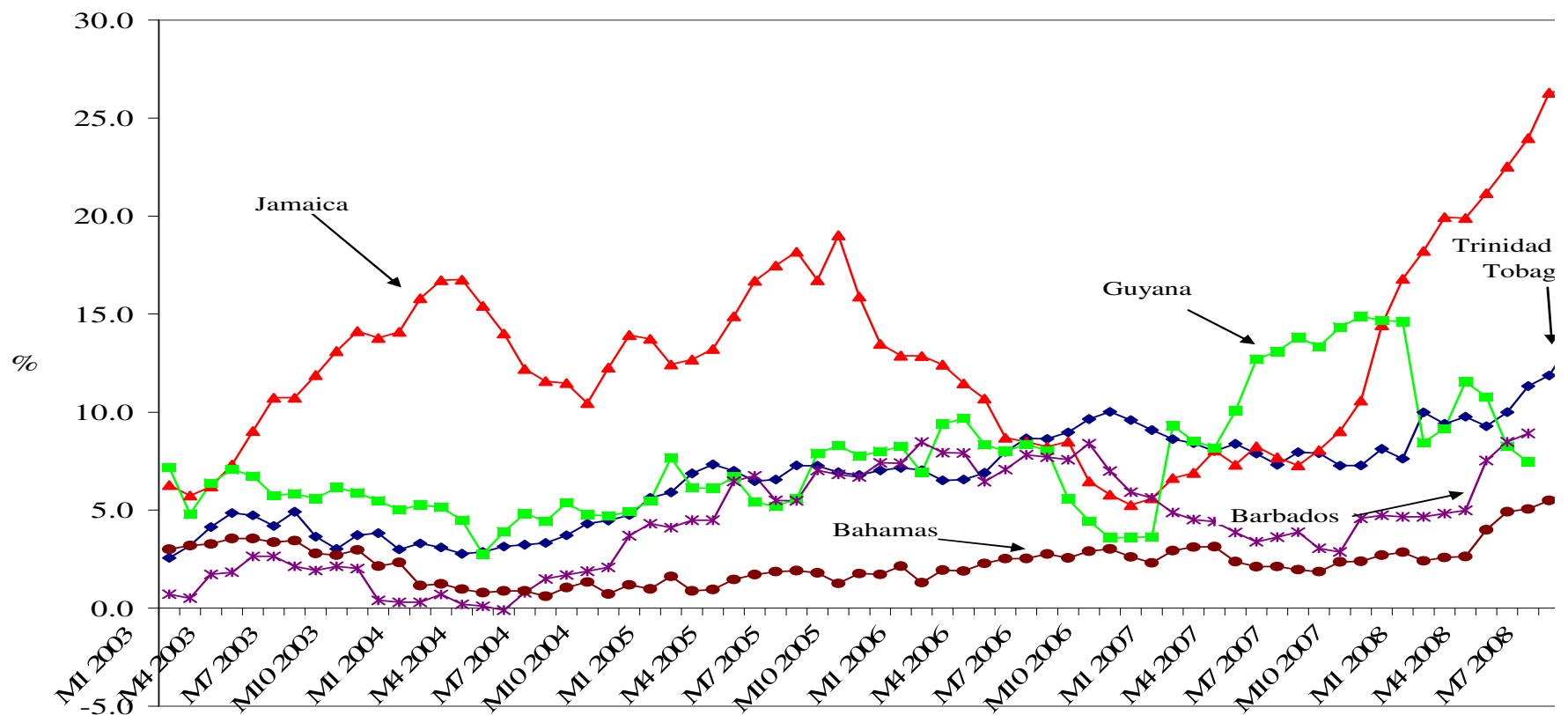


A Look at Recent Price Trends in Barbados

- One of the main factors pushing up food prices in the island has been the rapid acceleration in commodity prices.
- With the exception of Beef and Barley, all the major commodity categories reported double-digit increases in 2007 and 2008:
 - the average monthly expansion for rice was 96 percent
 - For crude oil, cocoa beans, maize and soybean oil the average monthly growth for the year varied between 20 and 30 percent

A Look at Recent Price Trends in Barbados

Figure 5: Inflation in Barbados and Selected Caribbean Countries



Source: IMF's International Financial Statistics (Online Edition)

Brief Overview of Previous Literature

- Early studies looked at the price changes of particular products (Kashyap, 1995; Levy et al. 2002; Moeser, 2006)
 - prices could remain fixed for several years
- More recent research uses data from a larger number of items.
 - shorter duration spells about 4 months, but still relatively long
 - tends to be shorter in less developed countries (e.g. Sierra Leone)

Methodology

- For each good i , the frequency of price changes is calculated as the ratio of observed price changes to all valid price records.
- The implied duration of price spells can be calculated as the inverse of the frequency of price changes.

Methodology (cont'd)

- The rigidity of prices can be gleaned from the frequency as well as duration of price changes.
- Prices can be considered rigid if the frequency of price changes is small and therefore have relatively long duration of price spells.

Methodology (cont'd)

- Price synchronisation is assessed by comparing the ratio of the empirical standard deviation of the frequency of prices changes for product to the theoretical maximum standard deviation in the case of perfect synchronisation of price changes:

$$SYNC_i = \frac{\sqrt{T^{-1} \sum_t (F_{it} - F_i)^2}}{\sqrt{F_i(1 - F_i)}}$$

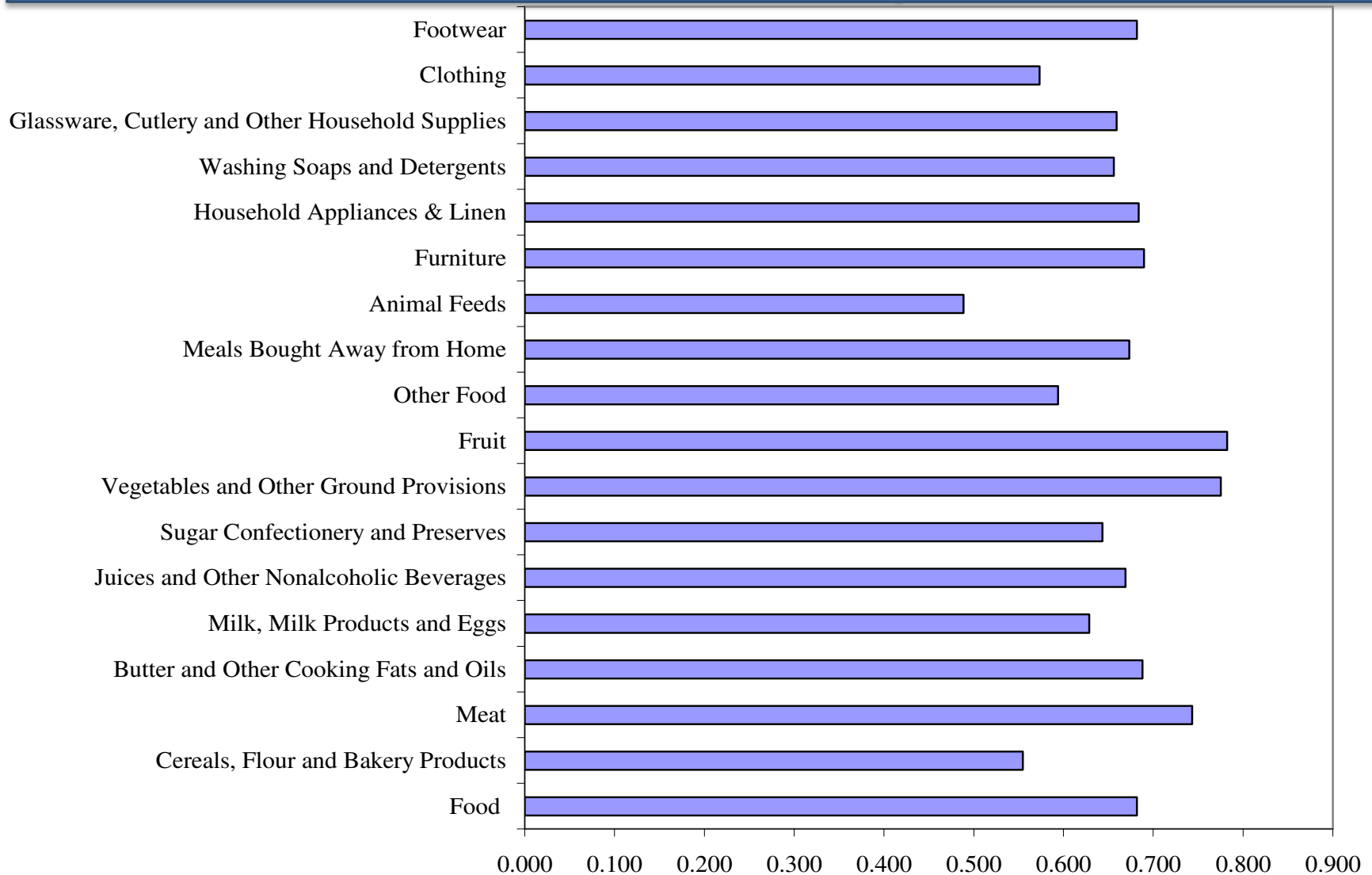
- If price changes are synchronised, i.e. the prices of all goods change at the same time or not at all, then the ratio should be near 1.

Methodology (cont'd)

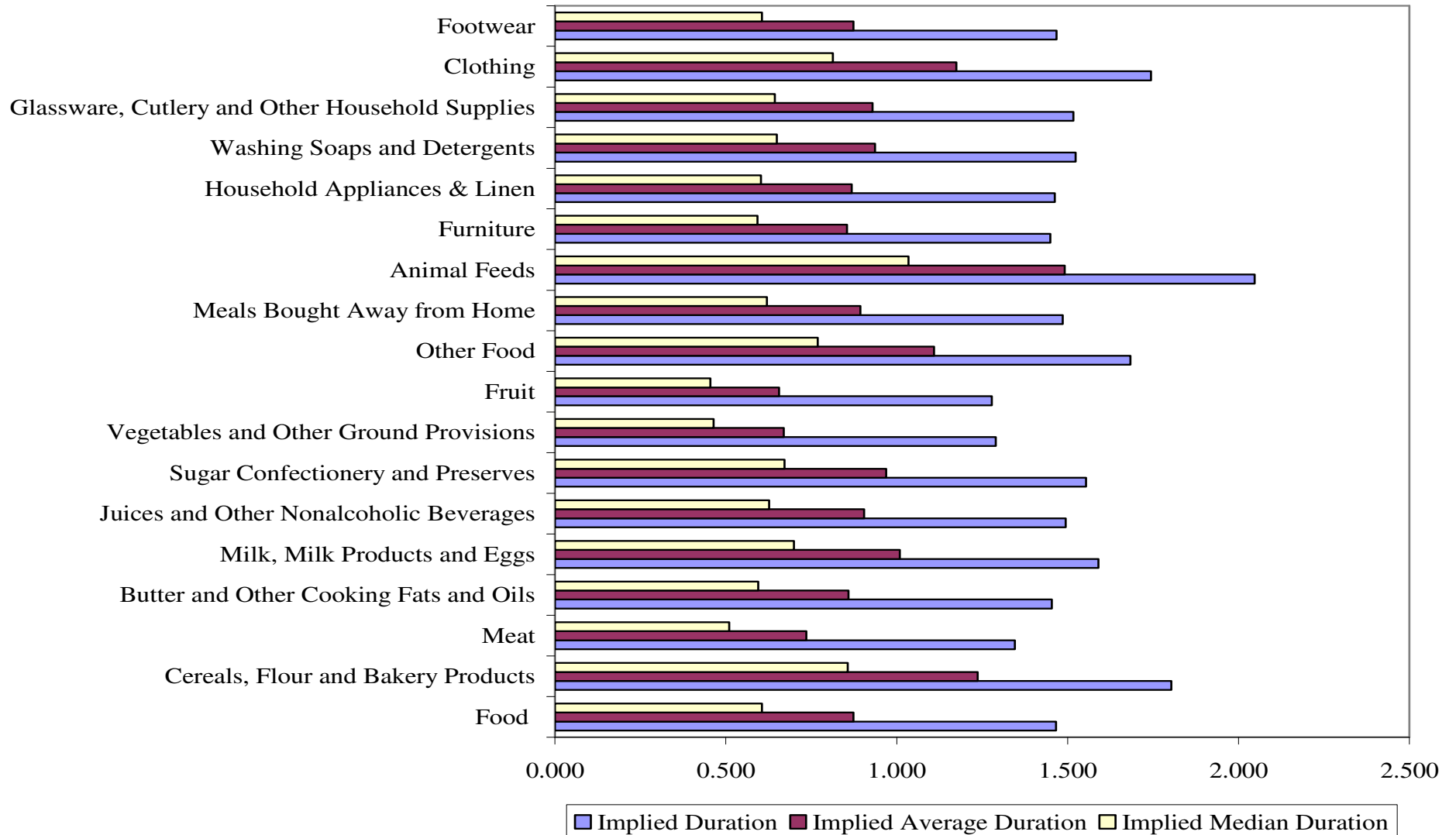
- Menu-cost models of price adjustment suggest that inflation tends to be higher in markets where price changes are more frequent (see Barro, 1972; Taylor, 1999).
- To understand the factors that have influenced price changes in Barbados over the last few years an empirical model of the frequency of price changes is estimated over the period 2000 to 2008.

$$F_t = \beta_0 + \beta_i \sum_{i=1}^2 F_{t-i} + \delta_i \sum_{i=1}^2 dM_{t-i} + \theta_i \sum_{i=1}^2 \pi_{t-i} + \mu_t$$

Frequency of Prices Changes by Product Group



Duration of Prices Changes by Product Group



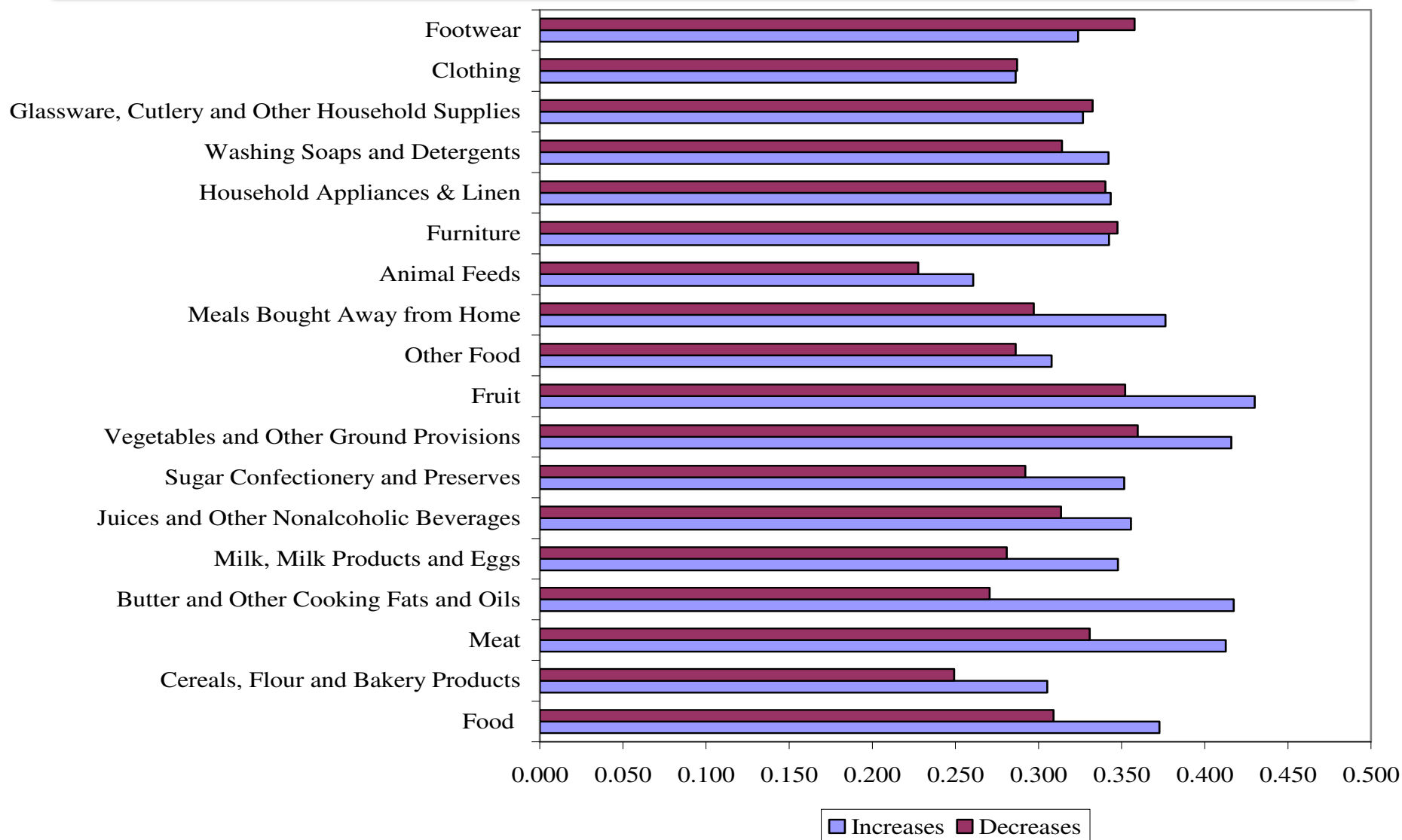
How often do Businesses Change Prices in Barbados?

- The average duration of most goods was between 1 and 2 months, with 'animal feeds' and 'cereals, flour and bakery products' on the longer end of this spectrum.
- After making adjustments to reflect continuous timing of price changes, the implied average and median duration of price spells is less than 1 month for most goods, with a median duration of about 0.6 months.
 - In the case of 'vegetables and other ground provisions' and 'fruit', prices tended to remain fixed for less than half a month. Only animal feeds had a median duration of over 1 month.

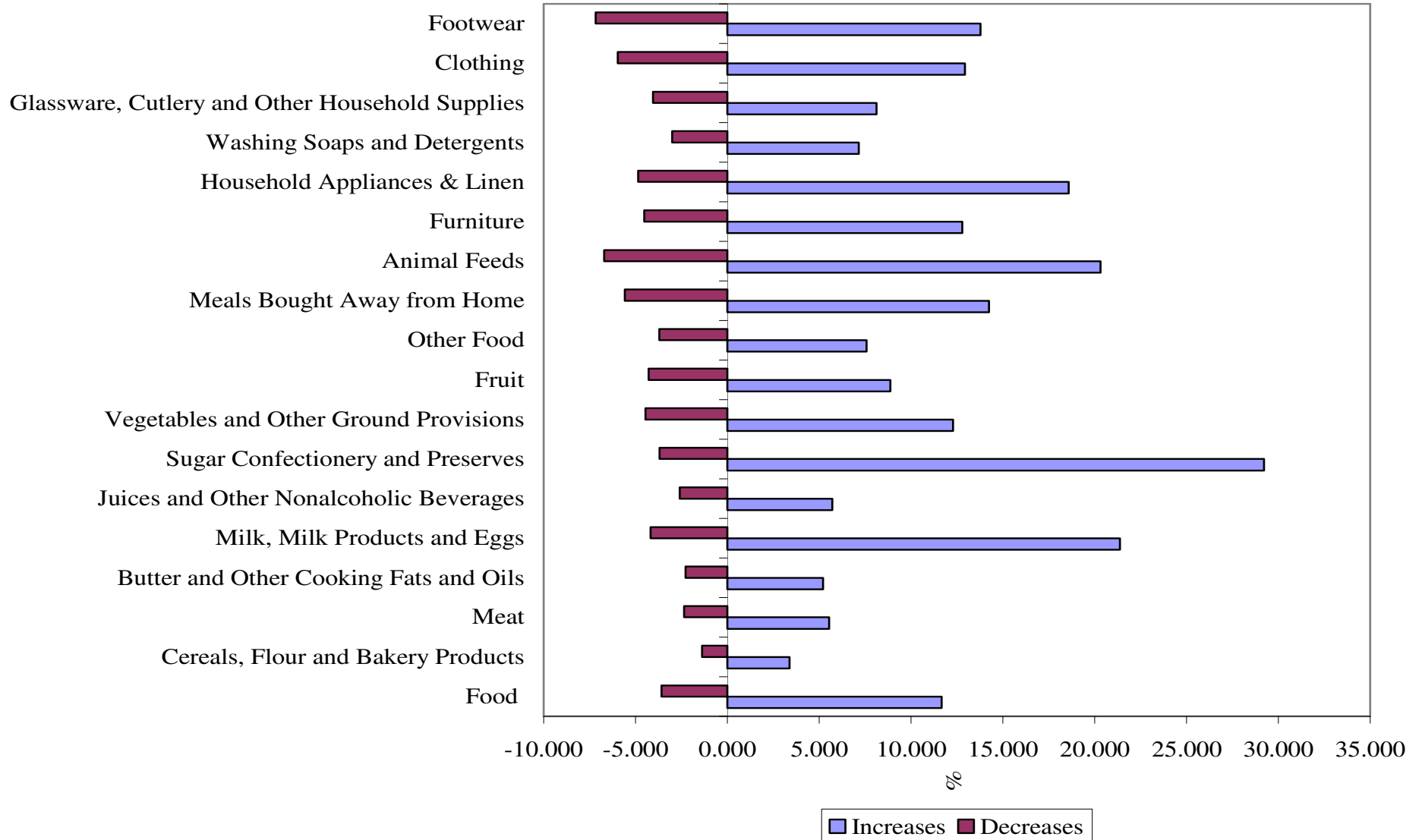
How often do Businesses Change Prices in Barbados?

- In every month, between 40 to 50 percent of goods tend to report higher prices while 30 to 40 percent of goods experience some decline in price.
 - 'Fruit', 'vegetables and other ground provisions', 'butter and other cooking fats and oils' as well as 'meat' tended to have the highest probabilities of price increases during any given month.

Frequency of Prices Increasing/Decreasing by Product Group (Per Month)



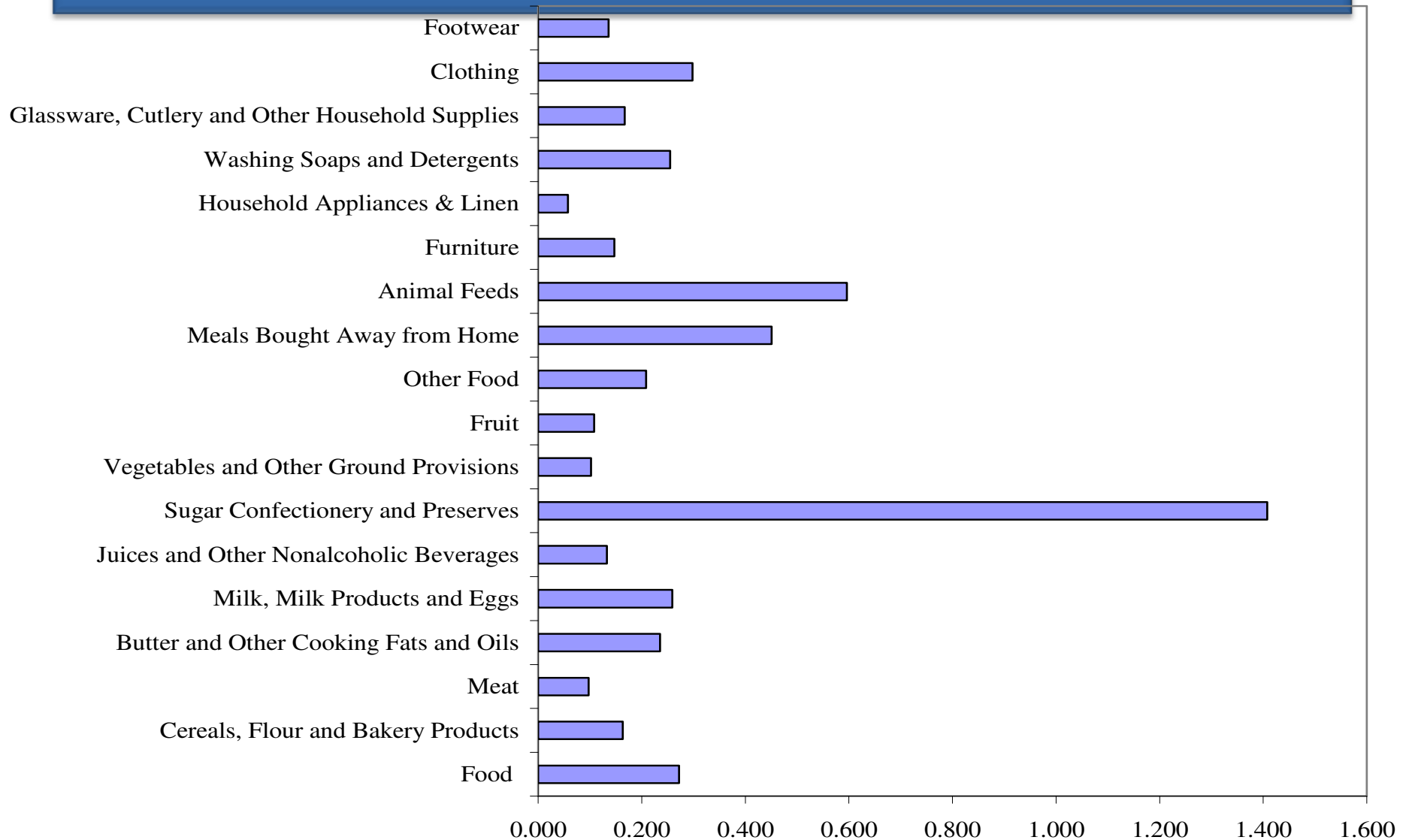
Average Size of Prices Increasing/Decreasing by Product Group (Per Month)



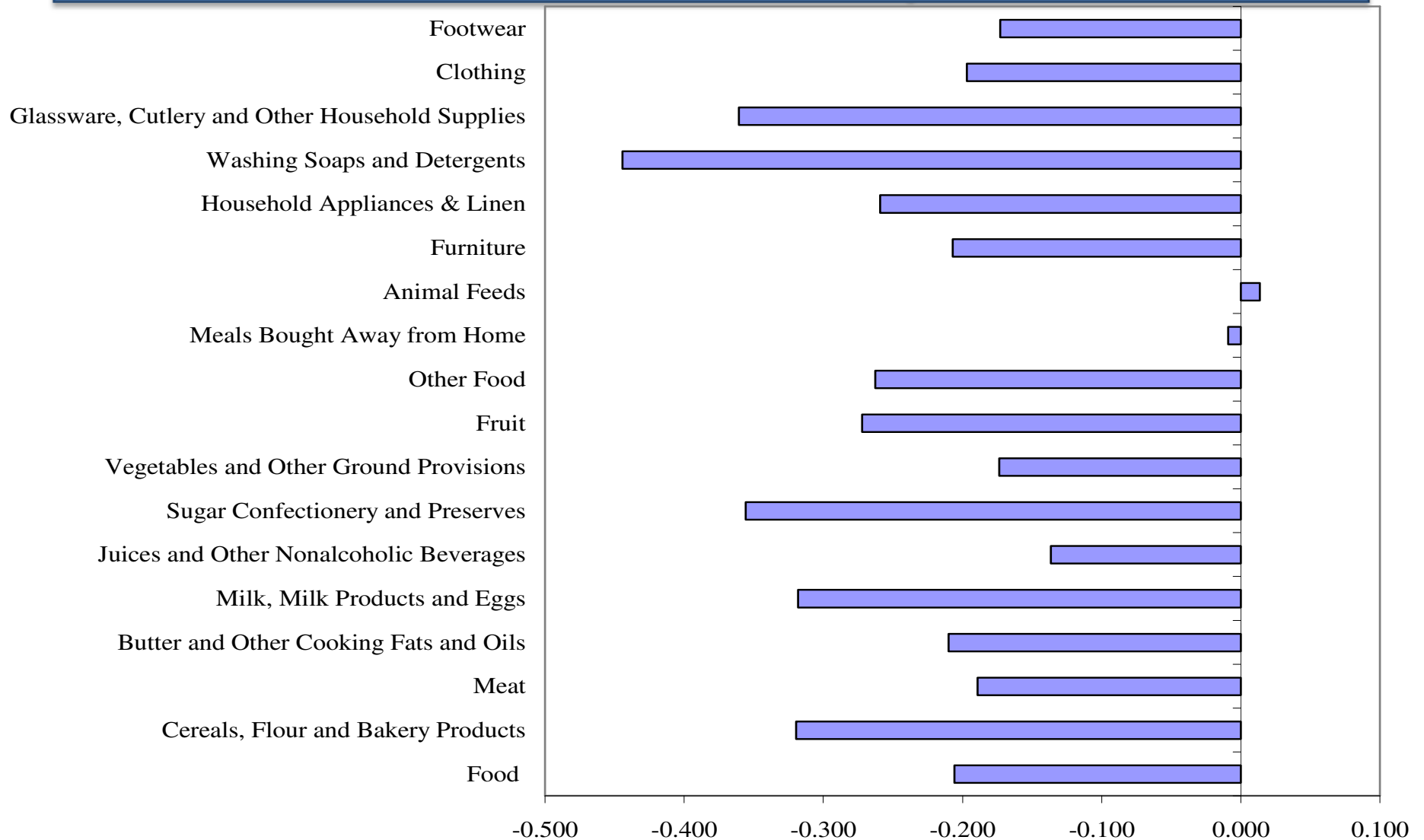
How often do Businesses Change Prices in Barbados?

- On average the size of these increases tended to be larger than price decreases: mean price increases ranged from 3 to 29 percent, while average price decreases ranged between 1 and 7 percent per month.
- Nine product groups had double-digit average monthly price increases: (1) milk, milk products and eggs; (2) sugar confectionery and preserves; (3) vegetables and other ground provisions; (4) meals bought away from home; (5) animal feeds; (6) furniture; (7) household appliances and linen; (8) clothing, and; (9) footwear.
 - ‘Household appliances’, ‘animal feeds’, ‘sugar confectionery and preserves’, and ‘milk, milk products and eggs’, had the largest average price increases per month at 15 percent. ‘Clothing, footwear and animal feeds’ had the largest average price decreases.

Estimated Volatility of Prices Changes by Product Group (Coefficient of Variation)



Estimated Inflation Persistence by Product Group



Determinants of Product Prices in Barbados

- Data on the monthly prices for 78 products items between 2000 and 2008 are stacked to produce a panel and employed to estimate the model of price changes.
- The results from two estimated models are provided for comparison purposes: (1) a model with only import prices, and; (2) a model with the full set of explanatory variables.

Determinants of Product Prices in Barbados

- Both regressions suggest that import prices are a positive and statistically significant determinant of domestic prices.
 - The coefficient estimate indicates that for every 1 percent increase in import prices, domestic prices rise by about 0.6 percent, suggesting that there is not full pass-through of import price changes to consumers; about 0.4 percent is absorbed by firms.
 - Even when all of the explanatory variables are included in the regression model, this finding still holds.

Conclusions

- Our conclusions may be summarised as follows:
 - Prices in Barbados are changed quite frequently; between 50 and 80 percent of items in every category recorded a price change every month on average;
 - In the present decade the frequency of price changes has remained more or less constant;
 - There are regular monthly price reductions as well as increases, but the reductions are always smaller and fewer than the increases;

Conclusions

- Our conclusions may be summarised as follows:
 - The magnitudes of increases and decreases have remained largely unchanged during the current decade;
 - Apart from five periods of highly volatile prices, which lasted between one and six months, price changes have fluctuated between decreases of five percent and increases of 10 percent;
 - The price volatility pattern is similar for all product groups;
 - However, within product groups price changes are not highly synchronised;
 - Price changes are not highly correlated with changes in a previous period; correlations are small and negative, indicating a slight tendency for increases to be followed by decreases, and vice versa; and
 - There is no measurable impact of changes in the money supply or national inflation on the frequency of price changes.