Food, housing and energy: evolution of consumer prices for the bare necessities*

Miles Parker†

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Abstract

This paper studies consumer price inflation over the period 1980-2012, with particular focus on the food, housing and energy sub-indices. It uses a comprehensive dataset of 223 countries and territories. Inflation is higher and more volatile in developing countries, but episodes of inflation above 100 percent are rare. Food and energy are the most volatile of the sub-indices studied here. Global factors explain a large share of the variance of national inflation rates for advanced countries, but not for middle and low income countries. By component, common factors explain food and energy prices, but not the remainder of the index.

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†Address: Economics Department, Reserve Bank of New Zealand, 2 The Terrace, PO Box 2498, Wellington, New Zealand. Email address: miles.parker@rbnz.govt.nz

1 Introduction

Understanding the evolution of the prices for the bare necessities – food, shelter, fuel – motivated the initial creation of consumer price indices (CPIs). When the CPI was first published in New Zealand in 1914 it only covered food, rent and fuel and light. In recent years, policymakers have once more been concerned about the impact of food, housing and energy prices on overall inflation. While cross-country comparisons of overall inflation are common, cross-country comparisons of sub-indices are relatively rare and are hampered by the lack of available and consistent data.

The goal of this paper is to provide a comprehensive dataset for consumer price indices for food, housing and energy, as well as the remaining items in the overall index. These data facilitate future efforts at more in-depth cross-country analysis. The accompanying data include the overall index for 223 countries and territories[1] for the period 1980-2012. Coverage of sub-indices is less extensive than for the overall index, but far exceeds existing data sources, which are mostly restricted to advanced economies. Every effort has been made to standardise the indices using the international standard Classification of Consumption according to Purpose (COICOP) in order to aid comparisons.

The beginning of the 21st Century was marked by low and stable inflation across the developed world, and reduced inflationary tendencies in the developing world. This stability was threatened in the latter half of the past decade by volatility in commodity prices, most notably food and energy, causing concern for policymakers (See, among others, Bernanke, 2008; IMF, 2008; ECB, 2008). Research into the effects of these movements in commodity prices on domestic inflation has generally been restricted to a small sample of countries, owing principally to a lack of readily available data.

[1]The official status of the countries and territories included here varies from internationally recognised sovereign states to overseas regions, dependencies territories and autonomous regions. The term 'country' is used hereafter for brevity, and is in keeping with the practice of the World Bank.

The rest of this paper describes the accompanying dataset. In particular, it sets out the exact definitions of the CPI sub-indices sought, together with a broad overview of the sources used.[2] This paper also sets out a number of stylised cross-sectional and time-series properties of overall CPI and its sub-indices.

Global inflation fell through the 1980s and 1990s, with the disinflation more marked in high income economies. Episodes of inflation exceeding 100 percent are rare, and mainly confined to Latin America in the late 1980s and early 1990s and the transition of Eastern European economies from command to market economies in the early 1990s. Inflation rates are higher and more volatile in developing economies.

More recently, a marked increase in inflation volatility occurred around the the time of the global financial crisis. This increased volatility can mostly be attributed to volatility in the underlying sub-indices for food and energy. These sub-indices are the most volatile of those studied here, and also have the highest average inflation over the period. Consumer price inflation excluding food, housing and energy has been remarkably stable in high income countries for the past two decades.

To illustrate the usefulness of the wider data, we reconsider the research of Ciccarelli and Mojon (2010) into global inflation. Ciccarelli and Mojon find that a common global factor can explain around 70 percent of the inflation variance in 22 OECD countries. We confirm this finding, but show that it does not generalise to the rest of the world, with global factors explaining much smaller shares of inflation variance in middle and low income countries. Using the dynamic hierarchical factor model proposed by Moench et al. (2013) we show that common factors explain a large share of the variance for CPI energy and CPI food prices, notably in high income countries, but the variance of other CPI components.

[2] An accompanying appendix that details the exact source used for each country is available upon request.

2 Data

2.1 Desired series

This paper uses consumer prices for nearly all sovereign states, territories and geographically distinct autonomous regions (e.g. French overseas regions such as Réunion). Ultimately, CPI figures were found for 223 countries.[3] The coverage roughly coincides with the countries in the World Bank's *World Development Indicators* database.

The data are at quarterly frequency to maximise coverage. Many countries only publish at this frequency, particularly developing ones. For those countries that publish monthly, the quarterly index value is calculated as the average of the monthly outturns, in keeping with standard international practice.

Differences in exact definitions of CPI can render cross-country comparisons difficult. The scope of items covered and the exact structure of sub-indices differs between countries. Where possible, the indices used here are standardised using the international standard Classification of Consumption according to Purpose (COICOP).[4] COICOP is used for a number of modern CPIs, including the European Union's Harmonised Index of Consumer Prices. The desired COICOP categories are:

Overall (CPI) : the all items index. The COICOP classification does not include mortgage payments, which have been excluded, where possible, from the national indices that include them.

Food (CPIF) : COICOP 01.1 food purchased for consumption at home.

Housing (CPIH) : COICOP 04.1-04.4 rents, maintenance and repair of dwellings, water supply and local authority taxes based on housing.

[3]Of widely recognised sovereign states, only Eritrea, the People's Democratic Republic of Korea, Turkmenistan, Uzbekistan and the bulk of Somalia are missing here.

[4]See `http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=5` for a description of the categories.

Energy (CPIE) : COICOP 04.5 electricity, gas and other fuels and COICOP 07.2.2 fuels and lubricants for operation of personal transport equipment.

For countries that do not publish on a COICOP basis, the closest sub-index to the desired COICOP category was used, except where that closest series remains far from the desired definition. For example, food and non-alcoholic beverages was used in place of food, the series for electricity, gas an other fuels was deemed sufficient for CPI energy. Conversely, the full transport category was deemed too far removed from fuels and lubricants given it includes public transport, purchase of vehicles, tax on vehicles and spare parts. The accompanying appendix sets out the exact series used for each country.

Not all statistical agencies publish CPI at a detailed level. Many only publish at the 12 COICOP division level, which means it is not possible to separate out housing and energy. For these countries, COICOP division 04 - Housing, water, electricity, gas and other fuels is used for a combined housing and energy series (CPIHE). For countries where separate housing and energy series are available, CPIHE combines the estimates for housing and energy.

National statistical agencies periodically rebase and re-reference their CPI series.[5] For the most part, an overlapping period is published for both the new and old series, allowing for the two series to be spliced together. In some cases there are no overlapping observations, but the old series has data covering the reference period for the new series. For example, the new series may only be published from 2008Q1, but is referenced to 2007=100 and the old series has observations for 2007. For the small number of cases where no overlap exists, the old and new series have been linked using the average growth of the relevant period in the preceding and subsequent five years. All such cases are noted in the appendix under the relevant country. The data have been re-referenced to

[5]Technically, the base refers to the period where the underlying expenditure used to calculate the weights takes place. The reference period is the period when the index is set to equal 100, or occasionally 1000. Since these periods often coincide, the use of 'base' for both is common practice.

2010=100 (with a few exceptions of countries that do not have 2010 data).

Also included in the accompanying data are the weights of the sub-indices in the total index. Weights for CPI sub-indices are typically estimated using surveys of household spending. The frequency with which weights are updated varies between countries, with updates usually more frequent in advanced countries. Where weights are not published, estimates are derived using ordinary least squares.[6]

Core inflation indices are constructed using the sub-indices and weights. The accompanying dataset contains series on CPI excluding food (CPIxF), excluding energy (CPIxE), excluding housing (CPIxH) and excluding housing and energy (CPIxHE). The accompanying data also include series for CPI excluding food and energy (CPIxFE). This measure is commonly used internationally as a measure of core, or underlying, inflation. The final core measure, discussed in more detail below, is CPI excluding food, housing and energy (CPIxFHE).

To calculate a core measure it is necessary to unchain the relevant indices by setting the base period equal to 100. This unchaining is required for each change in weight. The unchained indices are then weighted together using the current period weights. Finally, the unchained core indices are once more chain-linked together. As an example, the formula for calculating CPI excluding food and energy is shown below.

$$CPI\text{x}FE_t = \frac{100\left(100 \cdot \frac{CPI_t}{CPI_b}\right) - wF\left(100 \cdot \frac{CPIF_t}{CPIF_b}\right) - wE\left(100 \cdot \frac{CPIE_t}{CPIE_b}\right)}{100 - wF - wE}$$

Where CPI_t, $CPIF_t$ and $CPIE_t$ are the current index numbers for overall, food and energy prices, CPI_b, $CPIF_b$ and $CPIE_b$ are the index numbers for the base period – the quarter immediately before the change to the current weights – and wF and wE are the current weights for food and energy. The weight of overall CPI is 100.

[6] An accompanying data appendix that notes the cases when this method is used is available on request.

2.2 Sources

There are a number of international databases with CPI data. The *International Financial Statistics* published by the International Monetary Fund contain data on overall CPI for most member countries. The *Laborstats* database of the International Labour Organisation has indices for overall CPI and CPI food. Neither of these sources has information on the other sub-indices, nor on the weights.

The *Main Economic Indicators* of the Organisation for Economic Co-operation and Development contain more detailed information on sub-indices, including energy, and weights for its (advanced economy) members. There are also a number of regional organisations with CPI data for several countries, including the Economic and Statistical Observatory for sub-Saharan Africa (AFRISTAT) and the Secretariat of the Pacific Community. Two major international subscription databases were also used - Thomson Reuters Datastream and Haver Analytics.

For the most part, the sub-indices and weights must be obtained from national sources. When particular series were not all available on the website of the national statistical agency nor the central bank, both were contacted to request the data. A number of these institutions provided the requested data and have been noted in the country notes.

There are data for overall CPI for 127 countries in 1980Q1, and for over 200 countries by 1998Q1. Coverage of CPI food is also extensive. The availability of CPI energy and CPI housing is mostly restricted to high income countries in the first half of the period. The combined housing and energy series is more widely available, as noted above.

There are a number of reasons why the panel is not fully balanced, despite these systematic attempts to obtain the relevant CPI data. First, country formation during the sample period creates periods of no data pre-independence. Examples include the states formed from the break-up of the Soviet Union and later of Yugoslavia as well as

several newly independent states (e.g. Timor-Leste, South Sudan). Second, it was not always possible to obtain information on previous vintages of CPI for all countries - the records have not all been digitised or made available online. Furthermore, some countries did not publish CPI data on a quarterly or higher frequency throughout the sample (e.g. United Arab Emirates, Greenland). Finally, other breaks in collection have been caused by war, natural disasters or a lack of personnel at statistical agencies.

3 Evolution of inflation since 1980

3.1 Distribution of country headline inflation rates

There is a marked difference in overall CPI inflation between high income countries and less developed countries. For high income countries, there was a period of disinflation through the first half of the 1980s (figure 1). Inflation in these countries settled at low and stable rates from the early 1990s through to the middle of 2007. In the 15 year period between 1992Q3 and 2007Q3, the median inflation rate for high income countries ranged between 1.4 and 3.2 percent. This period is also remarkable for the reduction in the right-hand skew of the distribution of country inflation rates.

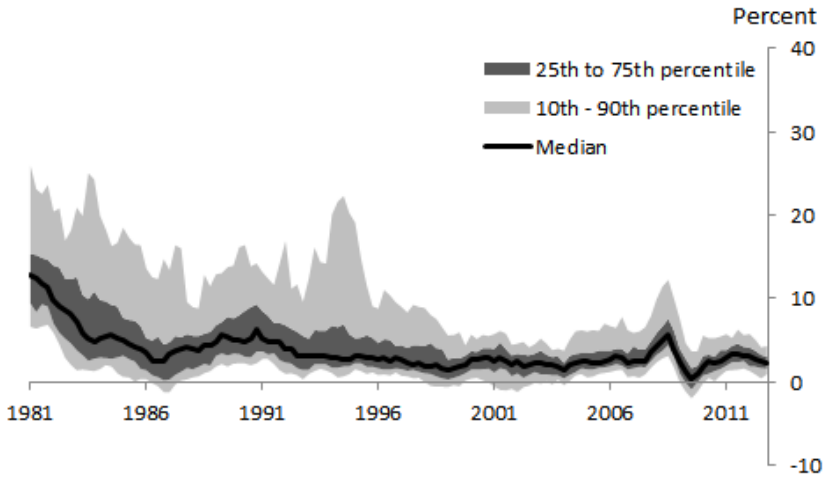
That period of inflation stability was followed by increased volatility during the global financial crisis (GFC) with a sharp peak in inflation, followed by an immediate trough. Inflation in 2011 and 2012 appears more in keeping with the pre-GFC distribution.

The median inflation for middle income countries follows a similar pattern to high income countries, albeit at a higher rate overall. The disinflation of the early 1980s is less marked, and continues through to 2000. This disinflationary period was accompanied by a reduction in skew. The period 2000-2007 appears to be a period of relative stability in inflation. The volatility around the GFC is more marked.

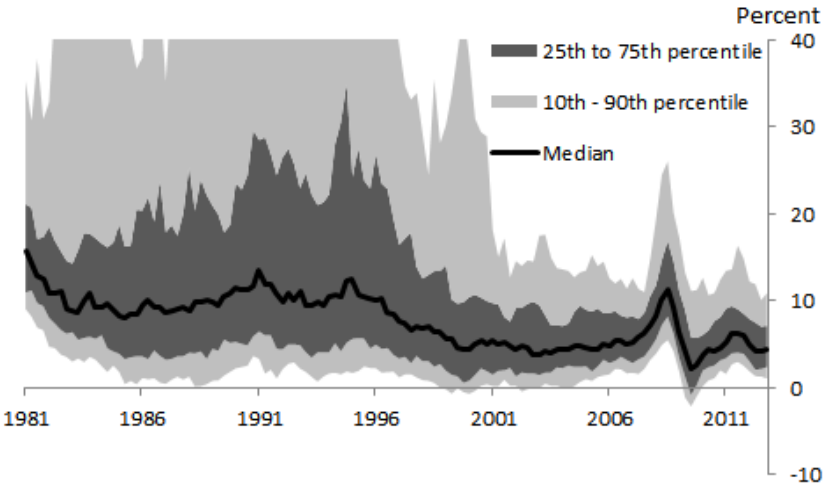
Inflation for low income countries is more volatile than for high or middle income countries. The median inflation rate follows a similar path to that of middle income countries,

Figure 1: Distribution of annual overall CPI inflation

(a) High income



(b) Middle income



(c) Low income

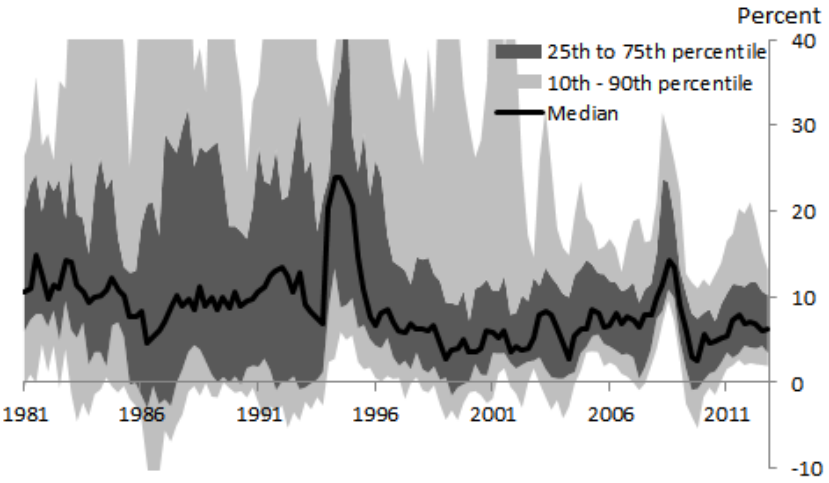


Table 1: Probability of change in inflation

Inflation	Probability that inflation at year T+1			
Year T	will rise	will fall	exceed 100	Number of observations
<0	73.2	0.0	0.0	385
0 - 20	3.3	5.8	0.0	4668
20 - 40	13.3	48.9	1.6	309
40 - 60	23.9	59.1	6.8	88
60 - 80	25.0	50.0	17.9	56
80 - 100	25.0	66.7	25.0	24
100+	0.0	38.1	61.9	105

but with a greater variance. Deflation is more common in low income countries than in high or middle income countries. Indeed, there are periods when the 25th percentile lies below zero. There is a sharp spike in inflation in the early 1990s, in part reflecting the high inflation rates as former Soviet Union states transitioned from command to market economies.

3.2 Transition to high inflation

There are a number of examples of countries succumbing to hyperinflation through the sample, notably in Latin America and East European economies in transition. Such episodes are relatively rare, and represent a clear de-anchoring of inflation expectations. This de-anchoring leads to the question whether there is a threshold beyond which inflation accelerates.

Bruno and Easterly (1998) investigate inflation dynamics over the period 1961-1992, with particular focus on potential non-linearities in inflation dynamics. They find that the probability of the following year's inflation rate exceeding 100 percent increases sharply beyond a threshold of 40 percent in the current year. Fischer et al. (2002) confirm the probability of exceeding 100 percent in the following year does increase with the current inflation rate, but find no evidence of a non-linear threshold.

For the period studied here, inflation appears anchored at lower rates than for the

period studied by Bruno and Easterly (Table 1). Two thirds of observations fall in the range 0-10 percent, and over four fifths of observations are between 0 and 20 percent. Annual inflation exceeds 40 percent in a little less than 5 percent of cases – lower than the incidence of deflation. Once inflation rises beyond 40 percent, the probability of increasing does indeed rise, but remains roughly constant at around a quarter throughout the range 40-100 percent. When current inflation is in that range, the most likely outcome for inflation in the subsequent year remains a fall.

The probability that inflation will exceed 100 percent in the following year increases as current inflation rises, but there is little evidence of non-linearity around 40 percent. The probability of exceeding 100 percent in the following year is lower for each range of current year inflation than that found by Bruno and Easterly. The data here therefore support the findings of Fischer et al that there is not a non-linear threshold beyond which inflation accelerates.

3.3 Sub-indices

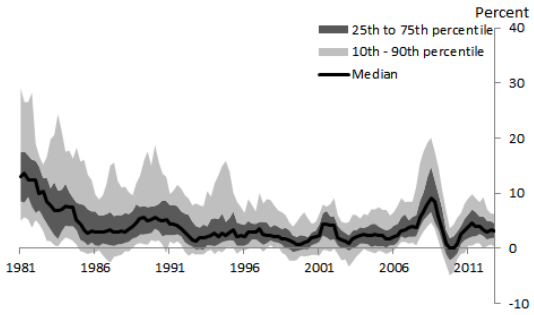
This section considers whether the evolution of CPI inflation noted in section 3.1 above is attributable to movements in any particular sub-index. In particular, are movements in the overall index dominated by the evolution of prices for food, housing and energy, or by the remainder of the index?

The evolution of food price inflation mirrors that for overall CPI. For middle and low income countries this is perhaps not surprising given the weight of food in the total index (see section 3.5 below). There is a marked run-up in food price inflation worldwide immediately prior to the GFC, which quickly reversed following the collapse of Lehman Brothers. This period is the most marked episode of volatility for high income countries, and appears to be a major contributing factor to movements in the overall index. For middle and low income countries, the food price inflation rate is higher on average, more

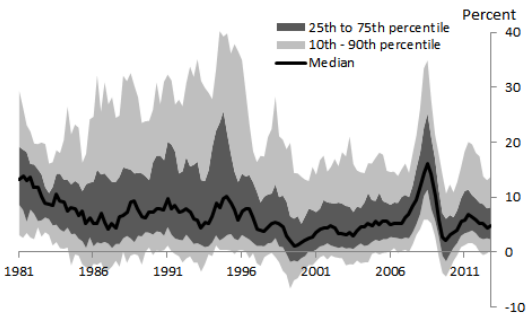
volatile and more dispersed.

Figure 2: Distribution of annual inflation of CPI sub-indices

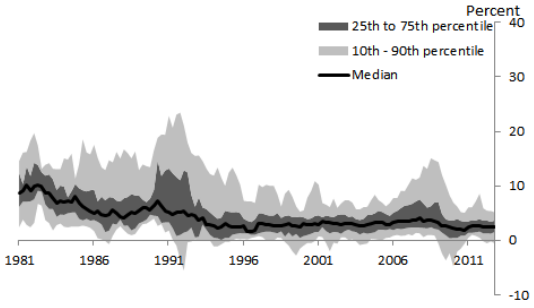
(a) Food - high income



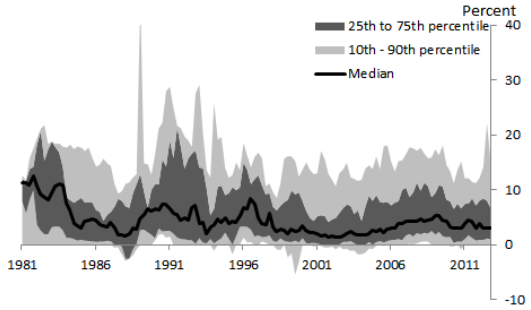
(b) Food - middle/low income



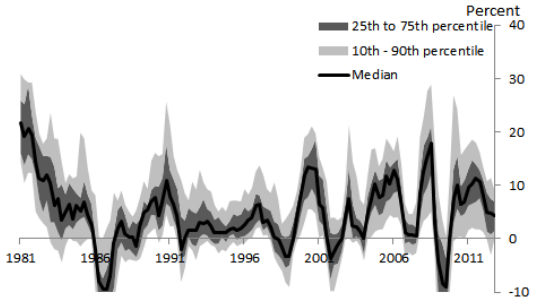
(c) Housing - high income



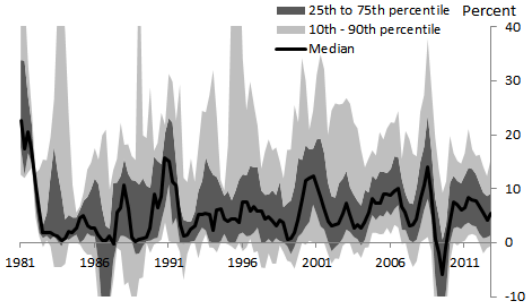
(d) Housing - middle/low income



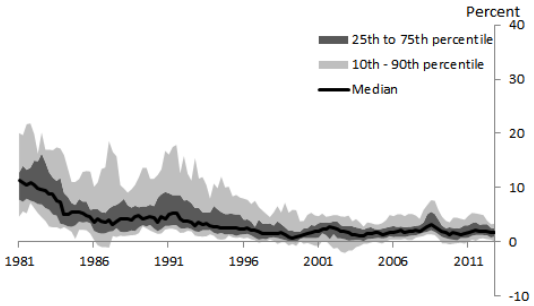
(e) Energy - high income



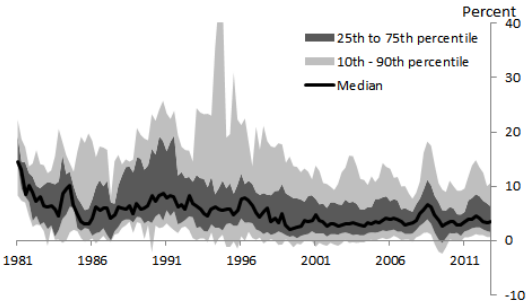
(f) Energy - middle/low income



(g) CPIxFHE - high income



(h) CPIxFHE - middle/low income



The median rate of housing inflation in high income countries displays less volatility

than food-price inflation. The median housing inflation rate, and indeed the interquartile range, is not affected around the time of the GFC, in contrast to the volatility witnessed with food price inflation. It also contrasts with the widespread increase, and reversal, in house prices at that time. The housing component of the CPI is principally rents, and the lack of increase in the CPI component in line with house prices is consistent with evidence that house prices over the period became divorced from historic relationships with rents (e.g. OECD, 2012).

The energy sub-index is the most volatile of the sub-indices studied here, and also the most prone to outright price falls. There have been a number of cycles in energy prices since the early 1980s. This is most obvious in higher income countries where the distribution of inflation rates is tight relative to the volatility of the median. The outcomes are more dispersed for middle and low income countries (note there are few observations for these countries in the early part of the period).

For high income countries, the remainder of the CPI - the index excluding food, housing and energy - has been low and stable for most of the period. The outcomes across countries are similar, with very little dispersion in inflation rates. A minority of high income countries had an increase in CPIxFHE inflation immediately prior to the GFC, but in general this sub-index did not exhibit the same volatility around the GFC that the other sub-indices did. The stability in the CPIxFHE inflation rate was less evident in middle and low income countries.

3.4 Inflation volatility

Table 2 shows the mean, median and standard deviation of inflation for the period 1981-2012, split by country income level and by sub-index. In order to remove the influence of a small number of extreme outliers, periods of inflation above 100 percent have been excluded from this table.

Table 2: Mean, median and standard deviation of inflation

	Full sample		1980-1991		1992-2006		2007-2012	
Income	H	M/L	H	M/L	H	M/L	H	M/L
Mean								
Overall	4.9	9.9	7.9	13.7	3.8	9.4	3.3	7.0
Food	4.5	8.7	7.1	10.8	3.1	7.9	4.7	8.6
Housing	4.4	6.3	7.8	7.7	3.7	5.4	3.5	7.1
Energy	5.3	8.0	5.5	8.1	4.9	9.1	5.8	6.8
CPIxFHE	3.5	6.0	7.0	9.3	2.7	6.1	2.4	5.2
Median								
Overall	3.0	6.1	5.1	9.1	2.5	5.2	2.8	5.5
Food	3.1	5.8	5.1	8.1	2.2	4.7	3.8	6.5
Housing	3.3	3.6	6.4	5.6	3.0	2.7	2.9	4.1
Energy	4.3	5.9	4.8	5.4	3.5	6.3	5.9	5.6
CPIxFHE	2.3	4.0	5.2	6.8	1.9	3.8	1.9	3.9
Standard deviation								
Overall	7.8	13.6	11.0	16.5	6.5	13.8	2.9	7.2
Food	6.1	12.1	8.4	13.6	4.5	12.7	5.1	9.3
Housing	5.2	17.6	6.3	8.9	4.8	9.6	4.4	25.1
Energy	9.2	13.8	10.8	11.1	7.6	13.6	10.3	14.3
CPIxFHE	4.7	8.6	6.0	13.3	4.3	9.5	2.3	6.1

Headline inflation averaged 4.9 percent over the whole period for high income countries. For middle and low income countries, the mean inflation rate was double that at 9.9 percent. As noted above, there was disinflation over the course of the three decades studied here, in both high income and middle/low income countries.

The energy sub-index exhibited the highest average rate of inflation, followed by food, then housing and finally the remainder of the index. Note the populations are not the same across sub-indices, so the sub-indices do not 'add up' to the headline result. In particular, there is a reporting bias, with those countries that provide separate information on housing and energy likely to be more economically developed and in general exhibit lower overall inflation.

Inflation volatility exhibits similar patterns to the mean rates. The standard deviation of inflation rates is lower for high income countries than for middle and low income countries. The standard deviation falls through the period under analysis. In terms of

the sub-indices, energy is the most volatile, followed by food, then housing. Not only do the remaining items of the index have the lowest rates of inflation, they also have the lowest variance.

3.5 Expenditure weights

How households allocate expenditure has been the subject of a large literature dating back to Engel (1857). Engel's Law states that as households become richer, the share of their spending devoted to food declines: food has an income elasticity of less than 1. Research has extended to considering more categories of expenditure than just food, but in general focuses at the level of the individual household, using surveys of household expenditure. These same surveys are typically used to construct the expenditure weights in the CPI. These expenditure weights are used to combine the individual price series to form the overall index.

Despite the large literature at the household level, international comparisons of expenditure shares have been rare. Notable exceptions include Seale and Regmi (2006) who study expenditure shares for 114 countries and Kaus (2013) who studies 50 countries using UN data over the course of 50 years. These authors study a finer breakdown of expenditure weights by type than covered here, but have a markedly smaller coverage of countries. Only Anker (2011), who studies the food share of consumption, approaches the country coverage.

Comparisons between countries suffer from a number of potential problems. First, the exact nature of expenditure needs to be standardised across countries. For example, some countries include restaurants and cafés in their CPI food index. Second, transport costs, tariffs, taxes and subsidies can affect the relative price of goods and services between countries, and hence consumption shares. For example, petrol is frequently subsidised in developing countries, but taxed in advanced countries. In some advanced countries the

tax share of the price paid by consumers for petrol can exceed 40 percent. This difference is also true over time – changes in world commodity prices for oil and food can affect the relative price of these goods.

Finally, the frequency of updating expenditure weights varies between countries. Since household expenditure surveys are expensive, updating tends to be more frequent in high income economies. The longer between updates, the less likely the index represents true household spending. New expenditure surveys also allow for the incorporation of new goods and services, such as mobile phones, internet broadband providers and pet insurance. Infrequent weight updates in some countries means that there are several income observations for the same expenditure share.

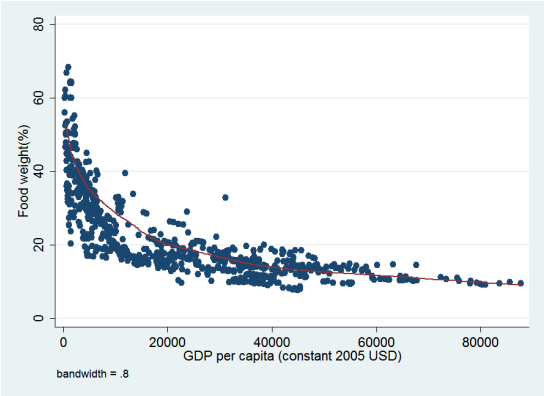
Figure 3 shows international Engel curves for food, housing, energy, and the remaining items of consumer spending. These curves match the share of expenditure on these items, as measured by their weight in the CPI, against the average per capita income of the country. As noted above in section 2.1, every effort has been made to put the series on as consistent a basis as possible. The scatterplots show the respective weights only when updated, to avoid the aforementioned problem with income changing over the period between updates. Scatterplots using just the 2010 Q4 data (not reproduced here) yield qualitatively similar results to the entire sample, suggesting that shifts in relative prices are of secondary importance to shifts in income.

The Engel curves are fitted in a non-parametric fashion, using locally weighted scatterplot smoothing (LOWESS, Cleveland, 1979). LOWESS is a local linear estimator using the tricube kernel function to calculate sufficiently smooth weights for neighbouring observations.

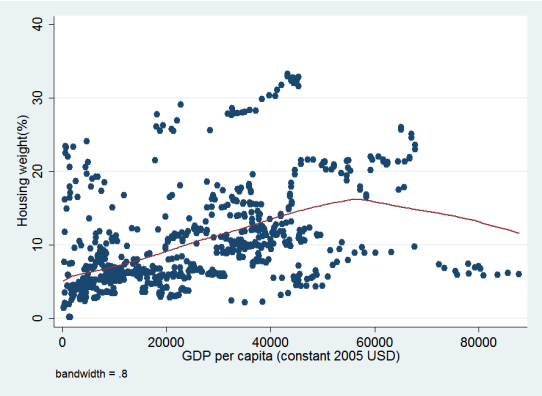
For food, there is a clear negative slope to the cross-country Engel curve; the relationship between income and the expenditure share of food across countries replicates that

Figure 3: Engel curves for CPI components, updated weights

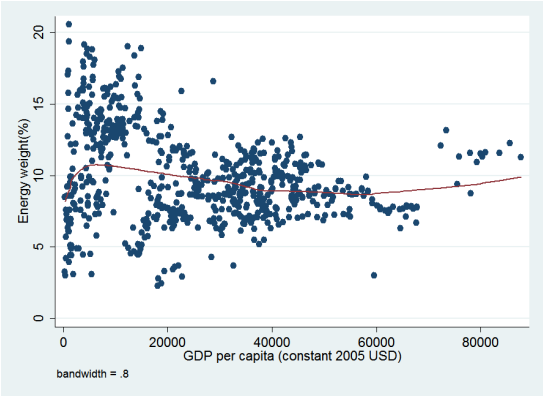
(a) Food



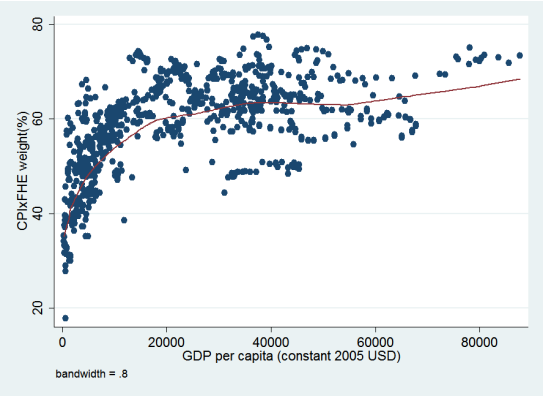
(b) Housing



(c) Energy



(d) CPIxFHE



observed at the household level. For the most part the Engel curve for energy is downward sloping – a 'necessity' in the parlance of the literature. For the poorest countries, the Engel curve for energy is upward sloping, suggesting that these countries are income constrained and consuming less energy than desired.

The Engel curve for housing is upward sloping, implying that housing is a 'luxury'. While shelter is a basic necessity, countries with higher incomes can devote a greater share of income on larger, and better quality housing. The remaining items of consumer spending also have an upward sloping Engel curve. The results here are qualitatively similar to the results found by Kaus (2013) for a much smaller sample of countries.

4 Measures of global inflation

This section uses the data described above to consider the extent to which national inflation rates can be explained by measures of global inflation. A number of recent articles on the subject suggest a large role for global factors in explaining national inflation rates, although the analysis concentrates on high income countries. Ciccarelli and Mojon (2010) study the headline inflation rates for 22 OECD countries over the period 1960-2008. They establish that almost 70 percent of the variance of national inflation rates can be explained by a common, global factor. They demonstrate that including this global factor improves the forecasting performance of augmented Phillips curves. We extend their analysis below to include a much wider range of countries.

Eickmeier and Pijnenburg (2013) similarly augment the Phillips curves of 24 OECD countries with global factors, finding a role for the common global component in domestic inflationary pressures. Neely and Rapach (2011) decompose the inflation rates of 64 countries into global, regional and domestic factors, finding that the global factor accounts for 36 percent of total inflation variance and regional factors a further 16 percent. Their regions are geographic in nature, so can include diverse economies such as the United States and Barbados in one group. The divide is also somewhat arbitrary at times - grouping English-speaking Caribbean nations into North America and Spanish-speaking ones into Latin America. Mumtaz and Surico (2012) use a dynamic factor model to investigate the inlunce of global inflation factors on a wide range of price indices for 10 advanced economies. Their analysis suggests that the comovement in the series has increased since the 1980s.

Karagedikli et al. (2010) study the global component of 28 matched product categories for 14 advanced countries. They allow for a global inflation factor, category-specific factors and individual country factors. They find that category-specific factors account

for a large share of variance of products that are exposed to international trade. Förster and Tillmann (2014) use the four-level dynamic hierarchical model proposed by Moench et al. (2013) to disentangle the effects of CPI sub-components, specifically food, energy and the remainder of the index, for a group of 60 countries, all but six of which are high income. Förster and Tillmann find common factors explain large shares of the variance for energy and food, but not for the remainder of the index. We extend their analysis in section 4.2 below to a wider sample of countries and also including CPI housing inflation.

4.1 Headline

Like Ciccarelli and Mojon (2010), we consider three estimates of global headline inflation:

1. The median country-level inflation rate.

2. The average country-level inflation rate, weighted by GDP, and

3. A measure based on principal components analysis.

The median inflation rate is calculated separately for each quarter from 1981Q1 to 2012Q4. It uses all available national headline inflation rates for each quarter, so the sample changes over time. The GDP-weighted average inflation rate weights together available headline inflation rates for each quarter by real GDP (in 2005 US dollars) from the World Bank's *World Development Indicators*. Since the raw calculated series is heavily influenced by a small number of countries experiencing hyperinflation, the series used here excludes countries in quarters where their headline inflation exceeds 100 percent. As noted in section 3.2, these exclusions represent a very small share of total observations.

The third measure is based on a static principal component approach (See Stock and Watson, 2002). This approach models the $nx1$ vector of national inflation rates, Π_t, as

being comprised of two parts:

$$\underset{n\times 1}{\Pi_t} = \underset{n\times 1}{\Lambda}\underset{i\times 1}{f_t} + \underset{n\times 1}{\epsilon_t} \tag{1}$$

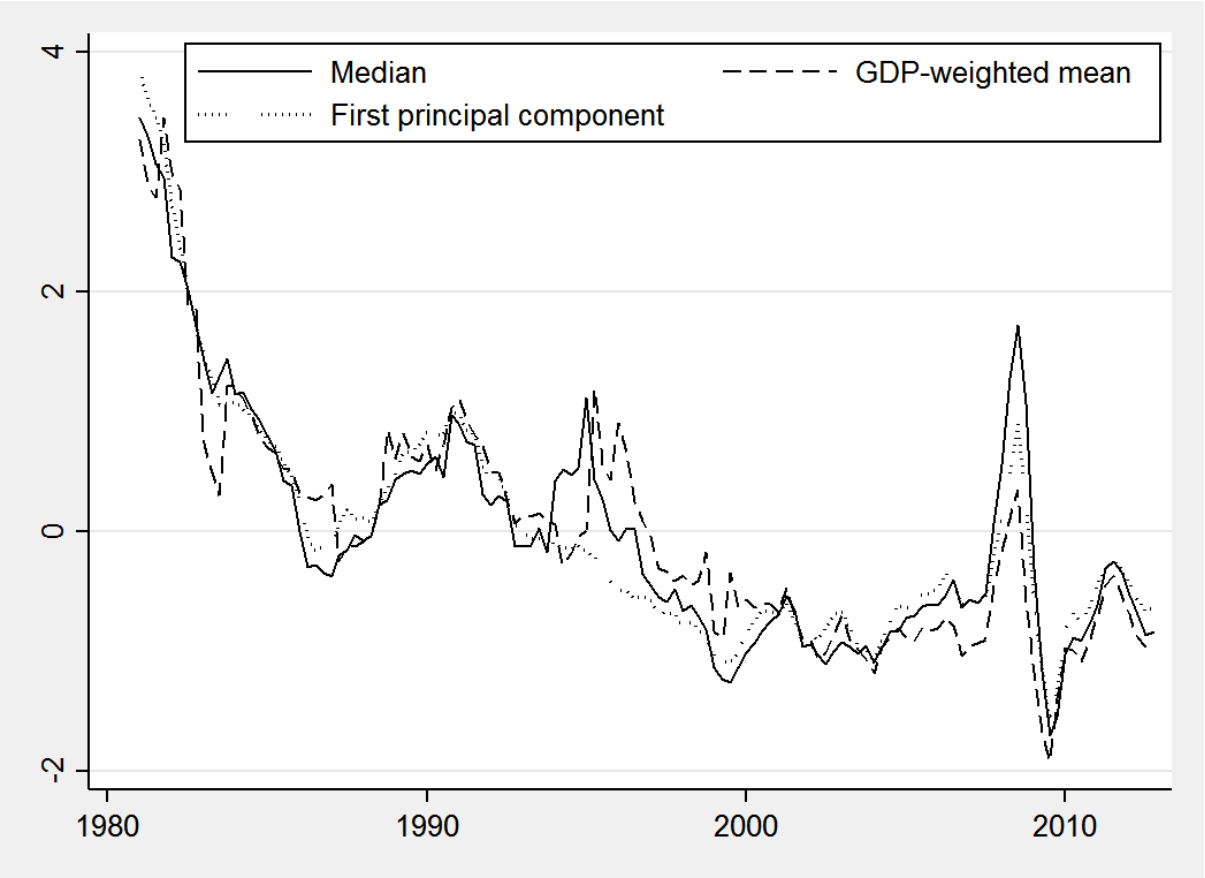
where the first part is the effect of the common, global factor f_t. Λ is the loading – the extent to which each country's inflation rate reacts to the global factor. The second term, ϵ_t, is the idiosyncratic component, representing the shocks to inflation that are domestic in nature. f_t and ϵ_t are assumed to be orthogonal, and ϵ_t is assumed to be normally distributed. The estimation of the static factors requires a balanced panel, so the inflation rates of the 104 countries for which there are observations of annual inflation in every quarter are used. These inflation rates are then de-meaned and standardised to have unit variance before the factors are estimated. The first principal component – the factor that explains the greatest share of the total variance – is taken as the measure of global inflation.

Figure 4 shows these three measures of global inflation.[7] All three measures display the main features of inflation through the period – the disinflation through the 1980s and 1990s, the relatively low and stable inflation of the early 2000s and the sharp volatility around the time of the GFC. Overall, the three measures track reasonably closely through time, with the exception of the mid 1990s. This may be a function of the different samples, since a number of countries enter the sample over that period which are picked up in the median and weighted mean series, but not the principal component measure.

Table 3 shows the share of the variance of national inflation that is explained by each of the three measures of global inflation. Countries are divided into four groups by income levels. Advanced countries make up the first group, defined as high income countries that were members of the OECD in 1990, essentially the countries incorporated in the analysis by Ciccarelli and Mojon (2010). The second group are the remaining countries classified

[7] The median and GDP-weighted measures have been de-meaned and standardised for the figure.

Figure 4: Measures of global inflation



as 'high income' by the World Bank that are not also classified as advanced. The final two categories are those countries classified by the World Bank as middle and low income. The variance shares are calculated by obtaining the R^2 from a regression of each national inflation rate on the global inflation measure and a constant.[8]

The advanced income countries are mostly the same countries as the 22 countries studied by Ciccarelli and Mojon (2010). The share of inflation variance of advanced countries explained by global factors is high – around two thirds, and in line with the findings of Ciccarelli and Mojon (2010). These findings are not robust, however, to the inclusion of a wider range of countries. The three measures of global inflation explain

[8]For those countries whose inflation rates are used to calculate the principal component measure, the method used here is equivalent to the $\lambda_i^2 var(f_t)/var(\pi_{it})$ more typically used for principal components. This latter method cannot be used since the factor loadings, λ_i do not exist for those countries not used in the calculation of the principal component measure.

Table 3: Share of inflation variance explained by measures of global inflation (percent)

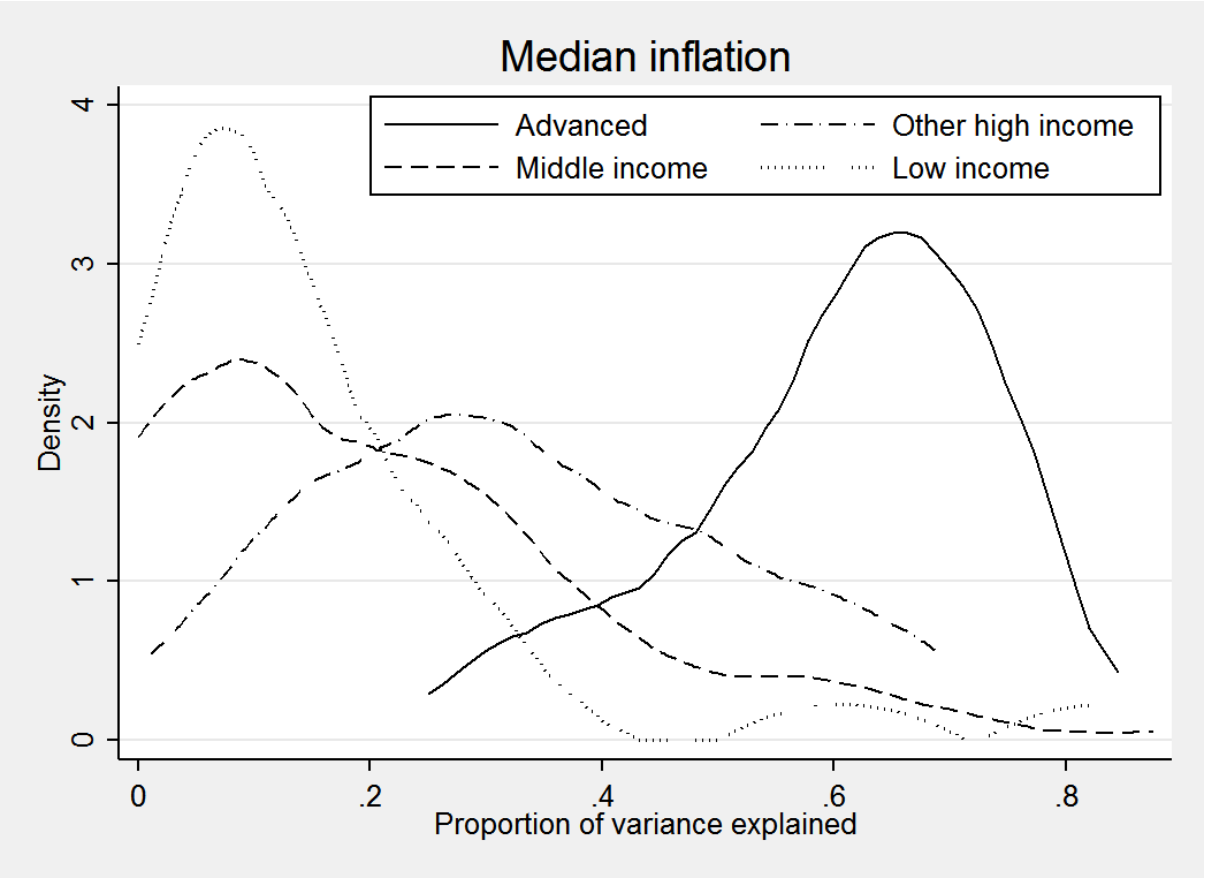
	Median	Weighted mean	Principal components
Median			
Advanced	62.1	64.6	71.4
Other high income	31.9	24.4	26.9
Medium income	17.6	15.8	14.7
Low income	11.1	6.0	7.9
Mean			
Advanced	60.3	59.0	68.5
Other high income	32.7	30.3	34.1
Medium income	20.2	19.6	19.7
Low income	15.4	12.6	13.0

a much smaller share of the variance of inflation rates of other countries – on average around a third of the variance of other high income countries, a fifth of the variance of middle income countries and slightly more than a tenth of the variance of low income countries.

The divergence between country groups of the share of variance of national inflation rate explained by the median global inflation measure is shown clearly in figure 5, which shows the kernel densities of the distribution by country type. There is a clear negative correlation between income and share of inflation variance explained by the global factors. The kernel densities by country type for the mean and principal components measures (not reported here) are broadly similar.

Using a different sample period, we confirm the findings of Ciccarelli and Mojon (2010) for advanced countries that a common, global factor can explain a large part of inflation variance. This finding, however, is not robust to the consideration of a wider range of countries, most notably emerging and developing economies. Ciccarelli and Mojon conclude that there is a need for international policy co-ordination between monetary policy makers. The evidence presented here suggests that advanced countries are better at eliminating idiosyncratic volatility, so the remaining volatility derives form movements in global factors, potentially related to commodity factors. The next section considers

Figure 5: Kernel density of share of variance explained by median global inflation measure



what can be learned by considering the sub-components of consumer prices.

4.2 A dynamic hierarchical factor model for global inflation

The disadvantage of the measures used in section 4.1 is that they treat all components of the CPI in equivalent fashion. Yet global shocks can have differing effects on sub-components. For example the greater integration of China into the global economy has depressed the prices of manufactured goods and at the same time put upwards pressure on commodity prices. Increased global liquidity over the 2000s put upward pressure on housing, food and energy prices, pressure which abated dramatically following the crisis in 2008/2009. To take into account these potential differences in spillovers, we use an alternative modelling strategy for global inflation, by using the dynamic hierarchical factor model developed by Moench et al. (2013). As noted above, this has been used

by Förster and Tillmann (2014) for a group of 60, mostly high income, countries. We extend their analysis by including a much larger sample of countries, and by examining the housing sub-component of the CPI.

4.2.1 Model

The model has a hierarchical structure of order four. Specifically, at time t, let F_t denote the global factor that captures movements in inflation common to all sub-indices and all countries. G_{bt} are the factors that capture variations in sub-indices, indexed by b and H_{bst} are the factors that capture the variations in country group s in the CPI sub-index block b. The structure of the model is give by:

$$Z_{bsnt} = \Lambda_{Zbsn} H_{bst} + u_{Zbsnt} \tag{2}$$

$$H_{bst} = \Lambda_{Hbs} G_{bt} + u_{Hbst} \tag{3}$$

$$G_{bt} = \Lambda_{Gb} F_t + u_{Gbt} \tag{4}$$

where Z_{bsnt} represents an observation for country n in country group (sub-block) s of the CPI sub-index (block) b at period t. Λ_{Zbsn}, Λ_{Hbs} and Λ_{Gb} are constant factor loadings. One useful feature of this model is that the total number of time series, N_{bs} can differ between blocks b and sub-blocks s, allowing for different coverage of sub-indices by country group. The global factor is dynamic and assumed to follow an autoregressive process of order one:

$$F_t = \rho_F F_{t-1} + \epsilon_{Ft} \tag{5}$$

We make the following assumptions to match persistence in the data:

$$u_{Zbsnt} = \rho_{Zbsn} u_{Zbsn(t-1)} + \epsilon_{Zbsnt} \tag{6}$$

$$u_{Hbst} = \rho_{Hbs} u_{Hbs(t-1)} + \epsilon_{Hbst} \tag{7}$$

$$u_{Gbt} = \rho_{Gb} u_{Gb(t-1)} + \epsilon_{Gbt} \tag{8}$$

with $\epsilon_{jt} \sim N(0, \sigma_j)$ for $j = Zbsn$, Hbs, Gb, F. All residuals ϵ_{jt} are uncorrelated across j and t. For identification purposes,the first entries of Λ_{Zbsn}, Λ_{Hbs} and Λ_{Gb} are set equal to 1, and the variances σ^2_{Hbs}, σ^2_{Gb}, σ^2_F to 0.1.

Since the hierarchical nature of the model imposes vertical dependency of the factors, along with the time-varying intercepts from equations 6 to 8, the model is estimated using Markov Chain Monte Carlo methods and the Kalman filter. In brief, each factor is first drawn conditional on the other factors and parameters. Then the factor loadings, autoregressive parameters and sub-block level variances σ^2_{Zbsn} are drawn conditional on the factors estimated in the first step.[9] After the first 50,000 draws are discarded as burn-in, a further 50,000 draws are carried out, storing every fiftieth draw. The 1,000 stored draws are used to calculate the posterior means shown below.

We choose the following ordering for the estimation: the first block is CPI excluding food, housing and energy, the second block is CPI housing followed by energy with the final block being CPI food. For the sub-blocks, the countries are grouped by income, rather than the grouping by geographical region that is common in the literature. We believe that commonalities associated with income and macroeconomic institutions are likely to be stronger than those associated with geographic location. Consider Australia and New Zealand: these two countries are small, open advanced economies whose monetary policy has been based on inflation targeting for the period in question. These characteristics are common with many other geographically distant high income countries - Canada, Sweden, Norway, the United Kingdom to name but a few. Neighbouring countries to Australia and New Zealand in Oceania, such as Fiji, Samoa and Tonga, are small island developing states with markedly different economic characteristics. The sub-blocks are ordered by high income countries first and medium income countries second. For the

[9]Moench et al. (2013) set out in full detail the MCMC approach and the use of the filter. The estimation of the model here is made with the help of the MATLAB code available on Serena Ng's website.

Table 4: Decomposition of variance from dynamic hierarchical factor model (percent)

Block	Subblock	N	Global	CPI subindex	Country group	Idiosyncratic
CPIxFHE	High	48	2.1	1.4	1.1	95.5
CPIxFHE	Middle	38	5.7	3.6	1.5	89.1
CPIxFHE	Low	10	5.1	3.2	2.7	89.0
CPIH	High	44	0.8	1.7	0.7	96.7
CPIH	Middle	18	0.0	0.1	9.9	90.0
CPIE	High	45	16.4	18.6	19.1	46.0
CPIE	Middle	18	7.1	8.0	2.7	82.3
CPIF	High	59	7.5	11.1	11.9	69.5
CPIF	Middle	68	9.0	13.3	1.0	76.7
CPIF	Low	21	3.2	4.7	9.6	82.4

CPIxFHE and CPIF blocks there are sufficient observations to have sub-blocks for low income countries. To maximise the sample, the analysis is run on annual inflation starting in 2001Q1 and ending in 2012Q4.

4.2.2 Results

Table 4 reports the proportion of the variance of each sub-block explained by the different hieararchical levels of the model. The first observation is that the idiosyncratic component accounts for the majority of the variance in each sub-block, with the sole exception of high income countries' CPI energy. For these countries, global factors explain just over half of the variance, split between the global factor (16.4 percent), the energy sub-index (18.6 percent) and the high income countries' energy price factor (19.1 percent). For middle income countries, the idiosyncratic component of CPI energy explains a much larger (82.3 percent) share of total variance. The difference in the share of variance explained by common factors may arise because of differences in regulation. Regulated fixed prices and subsidies for fuel are relatively common in emerging and developing countries, but not in advanced countries.

Common factors also account for a relatively large share of the variance of food price inflation – around a third for high income countries and around a quarter for middle income countries. For both these groups of countries, the food sub-index factor accounts

for at least 10 percent of the total variance. Yet even over a period marked by large volatility in world food commodity prices, the idiosyncratic components explained the majority of the variance. As with energy, the common factors for food explained a greater share of the variance for high income countries than for relatively poorer countries. This may be a result of higher food import shares for richer countries, and the existence of food price regulation in some countries.

For housing and for CPIxFHE, the common factors explain little of the variance. For high income countries the common factors explain 3.3 percent of the variance of CPI housing and 4.5 percent of the variance of CPIxFHE. For middle and low income countries, the proportion explained by common factors is in the order of 10 percent.

It is clearly important to consider the role of sub-components when assessing the extent of influence by global factors, given the divergent shares explained by common factors. For high income countries, common factors explain a large share of the variance of food and energy prices. This is perhaps understandable since there is a common world oil price, and central banks typically 'look through' the first round effects from movements in commodity prices. Given these components are also more volatile that the other components of the CPI, it follows that these factors account for a large share of total CPI variance.

Taking the results from the dynamic hierarchical factor model and from Section 4.1 together suggests an alternative conclusion to Ciccarelli and Mojon (2010). Monetary policy makers in advanced countries have been successful in eliminating the domestic, idiosyncratic fluctuations in inflation. The main source of remaining inflation variance in advanced countries is the movements in commodity prices, notably food and energy. In lower-income countries, monetary policy makers have been less successful in eliminating the influence of domestic factors on inflation, resulting in a proportionately smaller

influence from global factors.

5 Conclusion

This paper sets out the construction of a comprehensive dataset of consumer prices for 223 countries and territories for the period 1980-2012. Its main contribution lies in the inclusion of sub-indices for food, housing and energy, together with their respective weights in the overall index. Comparable international datasets for these sub-indices are rare, and mostly confined to advanced economies. As a consequence, research on inflation, and in particular it sub-components, has typically been confined to a small number of relatively rich countries.

There are a number of stylised facts on the cross-section and time-series properties of inflation provided by the dataset. Episodes of inflation above 100 percent are rare, and there does not appear to be any particular threshold at which inflation accelerates above this rate. Global inflation fell through the early part of the period studied, particularly in high income countries, and was relatively stable until the period around the recent global financial crisis.

This recent volatility was mostly attributable to food and energy prices. Food and energy prices are the most volatile sub-indices, and also exhibit the highest average inflation over the past three decades. Inflation in consumer prices excluding food, housing and energy is comparatively low and stable. The share of food in total expenditure falls as income rises; the share of housing increases.

As an application of the dataset, we consider the extent to which global factors can explain the variance of national inflation rates. We confirm the findings of Ciccarelli and Mojon (2010) that global factors can explain around 70 percent of the variance of advanced economies' inflation. However, this finding does not hold true for countries with lower income. The amount of national inflation variance explained by global factors

declines with income. Using the dynamic hierarchical factor model of Moench et al. (2013) we show that common factors are important for explaining energy and, to a lesser extent, food prices. The apparently high share of inflation variance explained by global factors in advanced economies therefore likely reflects success of monetary policy makers in reducing idiosyncratic, national factors. The remaining volatility comes from food and energy prices, whose direct impact central banks typically 'look through'.

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A Appendix

The author gratefully acknowledges the assistance provided by the relevant national (*) central bank and (†) statistical agency.

Country	CPI	CPIF	CPIH	CPIE	CPIHE	CPIxFE	CPIxFHE
Afghanistan	04Q2						
Albania	93Q1	01Q1			01Q1		01Q1
Algeria	80Q1	90Q1			02Q1		02Q1
Amer. Samoa	83Q1	83Q1			99Q1		99Q1
Andorra	98Q1	98Q1	98Q1	98Q1	98Q1	98Q1	98Q1
Angola	98Q1	00Q1					
Anguilla	98Q1	00Q4	00Q4	00Q4	00Q4	00Q4	00Q4
Antigua & Barb.	94Q1	94Q1	0Q4	00Q4	00Q4	00Q4	00Q4
Argentina	80Q1	93Q1			93Q1		93Q1
Armenia *	95Q1	95Q1		98Q1		06Q1	
Aruba	84Q1	84Q1	01Q1	01Q1	01Q1	01Q1	01Q1
Australia	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1
Austria†	80Q1	80Q1	96Q1	80Q1	80Q1	80Q1	96Q1
Azerbaijan	91Q1	98Q1					
Bahamas	80Q1	86Q1					
Bahrain	80Q1	85Q3			07Q3		
Bangladesh	93Q3	93Q3			08Q1		08Q1
Barbados*	80Q1	85Q1	85Q1	85Q1	85Q1	85Q1	85Q1
Belarus*	91Q1	02Q1					
Belgium	80Q1	80Q1	80Q1	80Q1	84Q1	80Q1	80Q1
Belize*	83Q1	85Q1			90Q4		90Q4
Benin	92Q1	97Q1		03Q1	97Q1	98Q1	97Q1
Bermuda	82Q1	82Q1					
Bhutan	03Q2	03Q2					
Bolivia	80Q1	88Q1	88Q1	88Q1	88Q1	88Q1	88Q1
Bonaire	96Q2	96Q2			96Q2		96Q2
Bosnia Herz.	05Q1	05Q1			05Q1		05Q1
Botswana	80Q1	80Q4			04Q3		04Q3
Brazil	80Q1	94Q4			94Q4		94Q4
Br. Virgin Is.	85Q1	85Q1					
Brunei	83Q1	83Q1	06Q1	06Q1	06Q1	06Q1	06Q1
Bulgaria	91Q1	98Q1	98Q1	98Q1	98Q1	98Q1	98Q1
Burkina Faso	80Q1	82Q4		03Q1	97Q1	00Q1	97Q1
Burundi†	80Q1	09Q1			09Q1		09Q1
Cambodia	94Q4	00Q1			00Q1		00Q1
Cameroon	80Q1	94Q1			94Q1		94Q1
Canada*	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1
Cape Verde	92Q1	05Q4					
Cayman Is.	80Q1	84Q3			08Q2		08Q2
Central Afr. Rep.	81Q1	81Q1			06Q1		06Q1
Chad	82Q4	88Q1			06Q1	95Q1	06Q1
Chile	80Q1	80Q1	89Q1	89Q1	89Q1	80Q1	89Q1
China	84Q1	93Q1			01Q1	93Q1	01Q1
Colombia	80Q1	88Q1			88Q1	99Q1	88Q1
Comoros	90Q1	92Q1	92Q1	92Q1	92Q1	92Q1	92Q1

Country	CPI	CPIF	CPIH	CPIE	CPIHE	CPIxFE	CPIxFHE
Congo (Brazz.)	80Q1	80Q1			90Q1		90Q1
Congo, DR	80Q1						
Cook Is.	80Q1	80Q1	06Q1	06Q1	06Q1	06Q1	06Q1
Costa Rica	80Q1	95Q1	95Q1	95Q1	95Q1	95Q1	95Q1
Cote dIvoire	80Q1	97Q1		03Q1	97Q1	97Q1	97Q1
Croatia†	94Q1	94Q1	98Q1	98Q1	98Q1	98Q1	98Q1
Cuba	00Q1	00Q1					
Curaçao	80Q1	90Q4			96Q1		96Q1
Cyprus	80Q1	96Q1	96Q1	96Q1	96Q1	96Q1	96Q1
Czech Republic	93Q1	00Q1	00Q1	00Q1	00Q1	00Q1	00Q1
Denmark†	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1
Djibouti	99Q3	99Q3			99Q3		99Q3
Dominica	80Q1	85Q1	00Q1	00Q1	00Q1	00Q1	00Q1
Dominican Rep.	80Q1	91Q1			91Q1	91Q1	91Q1
Ecuador	80Q1	81Q1			97Q1		97Q1
Egypt	80Q1	95Q1			03Q2	04Q1	03Q2
El Salvador	80Q1	80Q1			93Q1		93Q1
Eq. Guinea	85Q1						
Estonia	96Q1	96Q1	98Q1	98Q1	96Q1	98Q1	98Q1
Ethiopia	80Q1	80Q1					
Falkland Is.	82Q1	82Q1					
Faroe Is.	83Q1	83Q1	83Q1	83Q1	83Q1	83Q1	83Q1
FS Micronesia	00Q2	00Q2	00Q2	00Q2	00Q2	00Q2	00Q2
Fiji*†	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1
Finland	80Q1	80Q1	96Q1	80Q1	80Q1	80Q1	80Q1
France	96Q1	80Q1	96Q1	80Q1	80Q1	80Q1	80Q1
French Guiana	80Q1	80Q1	98Q1	98Q1	98Q1	98Q1	98Q1
French Polynesia	80Q1	81Q1	81Q1	81Q1	81Q1	81Q1	81Q1
Gabon	80Q1	90Q3			90Q3		90Q3
Gambia	80Q1	80Q1					
Georgia†	97Q1	97Q1	04Q1	04Q1	00Q1	04Q1	00Q1
Germany	80Q1	80Q1	91Q1	80Q1	80Q1	80Q1	80Q1
Ghana*	80Q1	84Q1			97Q4		97Q4
Gibraltar	80Q1	80Q1			80Q1		80Q1
Greece	80Q1	80Q1	96Q1	89Q1	80Q1	89Q1	80Q1
Grenada	80Q1	01Q1			01Q1		01Q1
Guadeloupe	80Q1	80Q1	98Q1	98Q1	98Q1	98Q1	98Q1
Guam	80Q1	80Q1	96Q3	96Q3	86Q2	96Q3	86Q2
Guatemala	80Q1	90Q1			01Q1	95Q1	01Q1
Guernsey	80Q1						
Guinea	87Q1	87Q1			03Q1	03Q1	03Q1
Guinea Bissau	86Q1	86Q1		03Q1	97Q1	03Q1	97Q1
Guyana	94Q1	94Q1			01Q1		01Q1
Haiti	80Q1	81Q1			99Q1		99Q1
Honduras	80Q1	80Q1			00Q1	00Q2	00Q1
Hong Kong	80Q4	82Q1	82Q1	82Q1	82Q1	82Q1	82Q1
Hungary†	80Q1	92Q1	01Q1	92Q1	01Q1	92Q1	01Q1
Iceland	80Q1	80Q1	96Q1	93Q1	93Q1	93Q1	93Q1

Country	CPI	CPIF	CPIH	CPIE	CPIHE	CPIxFE	CPIxFHE
India	80Q1	80Q1	95Q1	95Q1	95Q1	95Q1	95Q1
Indonesia	80Q1	80Q1	99Q2	99Q2	96Q1	91Q1	96Q1
Ireland	80Q1	80Q1	96Q1	80Q1	80Q1	80Q1	80Q1
Iran	80Q1	82Q1			06Q2		06Q2
Iraq	04Q1	04Q1	04Q1	09Q1	04Q1	04Q1	04Q1
Isle of Man†	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1
Israel	80Q1	86Q1	86Q1	86Q1	86Q1	86Q1	86Q1
Italy	80Q1	80Q1	96Q1	80Q1	80Q1	80Q1	80Q1
Jamaica	80Q1	80Q1	00Q1	00Q1	00Q1	00Q1	00Q1
Japan*	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1
Jersey	89Q1	00Q2	83Q1	83Q1	83Q1	83Q1	83Q1
Jordan	80Q1	80Q1	98Q1	98Q1	98Q1	98Q1	98Q1
Kazakhstan	94Q1	97Q4			08Q1	03Q1	08Q1
Kenya*	80Q1	80Q1	80Q1	90Q1	90Q1	90Q1	90Q1
Kiribati	83Q1	88Q1	00Q1	00Q1	00Q1	00Q1	00Q1
Kosovo	02Q3	02Q3			02Q3		02Q3
Korea	85Q1	81Q1	85Q1	85Q1	85Q1	80Q1	85Q1
Kuwait	80Q1	01Q1	01Q1	01Q1	01Q1	01Q1	01Q1
Kyrgyzstan	95Q1	03Q1	03Q1	03Q1	03Q1	03Q1	03Q1
Lao PDR	93Q2	00Q1					
Latvia	92Q1	96Q1	96Q1	96Q1	96Q1	96Q1	96Q1
Lebanon	00Q1	08Q1	08Q1	08Q1	08Q1	08Q1	08Q1
Lesotho	80Q1	84Q1			02Q1		02Q1
Liberia	01Q1	06Q1			06Q1		06Q1
Libya	01Q1	04Q1			04Q1		04Q1
Lithuania	92Q2	96Q1	96Q1	96Q1	96Q1	96Q1	96Q1
Luxembourg	80Q1	80Q1	96Q1	80Q1	96Q1	80Q1	96Q1
Macau	88Q1	89Q1			01Q1		v
Macedonia	96Q1	96Q1	05Q1	05Q1	05Q1	05Q1	05Q1
Madagascar	80Q1	80Q1		01Q1	01Q1		01Q1
Malawi	80Q1	91Q1			01Q1		01Q1
Malaysia	80Q1	80Q1	05Q1	05Q1	84Q1	94Q1	84Q1
Maldives	85Q1	85Q1			85Q1		85Q1
Mali	87Q3	90Q1		03Q1	97Q1	03Q1	97Q1
Malta	80Q1	80Q1	96Q1	96Q1	96Q1	96Q1	96Q1
Marshall Is.	91Q4	91Q4			03Q1		03Q1
Martinique	80Q1	80Q1	98Q1	98Q1	98Q1	98Q1	98Q1
Mauritania	85Q3	04Q1	04Q1	06Q2	04Q1	04Q1	04Q1
Mauritius	80Q1	87Q3	87Q3	87Q3	87Q3	87Q3	87Q3
Mexico†	80Q1	89Q1	89Q1	89Q1	89Q1	89Q1	89Q1
Moldova*	93Q4	95Q1	99Q1	99Q1		99Q1	
Mongolia	91Q4	96Q1	05Q4	05Q4	96Q1	05Q4	96Q1
Montenegro†	01Q1	05Q1	07Q1	07Q1	07Q1	07Q1	07Q1
Montserrat†	92Q1	92Q1	89Q1	89Q1	89Q1	89Q1	89Q1
Morocco	80Q1	80Q1			90Q1		90Q1
Mozambique	94Q1	94Q1			94Q1		94Q1
Myanmar	80Q1	80Q1					
Namibia	80Q1	80Q1			01Q1		01Q1

Country	CPI	CPIF	CPIH	CPIE	CPIHE	CPIxFE	CPIxFHE
Nauru†	08Q4	08Q4	08Q4	08Q4	08Q4	08Q4	08Q4
Netherlands	80Q1	80Q1	96Q1	80Q1	80Q1	80Q1	80Q1
Nepal	80Q1	80Q1					
New Caledonia	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1
New Zealand†	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1
Nicaragua	92Q1	00Q1				99Q1	
Niger	80Q1	80Q1		03Q1	97Q1	98Q1	97Q1
Nigeria	80Q1	80Q1			03Q1	03Q1	03Q1
Niue	80Q1	80Q1	92Q1		92Q1		92Q1
Norfolk Is.	90Q4	90Q4					
N. Mariana Is.	88Q2	88Q2			88Q2		88Q2
Norway†	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1
Oman	90Q1	90Q1	04Q4	04Q4	04Q4	04Q4	04Q4
Pakistan	80Q1	81Q3	98Q2	98Q2	98Q2	98Q2	98Q2
Palau	00Q2	00Q2	00Q2		00Q2		00Q2
Palestinian Terr.	97Q1	97Q1			07Q1		07Q1
Panama	80Q1	80Q1	07Q1	07Q1	03Q1	07Q1	03Q1
Papua New Guinea*	80Q1	80Q1	89Q1	89Q1	80Q1	89Q1	80Q1
Paraguay	80Q1	83Q1	95Q1	95Q1	95Q1	95Q1	95Q1
Peru	80Q1	95Q1	95Q1	95Q1	95Q1	95Q1	95Q1
Philippines	80Q1	80Q1			94Q1	00Q1	94Q1
Poland	88Q1	96Q1	96Q1	96Q1	96Q1	96Q1	96Q1
Portugal	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1
Puerto Rico	80Q1	84Q1	84Q1	84Q1	84Q1	84Q1	84Q1
Qatar	02Q1	02Q1			02Q1		02Q1
Réunion	80Q1	80Q1	98Q1	98Q1	98Q1	98Q1	98Q1
Romania*	90Q4	01Q1	01Q1	01Q1	01Q1	01Q1	01Q1
Russian Fed.	92Q1	02Q1	02Q1	02Q1	02Q1	02Q1	02Q1
Rwanda	80Q1	85Q1		06Q1	06Q1	06Q1	06Q1
St Helena†	82Q4	82Q4	89Q4	89Q4	89Q4	89Q4	89Q4
St Kitts & Nevis	80Q1	83Q1	01Q1	01Q1	01Q1	01Q1	01Q1
St Lucia	80Q1	84Q2	01Q1	01Q1	01Q1	01Q1	01Q1
St Pierre & Miq.	97Q1	97Q1	04Q4	04Q4	05Q1	05Q1	05Q1
St Vincent & Gren.	80Q1	86Q1	01Q1	01Q1	01Q1	01Q1	01Q1
San Marino	83Q2	83Q2					
Samoa†	81Q1	81Q1			90Q1		90Q1
São Tomé & Prín.	93Q1	96Q4			96Q4		96Q4
Saudi Arabia	80Q1	84Q1			99Q1		99Q1
Senegal	80Q1	80Q1		03Q1	97Q1	97Q1	97Q1
Serbia	95Q1	01Q1	04Q1	04Q1	01Q1	01q3	04Q1
Seychelles†	80Q1	86Q1	86Q1	86Q1	86Q1	86Q1	86Q1
Sierra Leone	80Q1	93Q1	05Q1	05Q1	05Q1	05Q1	05Q1
Singapore	83Q1	80Q1	83Q1	83Q1	83Q1	83Q1	83Q1
Sint Maarten	80Q1	07Q1	07Q1	07Q1	07Q1	07Q1	07Q1
Slovak Republic	91Q1	91Q1	96Q1	96Q1	96Q1	96Q1	96Q1
Slovenia	93Q1	93Q1	00Q1	00Q1	00Q1	00Q1	00Q1
Solomon Islands	80Q1	80Q1			07Q1		07Q1
Somaliland	07Q1	10Q1	10Q1	10Q1			

Country	CPI	CPIF	CPIH	CPIE	CPIHE	CPIxFE	CPIxFHE
South Africa*†	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1
South Sudan	07Q2	07Q2			07Q2	07Q2	07Q2
Spain	80Q1	84Q1	84Q1	80Q1	80Q1	80Q1	84Q1
Sri Lanka†	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1
Sudan	80Q1						
Suriname	80Q1	96Q1					
Swaziland	80Q1						
Sweden	80Q1	80Q1	96Q1	80Q1	80Q1	80Q1	80Q1
Switzerland	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1
Syria	80Q1	80Q1	95Q1	95Q1	95Q1	95Q1	95Q1
Taiwan	80Q1	81Q1	81Q1	81Q1	81Q1	81Q1	81Q1
Tajikistan	00Q1	00Q1	02Q1	00Q1	02Q1	00Q1	02Q1
Tanzania	80Q1	98Q2	02Q1	02Q1	02Q1	02Q1	02Q1
Thailand	80Q1	85Q1	80Q1	80Q1	80Q1	85Q1	85Q1
Timor-Leste	03Q2	03Q2	03Q2	03Q2	03Q2	03Q2	03Q2
Togo	80Q1	97Q1		03Q1	97Q1	97Q1	97Q1
Tonga*	80Q1	80Q1	06Q1	06Q1	06Q1	06Q1	06Q1
Trinidad & Tob.	80Q1	80Q1	04Q1	04Q1	04Q1	04Q1	04Q1
Tunisia	80Q1	01Q1	06Q1	06Q1	01Q1	06Q1	01Q1
Turkey	80Q1	99Q1	03Q1	99Q1	03Q1	99Q1	03Q1
Tuvalu	87Q4	87Q4	96Q2	96Q2	96Q2	96Q2	96Q2
Uganda	81Q1	97Q3	05Q3	05Q3	97Q3	05Q3	97Q3
Ukraine	94Q1	02Q1	02Q1	02Q1	02Q1	02Q1	02Q1
Utd. Arab Emir.	08Q1	08Q1			08Q1		08Q1
United Kingdom	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1
United States	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1	80Q1
Uruguay*	80Q1	93Q2	97Q1	97Q1	93Q2	97Q1	93Q2
Vanuatu	81Q1	81Q1			81Q1		81Q1
Venezuela	80Q1	97Q1	99Q1	00Q1	00Q1	99Q1	00Q1
Viet Nam	90Q1	98Q1			91Q1		98Q1
Wallis & Futuna	99Q4	99Q4	99Q4	99Q4	99Q4	99Q4	99Q4
Yemen	01Q1					05Q1	
Zambia	85Q1	04Q1					
Zimbabwe	80Q1	90Q1					