DO SALES OF MEN'S UNDERWEAR REALLY PREDICT THE STATE OF THE ECONOMY?

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ABSTRACT

Alan Greenspan, the then Chairman of the US Federal Reserve, was reported in 1997 to have studied men's underwear sales, to provide an early warning for recession in the US economy. Since then many economics editors have written about men's underwear sales and a Men's Underwear Index, to support their views on the future direction of the economy; and the OECD use a basket of indicators to forecast the world economy (OECD, 2008). This paper explores the theory and its empirical robustness for 57 countries. There is some limited statistical evidence that sales of men's underwear might be an indicator of the US economy, or more precisely of looming recession. But the relationship is far from clear; therefore as an indicator it should be approached with extreme caution. Certainly more detailed and robust investigation is required. Looking across a further 56 counties, men's underwear sales appear to be unrelated to the economy as a whole, seeming to behave as a basic commodity. However, for Armenia, Ecuador and Kuwait, there may be some validity in understanding the relationship further.

Keywords: Apparel consumption; Economic forecasting; Men's underwear index; Recession; World economy

1. INTRODUCTION

Given that sales data is often released prior to official economic data, a number of economists and policymakers have attempted to construct an index which will forecast some element of the economy. The OECD, for example, uses a composite of leading indicators to forecast movements in the World economy (OECD, 2008). The academic antecedents of these indices can be traced back to 1942 and Roy Harrod's 'Towards a Dynamic Economics'; whilst more recent empirical debate is contained in Yerex (2011), Bai & Ng (2008), Davidson & Hinkley (2003), McGuckin et al. (2001), Rogers (1998), Emerson & Hendry (1994), Stock & Watson (1992), and Diebold & Rudebusch (1991). Perhaps the most persistent of these indices is The Economists 'Big Mac Index'; indeed The Economist (2011) also lists the lipstick, cranes and men's underwear indices.

Commentators on apparel sales have long suggested that sales of men's underwear are a leading indicator (it predicts rather than follows other indicators) for the economy (The Jakarta Globe, 2009; Smith, 2011). The received wisdom is that as soon as a recession hits, the first item of discretionary spending to be cut are men's underwear (in other words they have a high level of economic elasticity).

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Since 1997, it has been widely reported that Alan Greenspan said that men's underwear sales '… is almost always a prescient, forward impression that here comes trouble' (National Public Radio, 1998; the majority of the reports were actually in 1998 and 1999, resulting from publicity to Alan Greenspan's book published in 1997). Since this revelation, economics editors in many countries have discussed men's underwear sales and described a Men's Underwear Index (MUI). This MUI is often attributed to Mintel (a global publisher of market intelligence; see 2008) and editors normally refer to Mintel's forecast data in describing this MUI (Washington Post, 2009); but no serious attempt at constructing a MUI is evident.

2. METHODOLOGY

This paper only seeks to establish if there is any validity in the widely held belief that men's underwear sales decline prior to an economic downturn, by using a simple correlation. It does not attempt to explain the relationship, or construct a more general theory based on the elasticity of demand of men's underwear sales. It is limited to this unambitious analysis because the comparative international data does not support a more sophisticated, or more advanced, statistical analysis. Indeed, it can at best only indicate that there could be a relationship not fully to prove or disprove the theory, as it does not guarantee the existence of causality. As the theory appears to have originated in the US and that there has been more commentary on the MUI in the US, the initial investigation explores the relationship between underwear sales and the US economy. Nevertheless, as with any investigation of this type it is only as good as the data available. Unfortunately, relevant US Government statistics are not released quickly enough to be of value in predicting the near future (although, Alan Greenspan would have had access to unpublished statistics).

More encouragingly, US trade statistics are published each month and normally available just two months after the end of the relevant month (Census.gov., 2011). In addition, Gross Domestic Product (GDP) data is available fairly quickly, although only on a quarterly basis. Therefore, Consumption Imports of Men's and Boys' Underwear and Nightwear can be used as a proxy for men's underwear sales. Whilst these are more a reflection of retailer's predicted sales than actual sales, their movements should provide some insight into actual sales (albeit reacting slower than actual sales). Taking the period from January 2007 until May 2011, consumption imports are tracked and plotted against quarterly GDP. Because consumption and GDP use different measurements, the data has been statistically transformed (using a Z Score), so that they can be more readily compared. Z scores are an artificial construct so their scales have been omitted from the linear axis of the line graphs; furthermore it is important to recognize that a negative figure is simply a point on the artificial scale.

The United Nations collate relevant statistics from a number of countries (not including the US) that facilitate this sort of global comparison (Unstats.un.org., 2011). Unfortunately they are not collated and published quickly enough to be used for forecasting future movements of global economies. In addition, they are only published on an annual basis (data is considered from 1995 to 2008). But they can be investigated to suggest if men's underwear is a useful predictor in countries other than the US. Z Scores is even more useful comparing these disparate datasets. Furthermore the data relates solely to men's underwear sales.

In addition, to plotting the data on simple line graphs, a simple linear correlation has been constructed for the period tracked and just for recessions. Given the seasonality of the US data it may have been wise to also use a statistical method to iron out these effects (such as moving average, or even a forecasting technique such as the Box Jenkins Method, see Box & Jenkins, 1970), although there isn't really enough data for this to be effective in tracking the sorts of movements and relationships we are interested in.

3. RESULTS AND DISCUSSION

Looking initially at data from the US, the picture is complicated due to seasonal fluctuations and the problems of comparing monthly with quarterly data. At first sight monthly changes in consumption imports do not appear to be a leading indicator of the economy.

But using trend lines to iron out the fluctuations reveals a potential relationship between consumption imports and the economy. Although this does not provide any evidence on the nature of this relationship.
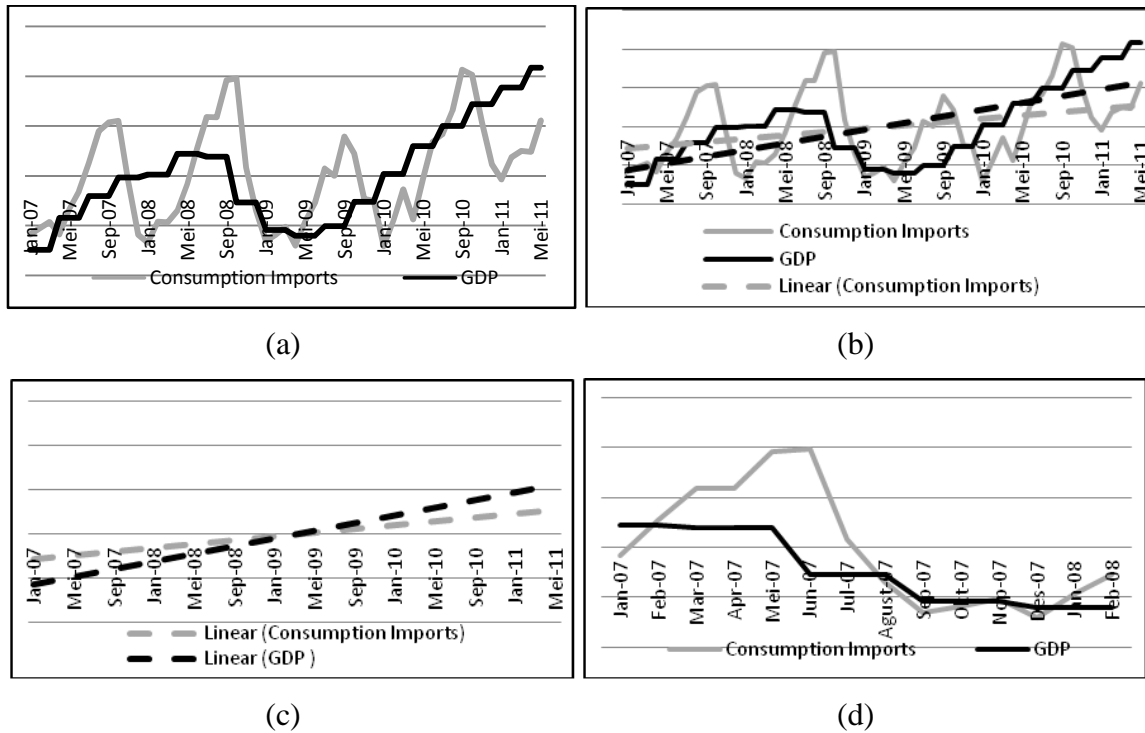

(a)

(b)

(c)

(d)

Figure 1 US men's and boy's underwear and nightwear

In November 2008 the trend lines cross, suggesting that the relationship is far from straightforward. A simple linear correlation of the two datasets does establish a positive relationship i.e. sales fall when the economy slows and increase when it revives. But at 0.511 (on a scale of 1 to -1), this is hardly a convincing result.

In July 2008 the US went into recession, but consumption imports for this period do not decline until November 2008 (the month the trend lines cross). This may be an artefact of using consumption imports as a proxy, but it would seem to imply that sales follow the economy rather than being a leading indicator, as Alan Greenspan's theory suggests. Nevertheless, as the correlation for this period rises to 0.839, it would seem to support at least a part of his theory and the overall theory being tested in this paper.

Looking at the UN data, immediately some interesting patterns begin to emerge, with underwear sales appearing to mirror movements in some economies (for example the match is near perfect for the Czech Republic (Figure 2a) and Finland (Figure 2b)). What is striking is that for annual data a time lag is not apparent. This could mean that men's underwear sales are not a leading indicator (i.e. they simply follow the overall economy), or that the lag between indicators is between one month and one year.

Plotting the data for the more dynamic economies of Asia (Hong Kong (Figure 2c), Indonesia (Figure 2d), and Malaysia (Figure 2e)) the pattern still seems to exist. But the relationship is a

little more complicated; not least because the datasets are incomplete for Indonesia and Malaysia. Certainly for Indonesia consumption appears to flatten out in 2004, whilst GDP surges ahead (possibly a reflection of the inflation accelerating in 2004).

(a)   (b)

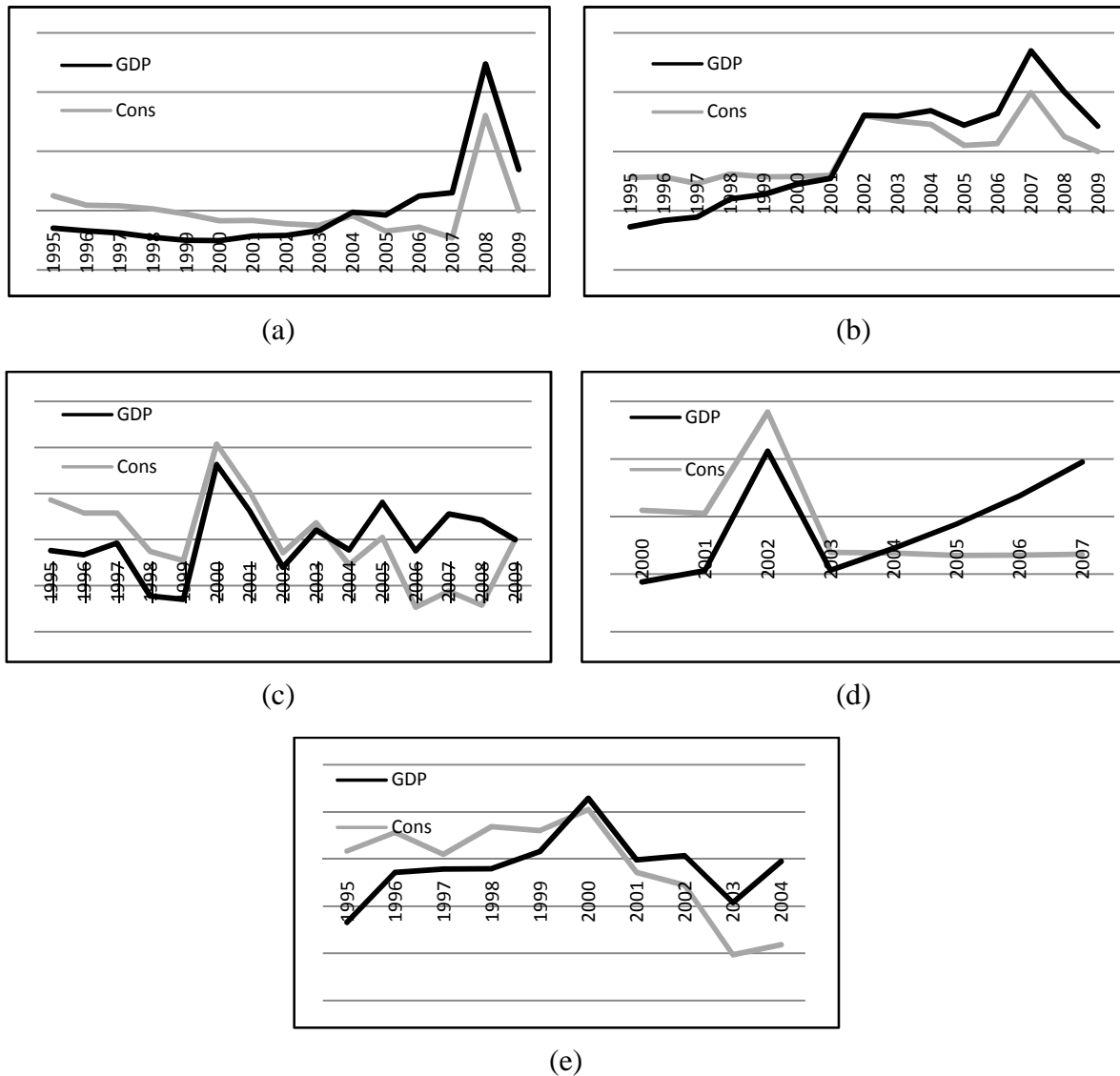(c)   (d)

(e)

Figure 2 Men's Underwear (a) Czech Republic; (b) Finland; (c) Hong Kong; (d) Indonesia (e) Malaysia

Given the severe problems some of the smaller European economies are facing, it is interesting to look at the profiles for Ireland (Figure 3a) and Portugal (Figure 3b). Again, there is a discernable pattern, but once more the relationship is complex. Certainly, men's underwear sales, if a predictor, do not appear to discriminate between more dynamic and weaker economies.

In other parts of the World there are a number of other good examples, of an apparent relationship. For example, Armenia (Figure 3c) displays a strong relationship, whilst Mexico (Figure 3d) appears to have a good relationship, but with a degree of complexity. Nevertheless across all the countries discussed, a relationship does appear to exist and that if there is a time lag between sales and the economy it appears to be less than one year.

Unfortunately, a simple linear correlation across the 56 countries, for which the data is sufficiently robust, appears to disprove any relationship, as overall it was -0.204, meaning that there is a negative relationship between sales of men's underwear, and the economy! Even though they initial results appear to show that the phenomenon crosses national and cultural boundaries, the lack of a correlation may simply suggest that the relationship holds true for some countries and not for others.
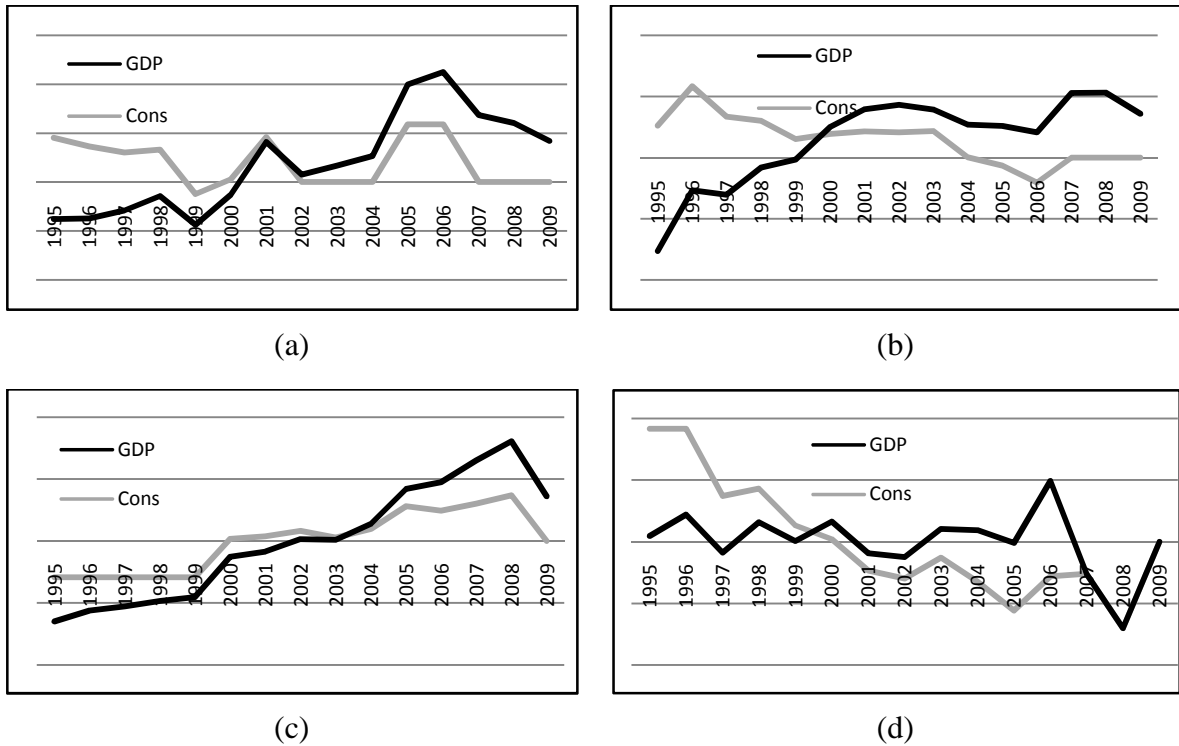

(a)

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Figure 3 Men's Underwear (a) Ireland; (b) Portugal; (c) Armenia; (d) Mexico

Nevertheless the differences by country appear to defy any natural logic, with the relationship being strong for: Kuwait (0.903), Armenia (0.914), Ecuador (0.917); and to be strongly negative for: Cyprus (-0.966), France (-0.955), Poland (-0.954), Mexico (-0.940, despite visually appearing to have a positive relationship), Spain (-0.917), Australia (-0.901). Even though there are some strong positive and strong negative correlations, for most countries the relationship is less apparent. Indeed when the correlations are plotted on a graph, they appear to be totally random.

Table 1 Correlation of men's underwear sales to GDP by country

Country	Correlation	Country	Correlation
Armenia	0.914	Italy	- 0.378
Australia	- 0.901	Japan	- 0.424
Austria	- 0.463	Kazakhstan	- 0.871
Azerbaijan	0.772	Kenya	0.799
Belarus	0.569	Kuwait	0.903
Belgium	- 0.102	Kyrgyzstan	0.403
Bolivia	0.108	Latvia	0.819
Brazil	- 0.561	Lithuania	- 0.204
Bulgaria	- 0.725	Malaysia	- 0.774
Chile	- 0.546	Mexico	- 0.940

Table 1 Correlation of men's underwear sales to GDP by country (cont.)

| Country	Correlation	Country	Correlation
Colombia	- 0.640	Moldova	0.839
Croatia	- 0.547	Mozambique	- 0.522
Cuba	0.838	Myanmar	0.639
Cyprus	- 0.966	Oman	- 0.169
Czech Republic	0.242	Panama	- 0.829
Denmark	- 0.813	Poland	- 0.954
Ecuador	0.917	Portugal	- 0.756
Estonia	- 0.371	Romania	- 0.886
Finland	0.759	Russian Federation	- 0.798
France	- 0.955	Slovakia	- 0.483
Germany	- 0.565	Slovenia	- 0.889
Greece	0.269	South Africa	- 0.743
Hong Kong SAR	- 0.692	Spain	- 0.917
Hungary	- 0.726	Sweden	0.269
Iceland	0.180	T. F. Yug. Rep. Macedonia	- 0.667
Indonesia	- 0.556	Turkey	0.443
Iran (Islamic Rep. of)	- 0.734	Ukraine	0.352
Ireland	0.346	United Kingdom	0.269
Average			**- 0.204**
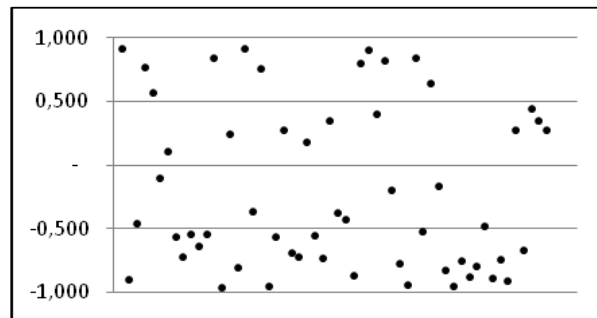
Figure 4 UN Correlation

However, these correlations relate to economies across an economic cycle, when the original theory suggests that sales are a predictor of recession! The data relates to 1995 to 2008, a period of growth for most economies. Nevertheless we can identify recession in Columbia, Ecuador, Hong Kong, Iceland, Japan and Turkey, but again taken overall the data looks random.

Another way of looking at the relationship between sales and the economy is to correlate sales to growth in GDP. The overall correlation for all countries is -0.623. This appears to suggest that a negative relationship exists for men's underwear sales and economic growth!

Table 2 Correlation of men's underwear sales to GDP during a recession by country

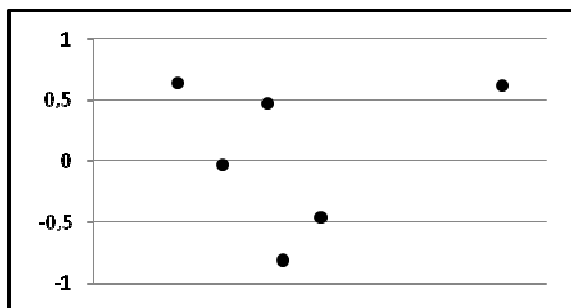| Country	Correlation	Correlation Recess	Difference
Colombia	- 0.640	0.642	1.281
Ecuador	0.917	- 0.026	- 0.944
Hong Kong SAR	- 0.692	0.477	1.169
Iceland	0.180	- 0.811	- 0.991
Japan	- 0.424	- 0.456	- 0.032
Turkey	0.443	0.619	0.175

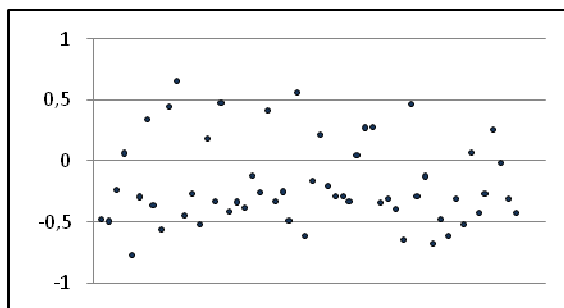Figure 5 UN correlation recession   Figure 6 UN growth correlation

It is possible that men's underwear sales are a useful economic indicator of the US economy, but much rests on the quality of the data being used (including the time intervals for its release) and its interpretation. Nevertheless traditional econometric forecasting is usually very poor at predicting turning (or tipping) points, going into recession and coming out of one. Therefore, it is tempting to track something like men's underwear sales, but these should only be used with extreme caution.

Looking at the global economy the overall correlation for all countries for sales to GDP growth was -0.623. Suggesting a negative relationship between for men's underwear sales and economic growth! Although counter-intuitive there are a number of possible explanations:
- Men (or their partners) buy new men's underwear during difficult economic times to cheer themselves up; or the more likely,
- Men (or their partners) stockpile men's underwear when it is discounted during a recession;
- Aware of the theory that men's underwear sales are the first to be affected by a recession, retailers discount men's underwear at the first sign of a recession, thereby stimulating demand.

Whilst the relationship is not strong enough to really establish a new theory, it certainly appears to disprove the original logic behind applying a Men's Underwear Index to global economies. Nevertheless, it is important to recognize the limitations of the data used and the methodology that has been applied in this paper. Certainly in a recent study of the Swiss economy Simon Elmer (2011) concluded that whilst a basket of indicators may provide a useful predictor of recession, he did not consider underwear to be a particularly important constituent of that basket.

4. CONCLUSION
Overall the investigation appears to suggest that men's underwear sales are unrelated to the state of the economy. Indeed far from being a highly price elastic good, their sales are more comparable to those of a basic commodity. For many countries men's underwear sales appear to be somewhat unaffected by the trade cycle, in other their movements, along with other goods, simply follow the economy. Therefore, for most countries it would be unwise (if not foolhardy) to construct a Men's Underwear Index to predict movements in the economy.

If data on men's underwear sales is available before data on the economy, it is tempting to use it to gain some insight into economic movements. In the main, one could only advocate using a MUI to predict recession and only after some more robust analysis has been done to understand the relationship (strength of the correlation and the causal relationship) and what, if any time lags exist. Countries which might want to construct a MUI include: Armenia, Ecuador, Kuwait, and the USA. Although a much more rigorous analysis than has been applied in this paper would be required. All other countries should treat the MUI as an interesting apocryphal and

stick to more traditional forms of economic forecasting. These findings are consistent with men's underwear being treated as a basic commodity in most economies, but in a few countries (especially richer countries like the US) they have become disposable fashion items.

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