Global Influences on UK Industrial Prices: Evidence Updated

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The impact of global forces (prices, tariffs, exchange rates) on domestically-produced product prices is most significant, subject to controversy and needs evidence for understanding and resolution. One extreme approach posits nothing but a 100% global influence, or pass-through; another extreme attributes little or no such influence. Based on the best data and estimation methods available, Coutts & Norman (2007) found the relevant linking parameter at just on 0.3. This means that the long-run (sustained) effect of a 10% maintained rise in world prices, a tariffs rise or exchange rate depreciation, would be around 3%, isolating this impact from other forces bearing on price-making, including domestic cost movements, taxes and demand pressure. This coefficient is closer to zero (the extreme Post-Keynesian position) than the 1.0 permeating nearly all conventional trade policy analysis. By conventional trade analysis we include the law of one price dominating trade models, the Marshallian, general equilibrium and effective-rate models of tariff policy analysis, and purchasing-power-parity models of exchange rate determination. In addition, there is hardly a neo-classical model of pricing that does not attribute some significant role for demand pressure, unlike the cost-based (Post-Keynesian) approaches developed from the 1930s that deny any (or much) role to demand pressure.

1. Main Results Presented in Summary Format

We have updated the data set we published previously for data running from 1971 to the end of 2010, a decade beyond that reported in Coutts & Norman (2007). The coefficient of greatest importance is reported below for a fixed-lag ARDL specification, covering the quarterly data period from 1971 to progressive end-points running annually from December quarter 1996 to the end of 2010. This approach to continuous re-estimation also illustrates the value of advance partitioning of time-series data sets as proposed as a standard procedure in Norman (2011).

The coefficient of global pricing influence moves upwards from the reported figure of 0.3 with end-points nearing the year 2000; it then stabilises near 0.37 for the main part of the decade to 2010. Using this tracing procedure, we can say that there has been a form of slow, mild warming to global influences in UK industrial price making, but the domestic cost factors ignored in standard trade theory still remain predominant. Combing the price-cost elasticities for both unit labour costs and materials prices, domestic costs exert an influence that moves from just over to just under 60% through the data epochs, confirming all previous econometric and survey studies made for UK and many other countries. In every specification and data span we investigated, five different measures of demand pressure are NEVER a significant influence of price movements.

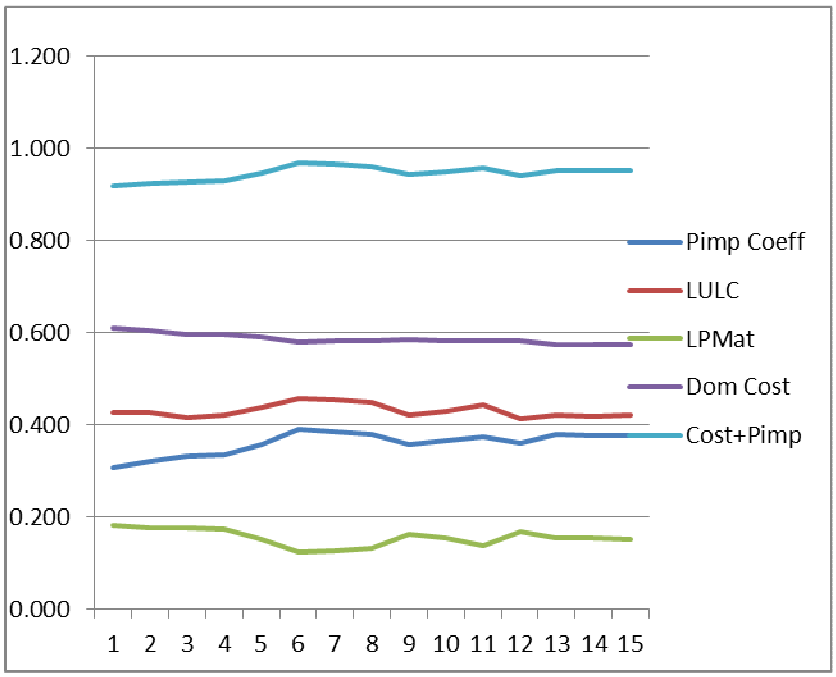
The data are presented in table A below. Arising from a log-log specification, they can be interpreted as the long-run percentage effect on prices if any of the variables in the column headings were to rise by one per cent, holding all other variables and influences in UK price movements constant as the adjustment takes place. In the addendum, we present a full range of statistical results, including standard errors and t-values. The fit, statistically is impressive,

with every coefficient being significant at the 1% level, with extremely high coefficient of determination and autocorrelation tests are clearly passed. The results to 2007 (q4) are highlighted as they are used in the forecasting analysis to predict the unseen data from 2008 to 2010, as report herein.

Table A: Estimated coefficients linking pricing determinants to UK producer price movements

1971 to end of	Pimp Coeff	LULC	LPMat	Dom Cost	Cost+Pimp
1996	0.308	0.428	0.182	0.610	0.918
1997	0.320	0.428	0.177	0.605	0.925
1998	0.332	0.417	0.178	0.595	0.927
1999	0.334	0.422	0.173	0.595	0.929
2000	0.356	0.437	0.153	0.590	0.946
2001	0.390	0.456	0.123	0.579	0.969
2002	0.385	0.455	0.126	0.581	0.966
2003	0.379	0.450	0.132	0.582	0.961
2004	0.358	0.421	0.164	0.585	0.943
2005	0.365	0.429	0.154	0.583	0.948
2006	0.374	0.444	0.138	0.582	0.956
2007	0.360	0.414	0.168	0.582	0.942
2008	0.379	0.420	0.154	0.574	0.953
2009	0.377	0.419	0.155	0.574	0.951
2010	0.377	0.422	0.153	0.575	0.952

The trend in estimated coefficients is show in Chart 1 below



2. Forecasting Analysis using Different Explana for Price Movements

It is a standard technique in data analysis to save some of the actual data, conventionally but not necessarily at the end of the data span, in order to undertake for forecasting and prediction-error analysis. (Henri Theil is the most ardent proponent of this method.) The purpose of this exercise is not simply to demonstrate how well alternative approaches can forecast; it is mainly as a further test of the veracity of alternative hypotheses. To do this we need to select (i) a projection period, starting from the dates which become unknown to the projection method (data saving); (ii) some projection approaches, reflecting specific theories of hypotheses on how industrial prices move; and (iii) some criteria by which to evaluate the alternative predictions: prediction error analysis.

Our method is to truncate/save some of the data at the end of pour data span, in order the enable the alternative approach to predict the price movements that actually took place in the projection span. We have chosen to predictons for the period 2008, March quester, to 2010, September quarter, the latest data available at the time the exercise was carried out. The cut-off point is justified by both economic and statistical considerations. Statistically, the eleven data points for the producer price series is a suitable number to test prediction power; economically, the end of 2007 comes at the height of the British currency's long strength, after which it was subject to considerable deprecation against other currencies; the span also captures the onset fo the global financial crisis that intensified during 2008 with effects enduring for the British economy through the entire projection span (2008/1 to 2010/3)

We test three specific approaches to predicting the course of British industrial prices in the period 2008-2010:

A. Conventional international trade and tariff theory, based on the dominating textbook proposition that domestic prices are determined by the duty-corrected prices of

foreign (imported) products. If this hypothesis were completely correct, an index of UK producer prices, PPI, would match exactly the index of prices of imported industrial products (Pimp). Almost the entire body of trade and tariff theory clings to this hypothesis. It is supported by the age-old assumptions of perfect product substitutability, perfect competition among home producers and the small-country assertion (that each 'home' country lacks any power to price independently of world prices).

B. An extreme post-Keynesian mark-up pricing approach, developed in Norman (1996) in which domestic procedures defy trends and movements in rival import prices, preferring for strategic reasons to gear their prices quite rigidly to domestic unit cost movements. In this approach were completely correct, then PPI would mirror an index of unit costs, or a weighted average of unit labour costs and materials costs. While many conventional economists might despite this approach because it goes no role whatever to either import prices or demand pressure, it is in principle no more extreme that the dominating trade theory model that gives no role whatever to domestic costs or demand influences.

C. A hybrid approach derived from our preferred regression method adopting the predictor of PPI from a log-log specification involving import prices, unit labour costs and material prices.

We have generated PPI predictions based on each of these three approaches for the estimation period 2008(q1) to 2010(q3). We show in each case the actual and predicted PPI, and the working to derive root-mean-squared prediction errors, which are comparable when applied to the same data sets. We commence with prediction-basis A, using import prices only as the predictor.

2(i) The standard trade theory predictor

Pimp		Predict	Actual	Error		Sqd Error
Predictor		106.7	106.7	0.0		
Mar-08	0.04	111	109.1	1.9		3.48942
Jun-08	0.0192	113.1	113.5	-0.4		0.1584
Sep-08	0.0189	115.2	114.8	0.4		0.1901
Dec-08	0.0463	120.6	112.4	8.2		66.7652
Mar-09	0.0442	125.9	112.2	13.7		187.854
Jun-09	-0.025	122.7	113.5	9.2		84.732
Sep-09	-0.009	121.6	114.3	7.3		53.8462
Dec-09	0.0175	123.8	115.5	8.3		68.426
Mar-10	0.0172	125.9	117.1	8.8		77.5456
Jun-10	0.0153	127.8	119.7	8.1		66.076
Sep-10	-0.006	127.1	119.7	7.4		54.6004
				sum		663.684
				Mean sqd e		60.3349
				rmspe		**7.7676**

The import-price (conventional trade theory) approach begins with closely concordant predictions in early 2008, but as the global financial crisis unfolds and sterling depreciates against most other countries, import prices in the UK rise significantly, especially from the March quarter 2009. British producer prices remained closely geared to costs from early 2009, apparently ignoring rising foreign-product prices. The prediction errors remain significant in the final years of the test period, as reflected in the high root-mean-squared prediction error.

2.(ii) Price predictions from Rigid Mark-up pricing geared to domestic costs

In this approach the predictor is a weighted combination of materials cost movements and those in domestic unit labour costs. The weights (0.43, 0.57) are those used in Coutts and Norman (2007). The workings of the prediction analysis for method B are now shown.

CBP	Crude	CBP	Actual			
		Predr	PPI	Error		SqdError
Mar-08	0.0348	110.4	109.1	1.3		1.72384
Jun-08	0.0564	116.6	113.5	3.1		9.8854
Sep-08	0.0089	117.7	114.8	2.9		8.28714
Dec-08	-0.017	115.7	112.4	3.3		10.9371
Mar-09	0.01	116.9	112.2	4.7		21.7488
Jun-09	0.0017	117.1	113.5	3.6		12.6932
Sep-09	0.0068	117.9	114.3	3.6		12.6239
Dec-09	0.0177	119.9	115.5	4.4		19.693
Mar-10	0.0082	120.9	117.1	3.8		14.5593
Jun-10	-0.004	120.4	119.7	0.7		0.47761
Sep-10	0.0045	120.9	119.7	1.2		1.52456
				Sum		114.154
				Mean		10.3776
				rmspe		**3.2214**

It is clear that prices track domestic costs much more closely that import prices, despite trade theory propounding implicitly that they would be irrelevant. Accordingly, the cost-based pricing prediction error is less than half that of the standard trade theory method. As such, if we were to judge between the two extreme approached (methods A or B) the evidence is overwhelmingly in favour of the (post-Keynesian) extreme. The question remaining is whether the hybrid method selected by the econometric approach can improve on prediction based only on extreme methods.

2(iii) Regression-method price predictions using both costs and import prices

This method uses the information available to the end of 2007, as highlighted in table A. The underlying theory is that UK producer prices are geared mainly to labour and materials costs, tempered by some consideration for rival import prices. There is no scope for any influence from cost or demand pressures in standard trade and tariff theory; however, there are approaches within the Post-Keynesian tradition that DO permit rival product prices to be a formal part of the price-formation explanation, notably approaches following Kalecki. (See Coutts and Norman (2011)).

The results are as below:

RegPredict	PPI	Actual	Error	SqdErr
0.02915	106.7	109.1	-2.4	5.76
0.03242	110.15947	113.5	-3.3	11.15911
0.01233	111.51765	114.8	-3.3	10.77385
0.0172	113.43566	112.4	1.0	1.072592
0.0245	116.21533	112.2	4.0	16.12284
-0.00814	115.2698	113.5	1.8	3.132208
0.00056	115.33403	114.3	1.0	1.069228
0.01357	116.89968	115.5	1.4	1.959111
0.00696	117.71332	117.1	0.6	0.376162
-0.00183	117.49801	119.7	-2.2	4.848774
0.00258	117.80149	119.7	-1.9	3.604349
			sum	59.87822
			mse	5.443475
			rmspe	**2.33313**

Clearly, the hybrid method predicts best of all these approaches; fuller information from both foreign and domestic influences on British industrial prices offers the best explanation of price movement. It is comforting that neither extremist approach performs as well.

2(iv) Prediction Analysis Overview, with comparisons with Australian results

We can thus summarise the prediction errors for each of the approaches in the present exercise. They are compared with extremist prediction approaches based on Australian data performed by the current authors in Melbourne in 2008.

Summary of Prediction Errors

Prediction period	2008/1 to 2010/3		2003 to 2008	
	UK	UK	Australia	Australia
Predictor	**RMSPE**	**% to bestFC**		
Pimp: Conventional Trade Theory	**7.768**	**333%**	**47.11**	**638%**
Crude CBP: Post-Keynesian	**3.221**	**138%**	**7.38**	**100%**
CN Regression basis: Multiple Explana	**2.333**	**100%**	**12.6**	**171%**

For the recent UK investigation we can conclude that the crude (post-Keynesian) pricing approach despised by many conventional economists performs almost as well as a price predictor as the preferred multi-variable regression method; however, the standard trade theory model adopted by conventional economists exhibits prediction errors more than three times as large as the regression approach and more than double the errors found in the mark-up pricing model.

While the prediction errors are not exactly comparable as between UK and Australia, because the time span is longer for Australia and the data variance is greater, the regression fit is closer overall for the UK. However, in each case there is very considerable and persistent exchange rate movement in the forecast period and the mark-up pricing model significantly outperforms the standard trade-theory approach in both countries.

3. Significance of the findings for economic analysis and policy advice

There are considerable implications of these further findings for economic analysis, the understanding of how economies work, and for economic (including trade) policy.

For analysis, marginalism appears to be neither a valid description nor an accurate predictor of forces shaping industrial price movements. Surveys and statistical evidence over long periods in many industrial countries affirm both points. In relation to international economics especially trade and tariff theory, it is difficult to see why the economic profession adheres so fervently to the conventional models that were set up for a former age of high competition and highly substitutable products. Using it and teaching it does considerable potential damage. The central point of Post-Keynesian pricing analysis is that demand functions and demand factors should be avoided or limited in any credible explanation of industrial price movements.

For the purpose of understanding how economies actually work, a Post-Keynesian framework offers richness and accuracy that is missing from conventional neoclassical theories of price, either general or as specifically embodied in models used in international economics.

For economic policy, demand factors either directly or via economic policy initiatives have relative small price impacts, and tariff and exchange rate movements have also relative small price impacts. In each case, the messages are quite contrary to conventional macro and micro economic policy hypotheses and advice e to policy makers.

It remains a mystery why findings like this have had such little impact on the manner in which economic is taught and policy advice is offered, especially from economists seeking to explain our world and guide policy makers in the quest of making it better. The intransigence of most economists and the limited marketing success of realistic economists seem to explain much. In the spirit of Keynes, these conclusions are demonstrably provisional.

References

Coutts, K., Norman, N. (2007) "Global Influences on UK Manufacturing Prices: 1970-2000", *European Economic Review"*, 51, Issue 5, July 2007, 1205-1221.

Norman (2011), *Data Partitioning in Time-series Econometrics* (mimeo)

Addendum: A Fuller presentation of the data results

1971 to									
end of	**Pimp Coeff**	St Error	***t-ratio***	**LULC**	St Error	***t-ratio***	**LPMat**	St Error	***t-ratio***
1996	**0.308**	0.102	***3.020***	**0.428**	0.093	***4.602***	**0.182**	0.087	***2.092***
1997	**0.320**	0.096	***3.333***	**0.428**	0.094	***4.553***	**0.177**	0.087	***2.034***
1998	**0.332**	0.093	***3.570***	**0.417**	0.093	***4.484***	**0.178**	0.087	***2.046***
1999	**0.334**	0.086	***3.884***	**0.422**	0.089	***4.742***	**0.173**	0.084	***2.060***
2000	**0.356**	0.079	***4.506***	**0.437**	0.085	***5.141***	**0.153**	0.078	***1.962***
2001	**0.390**	0.076	***5.132***	**0.456**	0.085	***5.365***	**0.123**	0.074	***1.662***
2002	**0.385**	0.069	***5.580***	**0.455**	0.089	***5.101***	**0.126**	0.069	***1.826***
2003	**0.379**	0.064	***5.922***	**0.450**	0.080	***5.625***	**0.132**	0.065	***2.031***
2004	**0.358**	0.063	***5.683***	**0.421**	0.080	***5.263***	**0.164**	0.063	***2.603***
2005	**0.365**	0.061	***5.984***	**0.429**	0.072	***5.958***	**0.154**	0.053	***2.906***
2006	**0.374**	0.058	***6.448***	**0.444**	0.067	***6.627***	**0.138**	0.045	***3.067***
2007	**0.360**	0.056	***6.429***	**0.414**	0.065	***6.369***	**0.168**	0.042	***4.000***
2008	**0.379**	0.063	***6.016***	**0.420**	0.070	***6.000***	**0.154**	0.042	***3.667***
2009	**0.377**	0.061	***6.180***	**0.419**	0.067	***6.254***	**0.155**	0.039	***3.974***
2010	**0.377**	0.061	***6.180***	**0.422**	0.066	***6.394***	**0.153**	0.039	***3.923***