

# Discussion Paper

Depreciation of Sterling 2008 - 2011

April 2012

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His doctoral thesis, the UK cyclically adjusted balance of payments 1980 - 1992 was published in 1995.

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The Sunday Times and Croissants is the weekly blog on news, economics, the day job and tennis updates.

His Corporate Strategy Case Study : Apple from the iPod to the iPad Second Edition was published in April 2012 and is available as a free download with teaching notes, excel files and keynote presentations from the web site.



# The Saturday Economist Briefing Paper

## The depreciation of sterling and the impact on the UK trade in goods deficit 2008 - 2011.

By John Ashcroft April 2012

The UK trade deficit is increasing at a time when given the depreciation of sterling and the weakness of domestic demand in the UK, conventional wisdom suggests the opposite should be the case. Depreciation is not producing the relative gains to trade expected. In this short paper we explain how, despite the 20% fall in the value of Sterling, there has been an increase in export prices of 18% and no improvement in the terms of trade. The improvement in relative volumes can be explained by world trade growth and the weakness in domestic demand. Cyclically adjusted, given the output gap in the UK, we would expect the deficit to be higher, in fact, the actual trade deficit is £1 billion higher than the forecast CA model.

### 1 Introduction

The UK trade deficit is increasing at a time when given the depreciation of sterling and the weakness of domestic demand in the UK, conventional wisdom suggests the opposite should be the case.

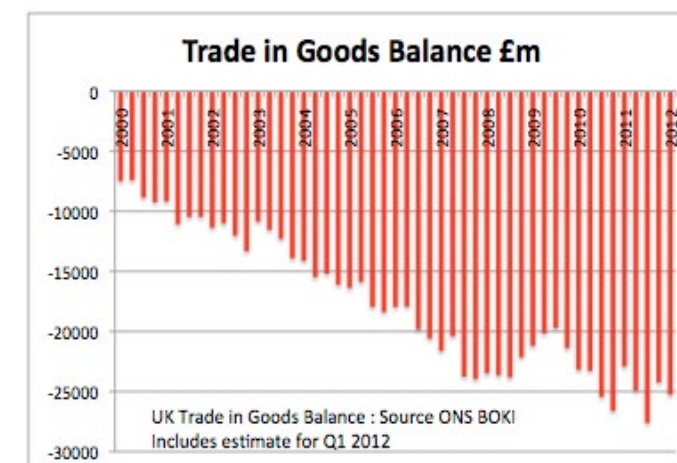
On the 12th April 2012, the ONS released the latest UK trade data. The deficit on seasonally adjusted trade in goods had increased to £8.8 billion in February, compared to £7.9 billion in January.

Monthly information on trade is erratic and subject to revision but nevertheless, we forecast the deficit (trade in goods) will be over £25 billion in the first quarter of the year compared to £23 billion in the first quarter last year.

For the year as a whole 2011, the deficit was approximately £100 billion compared to £93 billion in 2008. Despite the great depreciation in sterling, the trade deficit is increasing.

The demand co-efficients for exports and imports are so much stronger than price co-efficients, it is possible to cyclically adjust the trade deficit.

The UK output gap, is estimated at 4.5%. Assuming domestic demand is cyclically adjusted to trend, we would expect the trade deficit to be higher at the end of 2011, than is currently the case. In fact the trade deficit is higher than the cyclically adjusted forecast model.



### 2 Sterling Depreciation

Since 2008, sterling has been subject to a policy of benign neglect. Effectively since the end of 2007, sterling has fallen in value by some 20% trade weighted basis. According to conventional wisdom, a fall in sterling leads to an increase in competitiveness of exports and imports become more expensive. This in turn leads to a greater volume of exports, a fall in imports and a boost to output via a substitution effect, as domestic output replaces overseas production. The trade deficit should be decreasing not increasing.

The great caveat to the model, is what happens to prices. Too often it is claimed, gains from depreciation are frittered away in higher wages and domestic price inflation. Not so on this occasion suggests the Bank of England, domestically generated inflation is low and wages inflation has averaged 2% over the three year period.



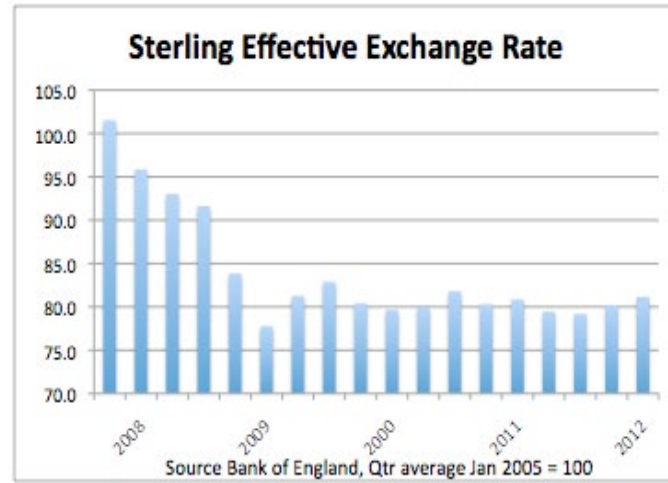


## 2 Depreciation and Inflation

CPI and RPI indices have increased by 12% since 2008 and the RPIX index has increased by 15%. [ONS]

Output prices for manufactures have increased by 12% and input costs have increased by 23%, squeezing margins.

So what has happened to export prices? According to the ONS export prices have increased by 18% since 2008 and imports have increased also by 18%. [ONS : BQKR, BQKS]

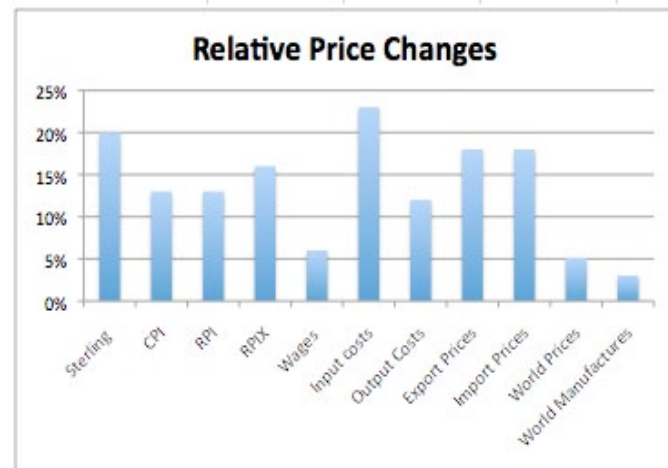


Sterling has depreciated by around 20% since 2008

## 3 Depreciation and the terms of trade

The terms of trade, ie export prices as a percentage of import prices, have remained largely unchanged despite the depreciation.

There has been no significant improvement in relative prices and competitiveness despite the fall in exchange rate values. [ONS BQKT, BQKM]



but import and export prices have increased by 18%

## 4 Depreciation and trade volumes

So what happened to volumes? Export volumes have increased by just 4.3% by the end of 2011 [BQKU] and imports have fallen by less than 1%. [BQKV] Excluding oil, export volumes have increased by 7.5%, import volumes remain unchanged. [BQKI, BQKJ]

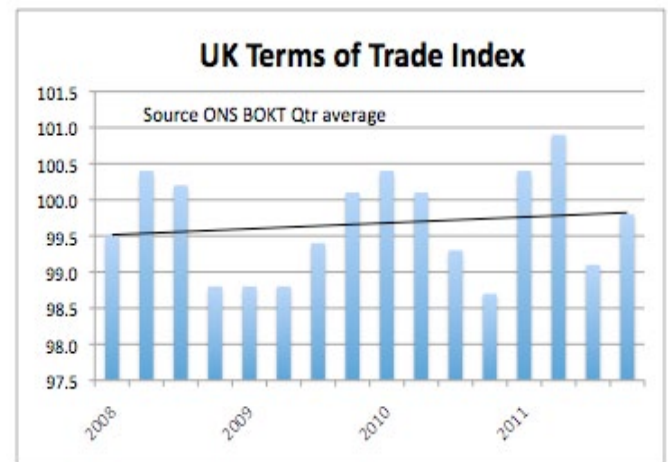
## 5 Modelling trade volumes

By convention, we model exports and imports as a function of demand and relative price using world trade for exports and domestic demand (or Total Final Expenditure) for imports as demand proxies.

Over the period, world trade has grown by 7% but GDP, domestic demand and TFE are all down by around 2% in comparison. The changes in volumes of export and import trade volumes are consistent with the demand co-efficients inherent in our trade model.

Export volumes can be explained by the relative strength of world trade and import volumes can be explained by the weakness of domestic demand.

Despite the depreciation in the value of the currency, there have been no relative price gains.

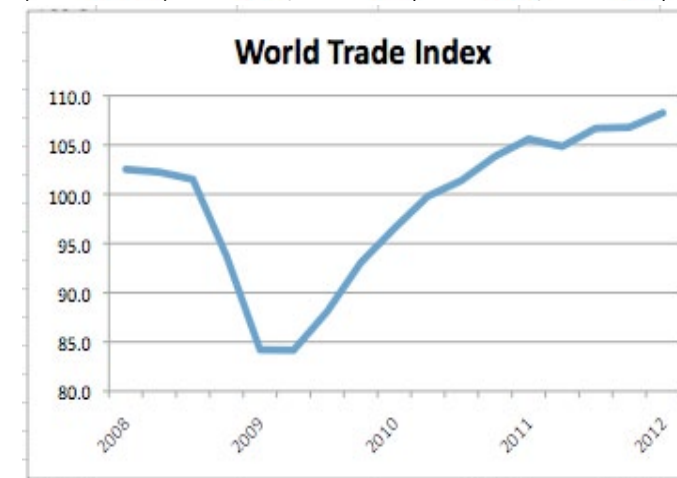


The terms of trade are largely unchanged despite the depreciation, yielding no competitive advantage

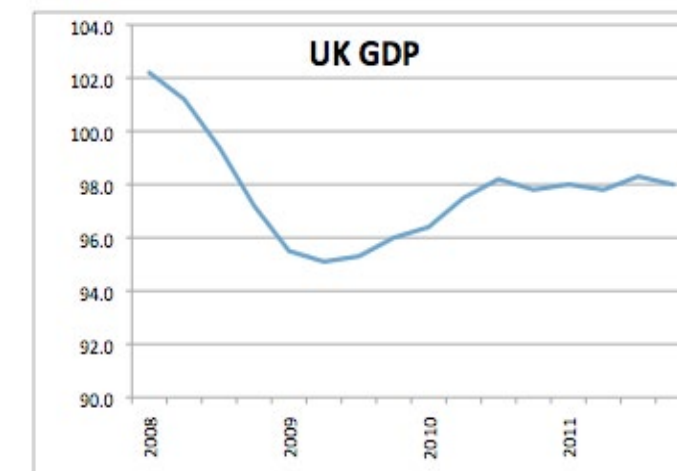
Exports are no less expensive compared to imports than in 2008. Prices cannot explain the change in trade volumes but relative demand components can.

Depreciation of Sterling 2008 - 2011

	3 Volume and Price Indices					Balance of Payments Basis				
	Volume (Seasonally adjusted)					Price Index (nsa)				
	Totals Exports BQKU	Imports BQKV	Total exc Oil Exports BQKI	Imports	Terms of Trade BQKT	Totals Exports BQKR	Imports BQKS	Total exc Oil Exports BQKK	Imports BQKL	Terms of Trade BQKM
2008	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2009	88.0	87.4	86.4	86.4	999.2	101.4	102.2	105.2	105.5	99.7
2010	97.4	97.3	97.8	97.9	99.6	107.8	108.2	109.0	109.1	99.9
2011	102.4	98.7	104.7	99.4	100.1	116.8	116.7	114.4	115.0	99.5
2009 Q3	87.2	86.6	86.4	85.6	99.4	100.5	101.1	103.3	103.5	99.8
2009 Q4	91.3	90.5	90.6	90.4	100.1	103.5	103.4	105.6	105.2	100.4
2010 Q1	91.8	92.9	91.4	93.9	100.4	106.5	106.1	108.1	107.3	100.7
2010 Q2	97.5	96.1	97.1	96.8	100.1	108.7	108.6	109.8	109.4	100.4
2010 Q3	98.6	99.1	99.9	99.1	99.3	106.8	107.5	108.3	108.7	99.6
2010 Q4	101.8	101.0	102.6	102.0	98.7	109.2	110.6	109.6	111.0	98.7
2011 Q1	104.2	99.0	106.2	100.5	100.4	113.6	113.1	112.0	111.8	100.2
2011 Q2	100.6	97.7	102.1	98.5	100.9	117.9	116.9	114.9	114.6	100.3
2011 Q3	100.3	98.6	103.2	99.0	99.1	117.8	118.9	115.3	117.2	98.4
2011 Q4	104.3	99.6	107.5	99.7	99.8	117.9	118.1	115.2	116.3	99.1



World Trade has recovered to 7% above 2008 level. Data : CPD World Trade Monitor.



But UK output, GDP, Domestic Demand and TFE remain some 2% below the 2008 average.

### References :

Ashcroft J K (2005) The Cyclically adjusted UK Balance of Payments 1980 - 1992 PhD Thesis  
Ashcroft J K (2012) Forty years of UK trade, Forthcoming

## 6 Cyclically adjusting the trade deficit.

UK GDP relative to trend rate is down by 4.5%. The demand components are so strong it is possible to cyclically adjust the trade deficit. [Ashcroft J K [1995, 2012]

Without the recession and with growth closing the output gap, cyclically adjusted, demand for imports would have been greater, the trade deficit would have been higher by some £2.5 billion to according to our first analysis. However, the higher deficit in Q3 2011 results in an out turn for the year £1 billion higher than the model projection.

## 7 Summary and Conclusions

Depreciation is not producing the relative gains to trade expected at the Bank of England and elsewhere.

There has been no improvement in the relative terms of trade following the depreciation.

The changes in export and import volumes can be explained by the changes in world trade and demand in the UK economy.

The trade deficit is increasing but the weakness of the underlying structural deficit is masked by the relative cyclical weakness of the UK economy compared to the rest of the world.

If and when the UK economy returns to a higher rate of growth, the trade deficit will increase substantially as domestic demand [and export growth] will result in higher import volumes.

Depreciation of Sterling 2008 - 2011



## Appendix 1 Basic trade equations

Derived from the original thesis

Ashcroft J K [1996] Determinants of the cyclically adjusted deficit of the visible account of the UK Balance of Payments 1980 - 1992. PhD Thesis.

The demand co-efficients are dominant and the price co-efficients do not satisfy the Marshall-Lerner condition.

### Basic Import Equation

$$M_t = -2.82 + 2.12Y_t + .331RIMP(t) - .276RIMP(t-1) + e$$

(-8.86) (17.38) (1.74) (-1.50)

T	=	75Q1 - 91Q3	R2	=	0.95
e	=	0.0311	DW	=	1.89
Reset (1,53)	=	1.55 [4.00]	HET (1,56)	=	1.61 [4.02]
AR (1,53) 1	=	0.00 [4.00]	AR (4,50)	=	0.30 [2.57]
AR (8,46) 8	=	0.17 [2.14]	AR (12,42)	=	0.34 [2.00]
ARCH (4)	=	1.69 [9.49]	NORM (2)	=	0.14 [5.99]
Predictive Failure Test			Stability Test		
Chow (4.54)	=	0.54 [2.53]	Chow (4.54)	=	0.41 [2.53]

Where :

M = Imports  
Y = GDP  
RIMP = Relative Import Prices

From this analysis, the demand variable with regard to changes in income was highly significant and was of the order of 2.12. The summed price elasticity was low and incorrectly signed (0.055).

Up to eight price lags were evaluated in the first instance.

### Basic Export Equation

$$X_t = .4159 + 1.01WT - .278RP(t-2) - .220RP(t-4) - 1.08DUM791 - .142DUM792$$

(13.85) (3.38) (2.58) (-4.31)

T	=	75Q2 - 92Q4	R2	=	0.81
e	=	0.024	DW	=	1.99
Reset (1,60)	=	1.17 [4.00]	HET (1,65)	=	0.03 [4.00]
AR (1,53) 1	=	0.60 [4.00]	AR (4,50)	=	0.64 [2.53]
AR (8,46) 8	=	0.49 [2.10]	AR (12,42)	=	0.63 [1.96]
ARCH (4)	=	3.14 [9.49]	NORM (2)	=	0.68 [5.99]
Predictive Failure Test			Stability Test		
Chow (4.61)	=	0.18 [2.53]	Chow (4.63)	=	0.92 [2.53]

Where :

Xt = Exports  
W = World Trade  
REXP = Relative Export Prices  
DUM = Dock Strike Dummies for 1979 Q1 and Q2 as was the convention at that time

From this analysis, the elasticity of response of UK export volume to world trade volume is estimated at close to unity 1.01 and the price elasticity is -0.5. Up to fifteen price lags were evaluated in the first instance.

## Appendix 2 Trade in Goods, results table

	IMPORTS			EXPORTS				Deficit Trade in Goods			
	Actual [GDP]	Fitted [GDP]	With Growth GDP Trend	Actual [WT]	Fitted [WT] [REXP]	Fitted X [WT] [EER]	FittedX [WT Trend] [EER]	Actual [GDP]	Fitted [WT] [REXP]	Fitted WT [EER]	FittedX [WT Trend] [EER]
2007	75133	76716	78133	53516	59745	59550	57440	-21617	-16971	-17166	-20692
	74985	78987	79145	54580	59668	59747	58106	-20405	-19319	-19240	-21039
	79290	80103	80261	55524	60065	60359	58777	-23766	-20039	-19744	-21484
	81204	82061	80963	57238	61010	62102	59479	-23966	-21051	-19959	-21484
2008	84250	84762	81256	60769	62576	64820	60202	-23481	-22186	-19942	-21055
	86692	85193	81981	65037	62734	65331	60933	-23655	-22459	-19862	-21048
	89545	84393	82922	66015	62333	65223	61657	-23830	-22060	-19170	-21265
	82415	85924	82946	60265	60568	62884	62435	-22150	-25356	-23040	-20512
2009	76965	85747	83233	55769	57902	59538	63213	-21196	-27845	-26209	-20021
	74697	84598	84934	54537	57156	58638	63935	-20150	-27442	-25960	-20999
	76425	85243	86373	56712	58410	60319	64682	-19713	-26833	-24924	-21691
	82075	85828	87225	60696	60900	63381	65469	-21379	-25928	-23447	-21756
2010	85426	88901	88348	62234	63912	65596	66256	-23192	-24989	-23305	-22093
	90002	90010	89694	66727	66452	67131	67047	-23275	-23559	-22879	-22647
	92228	90593	91167	66786	66607	67523	67839	-25442	-23986	-23070	-23327
	96566	91339	92224	69961	67235	69012	68667	-26605	-24104	-22327	-23558
2011	96951	92138	93590	74034	68176	70281	69493	-22917	-23962	-21857	-24097
	98863	92861	94689	73958	67517	70251	70345	-24905	-25345	-22610	-24304
	101661	93842	95969	74047	68093	71006	71195	-27614	-25749	-22836	-24774
	101300	94091	97456	77058	68320	70840	72057	-24242	-25771	-23251	-25399

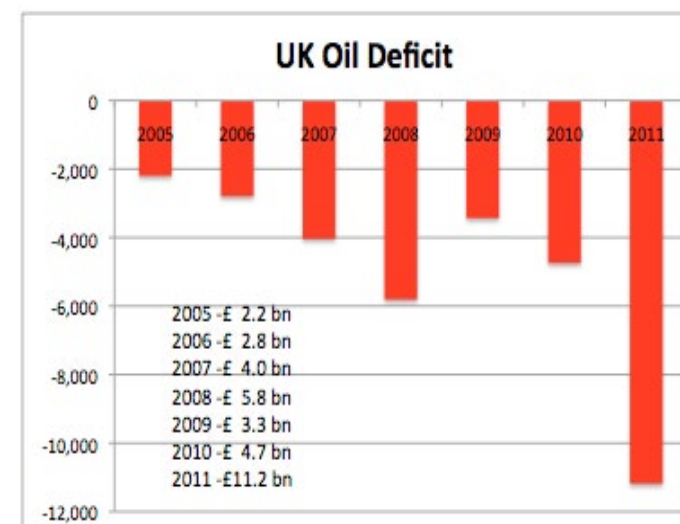
	IMPORTS			EXPORTS				Deficit Trade in Goods			
	Actual [GDP]	Fitted [GDP]	With Growth GDP Trend	Actual [WT]	Fitted [WT] [REXP]	Fitted X [WT] [EER]	FittedX [WT Trend] [EER]	Actual [GDP]	Fitted [WT] [REXP]	Fitted WT [EER]	FittedX [WT Trend] [EER]
2007	310612	317867	318502	220858	240488	241758	233802	-89754	-77379	-76109	-84700
2008	345202	340272	329105	252086	248212	258257	245226	-93116	-92060	-82015	-83879
2009	310162	342416	341766	227714	234368	241876	257299	-82448	-108048	-100540	-84466
2010	364222	360843	361433	265708	264206	269262	269808	-98514	-96637	-91581	-91625
2011	398775	372932	381704	299097	272106	282378	283090	-99678	-100826	-90554	-98614

### Appendix 2 Trade in Goods Notes

The actual trade deficit in 2011 was £99.7 billion compared to £98.5 billion in 2010. The forecast deficit within our fitted world trade and exchange rate model is £90.5 billion [EER] basis and £100.8 billion [Relative price basis].

According to our model, the cyclically adjusted trade deficit would have been £98.6 billion assuming no recession and trend rate of growth maintained in the UK and in world trade.

Part of the variance can be explained by the significance increase in the oil deficit in 2011 but stock movements (negative 2009) and positive in 2010 and 2011 may also explain the outturn relative to model.



Significant deterioration in the trade in oil account.

### Appendix 3 Updated Model Parameters Basic Export Equation

Ordinary Least Squares Estimation

\*\*\*\*\*

Dependent variable is LOGEXTIG  
84 observations used for estimation from 1991Q1 to 2011Q4

\*\*\*\*\*

Regressor	Coefficient	Standard Error	T-Ratio [Prob]
INPT	9.5859	.35629	26.9049 [.000]
LOGEER	-.48469	.077368	-6.2647 [.000]
LOGWT	.72874	.019083	38.1879 [.000]

\*\*\*\*\*

R-Squared	.94792	R-Bar-Squared	.94664
S.E. of Regression	.065031	F-Stat. F(2,81)	737.2131[.000]
Mean of Dependent Variable	10.7239	S.D. of Dependent Variable	.28152
Residual Sum of Squares	.34255	Equation Log-likelihood	111.8994
Akaike Info. Criterion	108.8994	Schwarz Bayesian Criterion	105.2531
DW-statistic	.34220		

#### Diagnostic Tests

\*\*\*\*\*

* Test Statistics *	LM Version	F Version	*
A:Serial Correlation	*CHSQ(4) = 58.6047 [.000]	*F(4,77) = 44.4231[.000]*	
B:Functional Form	*CHSQ(1) = 14.5229 [.000]	*F(1,80) = 16.7225[.000]*	
C:Normality	*CHSQ(2) = 3.0824 [.214]*	Not applicable	*
D:Heteroscedasticity	*CHSQ(1) = .02821 [.867]	*F(1,82) = .027551[.869]*	

\*\*\*\*\*

A : Lagrange multiplier test of residual serial correlation  
B : Ramsey's RESET test using the square of the fitted values  
C : Based on a test of skewness and kurtosis of residuals  
D : Based on the regression of squared residuals on squared fitted values

### Appendix 4 Updated Model Parameters Basic Import Equation

Ordinary Least Squares Estimation

\*\*\*\*\*

Dependent variable is LOGM  
81 observations used for estimation from 1991Q1 to 2011Q1

\*\*\*\*\*

Regressor	Coefficient	Standard Error	T-Ratio [Prob]
INPT	-18.3630	1.0876	-16.8838 [.000]
LOGRIMP	.18305	.10686	1.7129 [.091]
LOGGDP	2.2639	.063654	35.5653 [.000]

\*\*\*\*\*

R-Squared	.94783	R-Bar-Squared	.94649
S.E. of Regression	.080146	F-Stat. F(2,78)	708.5451[.000]
Mean of Dependent Variable	10.8961	S.D. of Dependent Variable	.34647
Residual Sum of Squares	.50102	Equation Log-likelihood	91.0311
Akaike Info. Criterion	88.0311	Schwarz Bayesian Criterion	84.4394
DW-statistic	.16653		

\*\*\*\*\*

#### Diagnostic Tests

\*\*\*\*\*

* Test Statistics *	LM Version	F Version	*
A:Serial Correlation	*CHSQ(4) = 68.0531[.000]	*F(4,74) = 97.2418[.000]*	
B:Functional Form	*CHSQ(1) = 8.2076[.004]	*F(1,77) = 8.6820[.004]*	
C:Normality	*CHSQ(2) = 6.6201[.037]*	Not applicable	*
D:Heteroscedasticity	*CHSQ(1) = 8.2151[.004]	*F(1,79) = 8.9166[.004]*	

\*\*\*\*\*

A : Lagrange multiplier test of residual serial correlation  
B : Ramsey's RESET test using the square of the fitted values  
C : Based on a test of skewness and kurtosis of residuals  
D : Based on the regression of squared residuals on squared fitted values

## Appendix 5 Notes on trend rate and the output gap

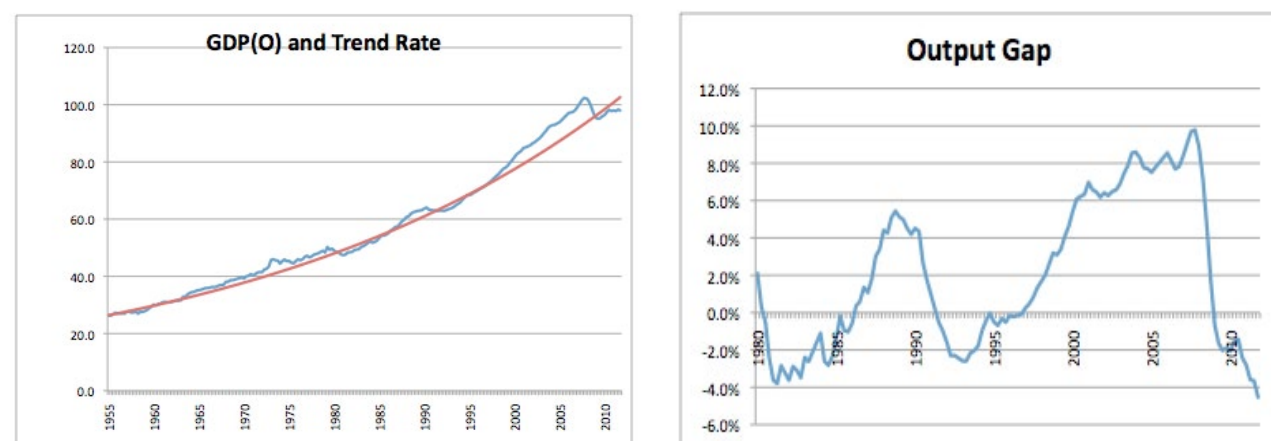
We define the trend rate of growth as the average rate of growth of the UK economy over the last sixty-one years, using the conventional model  $[LY(f)T]$  where LY is the log of UK GDP(O) and T is a time trend within a sample period 1950:1 to 2011:4.

The trend rate of annual GDP growth modelled on this basis is 2.44%. Within our own model, we use an average trend rate of growth of 2.4% to generate an output gap (relative to trend) of 4.5% by Q4 2011.

At certain stages in the development of the economy, it is argued a larger (or smaller) rate of growth can be determined. This was the case in the Lawson years of high growth in the 1980s and during the period of sustained above trend growth in the Gordon Brown era.

Now it is assumed the economy is set for a period of prolonged low growth, the result of the financial crisis, the banking collapse, sustained debt burdens for government and households and problems in Europe relating to low growth and the Euro challenges.

Rates of growth will vary within a prolonged time set but the trend rate of growth defined as the long term average growth rate is an absolute. A four minute mile is well defined but not all laps are run at the constant rate.



The latest update for the UK GDP(O) series suggests the Brown boom significantly overshadows the Lawson boom of the 1980s. The recession of 2008 results in a 4.5% output gap by Q4 2011, with output some 4.3% below the pre recession peak and in line with the levels experienced in 2006.

Using the trend rate of 2.44% results in an output gape even higher at 7.2%.

### Note Trend rate model LY (f) T

Ordinary Least Squares Estimation

Dependent variable is LOGGDPO

228 observations used for estimation from 1955Q1 to 2011Q4

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
INPT	3.2823	.0050127	654.7996 [.000]
TREND	.0060624	.3796E-4	159.7245 [.000]

R-Squared	.99122	R-Bar-Squared	.99118
S.E. of Regression	.037721	F-Stat. F(1,226)	25511.9[.000]

**GDP : The trend rate of growth may vary over the short term but the average rate of growth is absolute, a four minute mile is well defined but not all laps are run at the constant rate. JKA**

## Appendix 6 Output Gap, lost capacity and manufacturing

Manufacturing has experienced a long term rate of growth of 1.5% compared to a 2.4% rate of growth of GDP(O). This is consistent with a sector performance reflecting a falling rate of share of overall output now accounting for 10% - 11% of the UK economy.

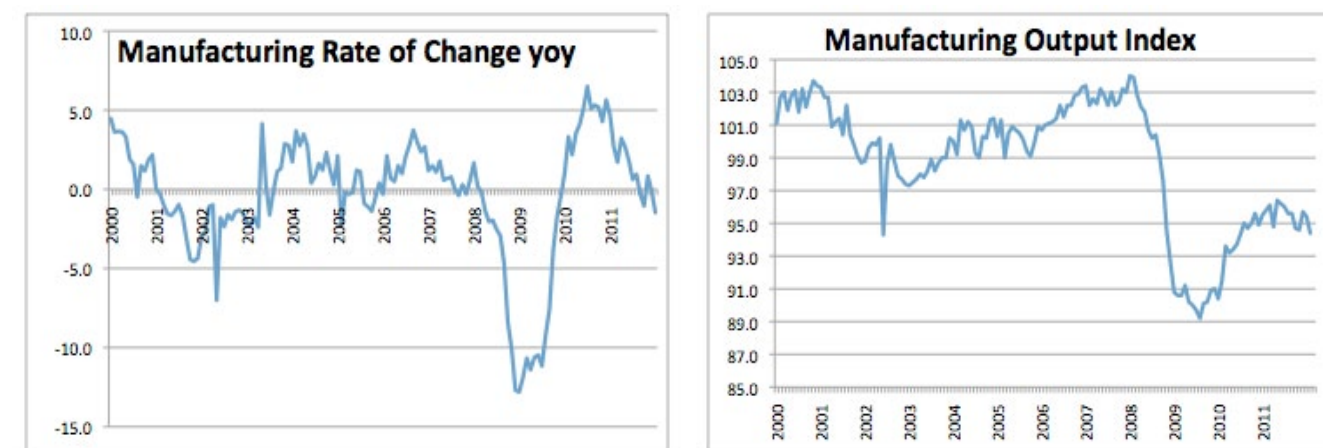
It is suggested the manufacturing sector can be stimulated in an attempt to “rebalance” the economy towards net export growth, higher investment and a move away from a dependency on household consumption. A lower value of sterling should assist in this process.

Some would argue that import substitution is also accelerated by relative lower domestic costs, the weakness of sterling, the increased labour costs in China, increased costs of transport as a result of the oil price increased plus the flexibility afforded to lead times by j-i-t just in time domestic manufacturing.

This is a pleasant fiction as historical and empirical observation demonstrates. Domestic manufacture is dependent on imports of raw materials, basic commodities, energy and semi-manufactures which are made more expensive by the depreciation of the currency. Exports have a high degree of import dependency and imports and exports are highly correlated.

It is not unusual for above average rates of growth in manufacturing to be experienced from time to time. As the rate of change chart demonstrates. Manufacturing experienced, a strong recovery in 2010 following the recession and set back in 2008, 2009.

However, into 2011 the recovery faded. Manufacturing output is still some 9% below the output peak of 2008. There is no march of the makers, rebuilding the workshop of the world. Recovery for the manufacturing sector is like falling off a cliff and waking from a coma. A recovery of sorts but still a long way off the top.



**There is no march of the makers rebuilding the workshop of the world. The manufacturing recovery is like falling off a cliff and waking from a coma. A recovery of sorts but still a long way off the top. JKA**

# Discussion Paper

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