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Contents	Page no.
Commentary on the economic situation	1
Research paper -	
The business cycle and share prices	3

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Slowdown in US money growth

New development puzzling, and slightly worrying, for the world economy in 2004

Recent slide in US money growth, despite 1% Fed funds rate

With Fed funds rate at a mere 1%, the American economy should be roaring ahead. People should be taking out mortgages to buy houses and companies should be borrowing from their banks to purchase assets (including other companies) on a spectacular scale. The resulting growth rates of bank credit and money should be so high as to strengthen balance sheets, and to motivate above-trend growth in spending and output. That was indeed the story in early 2003, when the typical annual rate of increase in M3 was 8%-10%. The buoyancy of M3 was part of the case for expecting a rebound in economic activity in late 2003, which has indeed occurred. But money growth declined heavily in late 2003. Although final numbers are not yet published for December, it seems plausible that the annualised rate of growth in the six months to December was a mere 1% - 1 ½%. On the same logic, the slide in M3 growth augurs badly for American economic activity in 2004.

Money growth has decelerated so sharply and for long enough to be a worry

Linkages between the quantity of money on the one hand and demand and output on the other should not be pressed too hard, particularly in the short run. However, in the long run the growth rates of money and nominal gross domestic product are undoubtedly related. How important are recent American money supply trends? A reasonable rule of thumb is that movements in very short periods (such as two or three months) are too minor to justify special comment. But – when a trend has been established for six months – it ought to colour forecasters' views. The current slowdown started in August and has now been at work for four to five months, long enough to deserve comment even if it is a bit early to be ringing alarm bells. Large monthly increases in the US money supply will be needed in early 2004 to remove anxiety about this relatively new development.

Explanation may be banks' response to Basel Accord discussions

The weakness in US money growth is something of a puzzle. Every year the *Federal Reserve Bulletin* carries an article on the banking system's profits and capital. The latest one – by Carlson and Perli in the June 2003 issue – was reassuring. Most US banks are financially robust, with the return on assets “reaching the highest level in more than three decades”. They are retaining a healthy proportion of high profits, enabling them to support future balance-sheet growth. The trouble may have arisen because the banks are preparing for the application of the Basel II capital standards or, at any rate, the diluted American version of those standards. On 4th August the four federal bank and thrift regulatory agencies in the USA published joint notices on the Basel Capital Accord, with a request for comment. Even so it is surprising that the banks should have reacted so swiftly to proposals which are far from finalization.

China's central bank relaxed about 20% money growth

It is probably still right to be positive about the world economy in 2004, but the recent surprising news on US money trends suggests the need for a little caution. Happily, the Chinese boom rolls on, with the People's Bank apparently relaxed about 20%-or-so growth rates of credit and money.

Professor Tim Congdon

30th December, 2003

Summary of paper on

‘How long will the bull market last?’

Purpose of the paper

After the big recovery in equities from March 2003, a key question for financial market participants is, “how long will the bull market last?”. The research paper uses a theory of the relationship between macroeconomic outcomes and the business cycle to answer this question.

Main points

- * The “output gap” can be defined as the difference between actual and trend output, where the level of trend output is that where unemployment is at the so-called “natural rate”. (See p. 3 for further explanation.)
- * A fair generalisation is that the *change* in inflation is a function of the *level* of the output gap, in line with ideas first proposed by Professor Milton Friedman in his 1967 address to the American Economic Association and now widely held.
- * A stylized four-stage theory of the business cycle can be built around this generalisation, with Stage Three (i.e., that with beneath-trend growth or falling output, a positive output gap and disappointing inflation news) having the worst macroeconomic outcomes. (See pp. 3 - 5.)
- * Unless investors are extremely well-informed about the link between the stages of a typical cycle and their macroeconomic results, the poor macroeconomic outcomes of Stage Three ought to translate into bad stock market performance.
- * The UK evidence in the last 40 years is clear-cut. Share prices fell in four of the five Stage Threes identified in the period. Share prices rose in every instance of the other three cyclical stages! (See p. 6.) The US evidence is less decisive. Three of the five Stage Threes identified in the last 40 years had rising share prices, while a few instances of the other three cyclical stages suffered falling share prices. But on average Stage Three was the worst for the stock market, as in the UK. (See p. 11.)
- * With US output probably still 1/2% to 1% beneath trend, the next global Stage Three - and so the next bear market - is several quarters away. (See p.11.)

This paper was written by Professor Tim Congdon. It was presented at the recent December quarterly seminar of Lombard Street Research’s UK service.

How long will the bull market last?

A theory of the relationship between the business cycle and stock market returns

2003 a good year for equities, but what about 2004?

2003 has been a satisfactory return for stock markets. In all the major equity markets prices are now higher than a year ago, while gains from the lows in early March often above 25%. The key question for investors now is, “how long will the bull market last?”. The purpose of this paper is to move closer to an answer by proposing a theory of the relationship between the business cycle and stock market returns. It will be suggested that a typical business cycle has four stages, in two of which macroeconomic outcomes are counter-intuitive. In one of these two stages macroeconomic outcomes are “unexpectedly” good and in the other “unexpectedly” bad. (1) It will be shown that – in both the UK and the USA – stock market returns are lower in the stage of bad macroeconomic outcomes than in the three other stages.

Analysis of equity returns to be related to a theory of the business cycle

The theory of how macroeconomic outcomes respond to the business cycle has appeared in this *Review* twice before. (2) The analytical fulcrum is the principle that the *change* in inflation depends on the *level* of “the output gap”, where the output gap is the difference between actual and trend output. This principle is a by-product of the acceleration-ist hypothesis advanced by Professor Milton Friedman in his 1967 presidential address to the American Economic Association. According to this hypothesis, the *level* of wage inflation is not a stable function of the rate of unemployment. Instead the *change* in wage inflation depends on the difference between the actual and so-called “natural” rate of unemployment. (Professor Phillips of the London School of Economics in a celebrated 1956 paper had assembled evidence that the *level* of wage inflation is a stable function of the unemployment rate. More rigorous statistical work in the late 1960s and 1970s supported Friedman’s view rather than Phillips’.)

The idea of “output gap” and its link with inflation

Friedman’s message in 1967 was that – if unemployment remained beneath the natural rate indefinitely – inflation would not rise and level out at a high level. Rather it would accelerate without limit. In the discussions which accompanied Friedman’s presidential address the focus was on the never-ending acceleration in conditions of over-full employment, but symmetry implied that inflation would decelerate and become deflation in conditions of very high unemployment. (3) The idea of the output gap grows readily from the natural rate framework. (4) An obvious extension is that output may be regarded as being at trend when unemployment is at the natural rate. Ideally, the role of other factors of production ought also to be recognised. If the capacity utilization rate in industry and the vacancy rate in the commercial property market are “normal” when unemployment is at the natural rate, the definition of trend output becomes more complete. (Of course, capacity

utilization in manufacturing may not necessarily be normal when unemployment is at the natural rate. The degrees of utilization of the factors of production may not always move in tandem. At any rate, some allowance for capacity utilization, vacancy rates in commercial property and so on helps in understanding how far output is from trend.)

Stylized account of the business cycle, with Stage One having good outcomes

It is also logical to generalise the relationship between the change in *wage* inflation and the divergence from the natural rate of unemployment into a relationship between the change in *price* inflation and the divergence of output from trend. A stylized account of macroeconomic outcomes in a “typical” business cycle can now be developed. For the purpose of the discussion, the starting-point is a cyclical trough in which output is beneath its trend level. Inflation has therefore to be falling. But neither the government nor the central bank wants inflation to become deflation. So policy is eased, with lower interest rates and fiscal expansion. Output grows at an above-trend rate. Despite the absorption of space capacity and declines in unemployment, inflation keeps on falling for some time, until the level of output has returned to trend. So Stage One of the cycle is characterised by a beneath-trend level of output (i.e., a negative output gap), an above-trend rate of output growth and a declining inflation rate.

Inflation starts to rise in Stage Two

Above-trend growth continues, as companies respond to buoyant demand by holding more stocks and increasing investment. The level of output goes above its trend level, perhaps by a wide margin, and inflation accelerates. Of course, the higher that output goes above its trend level, the more pronounced is the acceleration in inflation. Stage Two of the cycle sees an above-trend level of output (i.e., a positive output gap), an above-trend rate of output growth and a rising inflation rate.

THE OUTPUT GAP AND THE CYCLE

<i>Stage 1</i>	Above-trend growth, output gap negative, falling inflation
<i>Stage 2</i>	Above-trend growth, output gap positive, rising inflation
<i>Stage 3</i>	Beneath-trend growth, output gap positive, rising inflation
<i>Stage 4</i>	Beneath-trend growth, output gap negative, falling inflation

Stage Three sees poor macroeconomic performance,

Sooner or later the acceleration in inflation becomes unacceptable. Interest rates are raised, taxes are increased and the politicians curb public expenditure. The rate of output growth falls beneath its trend figure, unemployment starts to rise and capacity utilization weakens. (Output may even decline for a few quarters.) However, because the level of output remains above its trend level, inflation continues to accelerate. Stage Three of the cycle is marked by an above-trend level of output (i.e., a positive output gap), a beneath-trend rate of output growth (or falling output), and a high and possibly rising inflation rate.

before inflation again comes under control in Stage Four

Because inflation is disappointing, policy-makers must persevere with beneath-trend growth. Eventually the level of output again falls beneath trend and inflation starts to moderate. When output has only just dipped beneath its trend level, this moderation in inflation may be unconvincing and difficult to identify. Output growth may remain beneath its trend rate for some quarters or even years, until the decline in inflation is clearly established. Stage Four of the cycle has a beneath-trend level of output (i.e., a negative output gap), a beneath-trend rate of growth and a falling inflation rate. In due course inflation drops to a politically acceptable rate, monetary policy is eased, interest rates fall and the upswing in the first stage of the cycle returns.

Stages One and Three have counter-intuitive macro outcomes

The theory of the inflation and the business cycle outlined in the last few paragraphs builds on simple ingredients. Despite this simplicity, it has challenging and perhaps surprising results. Because of the dependence of the *change* in inflation on the *level* of the output gap, years of above-trend growth are not necessarily accompanied by rising inflation and years of beneath-trend growth may not experience falling inflation. In fact, two stages of the four-stage cycle need to be highlighted for their apparent departure from economic common sense. In Stage One above-trend growth is associated with good inflation performance and in Stage Three beneath-trend growth (or falling output) is associated with disappointingly high inflation. These are the two counter-intuitive stages mentioned earlier. As foreshadowed at the start of this paper, in Stage One the economic news is “unexpectedly” good and in Stage Three it is “unexpectedly” bad.

Surprising outcomes in these two stages may affect

The gap between investors’ expectations and outcomes is crucial to their behaviour. The length of the stages in real-world business cycles is extremely variable and defies loose generalisation. However, when the output gap is

investor sentiment

heavily negative and inflation is at a particularly low figure (or when the economy suffers deflation), Stage One may last for many quarters or even several years. Since this is the stage of unexpectedly good news, investors may be surprised – quarter after quarter, or even year after year – by a favourable gap between expectations and outcomes. Profits keep on advancing faster than national income, while interest rates are being held down by the benign inflation environment. As a result, Stage One ought to see an advancing stock market.

Stage Three should be the worst for stock market investors

The analysis has an entirely different message for Stage Three. This is the stage of unexpectedly bad news in which investors are hit by poor macroeconomic outcomes, weak profits announcements and worries about rising interest rates. Stage Three ought therefore to be accompanied by setbacks in share prices. If the theory of the relationship between the business cycle and macroeconomic outcomes is correct, and if investors respond to repeated disappointments by being willing to hold shares only at lower prices, Stage Three of the business cycle ought to be the worst for stock market returns.

Relationship between business cycles and stock market performance

In the UK

Stage of cycle	Quarter in which cyclical stage came to an end	Values of output gap in successive peaks, zero intersects and troughs in business cycles, as % of trend output	Summary of stock market experience in different cycle stages	
			Level of FT all share at end of previous stage	Change in FT all share during stage, %
Cycle 1	1	1964 Q1	104.16	
	2	1964 Q3	108.13	3.8
	3	1966 Q3	96.98	-10.3
	4	1967 Q4	121.64	25.4
Cycle 2	1	1971 Q3	180.1	48.1
	2	1973 Q1	196.95	9.4
	3	1974 Q4	72.2	-63.3
	4	1975 Q3	135.18	87.2
Cycle 3	1	1977 Q3	210.88	56.0
	2	1979 Q2	264.34	25.4
	3	1980 Q1	249.13	-5.8
	4	1981 Q2	319.74	28.3
Cycle 4	1	1986 Q1	729.09	128.0
	2	1988 Q4	940.37	29.0
	3	1991 Q1	1099	16.9
	4	1993 Q1	1384	25.9
Cycle 5	1	1997 Q1	2089.9	51.0
	2	2000 Q4	3018.63	44.4
	3	2003 Q2	1931.81	-36.0

An assessment of the evidence requires four cyclical stages to be identified

Does this theory hold in practice? The evidence was reviewed for two countries, the UK and the USA. In order to answer the question, a vital preliminary exercise is to identify and date the stages in the business cycles in the two nations. The data were examined from 1964 Q1 to 2003 Q2 in the UK case and from 1961 Q1 to 2003 Q2 in the US case. A cautionary comment is needed, that the identification of the cyclical stages is to some extent subjective. Output sometimes stays so close to trend over periods of several quarters that no clear cyclical fluctuation is to be found, while several successive quarters of above- or beneath-trend growth are unusual. Nevertheless, the record of output growth is not so far from the four-stage cycle as to make it a caricature of reality. It is unlikely that other analysts' views on the cyclical structure of the periods would be all that different from the one taken here.

The UK had (almost) five cycles between 1964 and 2003

In the UK the 1964 Q1 – 2003 Q2 period had three complete cycles and two incomplete cycles. (The incomplete cycles are at the beginning and end of the period. The latest incomplete cycle is the current one, where the level of output is judged to have been beneath trend in Q2 2003 but still to be suffering beneath-trend growth, i.e., the economy was then in a Stage Four the end of which was not known.) So the 39-year period contained five Stages Two and Three, and four Stages One and Four. What was the performance of the stock market in these stages?

The theory works well, at a casual-empirical level

The evidence is set out in the table on p. 6, where the FT all-share index is taken as the measure of share prices. *Four of the five Stage Threes had lower share prices at the end than at the beginning. By contrast, not one of the five Stage Twos, or of the four Stages One and Four, experienced an equity bear market!* This represents confirmation of the theory at the casual-empirical level required for most market operators. (5) As envisaged in the earlier discussion, poor macroeconomic outcomes did coincide with sliding equity markets. Indeed, a case could be made that the only Stage Three which broke the general rule (i.e., that between 1988 Q4 and 1991 Q1) was special, because it had been preceded by the stock market crash of October 1987. Share prices were in fact lower in 1991 Q1 than in 1987 Q2.

Stage Three clearly the worst for UK equities

The numbers can also be presented in average terms, on two different bases. First, on average UK equities fell by almost 20% in the five Stage Threes, whereas on average they rose in all three other stages. It is particularly

interesting that, on this criterion, the best cyclical phase was Stage One. Stock market buoyancy early in the cycle is in accordance with the argument of this paper, as Stage One has the most positive macroeconomic news. Secondly, an allowance needs to be made for the varying lengths of both the cycles and the cyclical stages. The average change per quarter during the five Stage Threes was minus 2.8%, whereas the average change per quarter in Stage One was plus 5.0%, in Stage Two plus 2.5% and in Stage Four plus 10.8%. (The difference in ranking between the average change per cycle and the average change per quarter stems largely from the effect of the length of the big bull market from 1982 Q1 to 1988 Q1.)

US data also agree with theory, although much less clearly

The USA's experience also agrees with the ideas proposed here, although the fit between theory and reality is less compelling. The 1961 Q1 – 2003 Q2 period had five complete cycles. With the equity market measured by the S & P 500 index, two of the five Stage Threes had lower share prices at the end than at the beginning. But – in contrast with the UK – some other stages also suffered that fate. Indeed, both Stage Two and Stage Four again had two of their five representatives in the 42-year period having lower share prices at the end than at the beginning. The iniquity of Stage Three therefore appears to be far less obvious in the USA than in the UK. (Note that in the USA Stage One delivered positive equity returns in all five cycles, as in the UK.)

Average change per quarter in Stage Three negative in USA, but positive in three other stages

However, if the cyclical stages are once more analysed in terms of their average characteristics, Stage Three proves clearly to be the worst in the USA, as in the UK. In the USA on average every cyclical stage had positive share prices, but in Stage Three it was insignificant (plus 0.9%). Stage Three was left behind by the average gains in Stage One (30.2%), Stage Two (32.9%) and Stage Four (8.6%). Meanwhile the average change per quarter in Stage Three was negative (at minus 0.5%), whereas the average quarterly movement in the three other stages was positive, although in Stage Four it was positive by only 0.7%. A fair conclusion seems to be that the theory “works” in the USA, but less decisively than in the UK. The explanation may be that, as the USA's cycles have been both more damped and more regular than the UK's, American investors have been more willing to override cyclical conditions in their portfolio decisions than their British counterparts.

Further work needed

More rigorous work, covering more countries and over longer periods, is needed to corroborate (or to refute) the theory being advanced in this paper.

But there is an obvious logic in both

- the relationship between the cyclical structure of the economy and the growth/inflation outcomes, and
- the relationship between the growth/inflation outcomes and the behaviour of equity prices.

Suppose it is accepted that Stage Three of the “typical” business cycle (i.e., the stage with a positive output gap and beneath-trend growth [or falling output]) is bad for share prices. What is the message for equity markets over the next year or two?

At present output gap in the USA is negative, perhaps by 1%

The USA’s stock market is of course far more important for global trends than the UK’s. In this context the crucial point is that the USA’s output has been and probably remains beneath trend, even if the size of the negative output gap is a matter for debate. At the time of writing (i.e., October 2003 reported in November) the unemployment rate is 6.0%, while the Federal Reserve’s capacity utilization index stands at 75.0. The natural rate of unemployment is usually put at 5% - 5 ½% and the average value of the utilization index between 1972 and 2002 was 81.3. (A favourite rule-of-thumb of US business economists is that inflation accelerates only when the capacity utilization index is above 83.) Further, many types of commercial real estate are in over-supply. A reasonable assessment might be that the USA’s output is ½% to 1% beneath trend.

Q3 strength reduced negative output gap

An important counter-argument is that the 8% annualised growth rate recorded in Q3 has eliminated much, or even all, of the negative output gap. Most estimates were that output was 1% - 1 ½% beneath trend in early 2003. Assuming a trend annual growth rate of 3%, the trend quarterly growth rate is of course ¾%. An annualised 8% growth rate in one quarter implies a 2% output jump in that quarter. If ¾% is deducted from 2%, the reduction in the negative output gap in Q3 was 1 ¼%, i.e., the entire negative gap in Q2! There is no simple answer here: the matter is for debate and discussion. Gap-ology is not an exact science. (Lombard Street Research’s International Service tracks output gaps in all the leading economies in its monthly publication, *Global Leading Indicators*.)

In the latest cycle the US negative output gap was at its largest in Q1 and Stage Four seems to have ended in Q2 2003. The second half of 2003 has

If Stage Two lasts eight quarters in USA, next Stage Three still distant

plainly enjoyed above-trend growth and there is a good chance that output will go above its trend level in the first half of 2004. That would imply a Stage One, in a new cycle, running from 2003 Q2 to 2004 Q2 or Q3. The length of Stage Two can only be surmised from the current vantage point, as it will depend on the rate of growth in late 2004 and 2005 and the level of the positive output gap at the next cyclical peak. The average length of Stage Two in the five cycles in the 1961 – 2003 period was eight quarters. If the typical pattern were to be repeated, the next Stage Three – and so the next phase of seriously rising inflation and tightening monetary policy – would be in early 2006.

Relationship between business cycle stages and stock market performance

In the USA

<i>Stage of cycle</i>	<i>Quarter in which cyclical stage came to an end</i>		<i>Values of output gap in successive peaks, zero intersects and troughs in business cycles, as % of trend output</i>	<i>Summary of stock market experience in different cycle stages</i>	
				<i>Level of S & P 500 at end of previous stage</i>	<i>Change in S & P 500 during stage, %</i>
	4	1961 Q1	-3.9	64.1	
Cycle 1	1	1964 Q1	0.5	78.8	22.9
	2	1966 Q1	3.9	88.9	12.8
	3	1969 Q4	0.4	91.1	2.5
	4	1970 Q4	-2.8	90.1	-1.1
Cycle 2	1	1972 Q2	0.3	108	19.9
	2	1973 Q2	3.5	104.8	-3.0
	3	1974 Q2	0.4	89.8	-14.3
	4	1975 Q2	-4.3	92.4	2.9
Cycle 3	1	1977 Q2	0.2	99.3	7.5
	2	1978 Q4	4	96.1	-3.2
	3	1980 Q2	-0.1	114.6	19.3
	4	1982 Q4	-6	139.4	21.6
Cycle 4	1	1984 Q2	0.3	153.1	9.8
	2	1989 Q1	2.9	292.7	91.2
	3	1990 Q4	-0.1	328.75	12.3
	4	1993 Q3	-2.1	459.2	39.7
Cycle 5	1	1997 Q2	0.1	876.3	90.8
	2	2000 Q2	3.1	1462	66.8
	3	2001 Q2	0.1	1238.7	-15.3
	4	2003 Q2	-1.2	988	-20.2

Cyclical analysis - although not valuations - positive for equities in early 2004

All forecasting of financial markets is rough and ready, whatever its pretensions to computer-based accuracy. This particular exercise in financial forecasting is very approximate and should not be pressed too far. But a reasonable comment is that – unless early 2004 sees a runaway boom which takes US output far above trend by next autumn - the next Stage Three is over two years away. If so, it would be a mistake to worry about a bear market in 2004. The historical record shows that the USA did not have a major bear market in any cyclical Stage Two in the four decades to 2003, which reinforces a sanguine view on equity markets in the next few quarters. However, critics of the analysis may protest that the level of valuations – as well as the stage of the business cycle – is relevant to any prognosis on equity markets. Without question the American stock market remains extremely expensive by past standards. The next Stage Three, like the Stage Three in the year to mid-2001, is likely to be painful for US equity investors. Equity markets in the rest of the world may be able to de-couple from those in the USA, but it would be unusual for them to go in an entirely opposite direction.

Change per quarter in US equities during the four cyclical stages, 1961 - 2003

<i>Stage 1</i>	+ 2.8%
<i>Stage 2</i>	+ 2.1%
<i>Stage 3</i>	- 0.5 %
<i>Stage 4</i>	+ 0.7 %

Notes

(1) The word “unexpectedly” is put in quotation marks, because anyone familiar with the theory ought not be surprised. Some economists may protest that the remarks in the text are inconsistent with the theory of “rational expectations”. But they are not inconsistent with the different and much more compelling idea of economic rationality. Implicitly, economies have large numbers of agents who have only a weak understanding of the relationships between macroeconomic variables. This would be entirely rational for most agents if the expected marginal returns on “investment in macroeconomic understanding” were equalised with the expected marginal returns on investment in other activities at an appropriately low level of macroeconomic understanding. “Investment in macroeconomic understanding” would include – for example – subscribing to the services provided by Lombard Street Research. Despite the considerable value of these services, only a tiny fraction of the UK’s – or the world’s – economic agents actually subscribe for them. The very low number of Lombard Street Research subscribers may be a symptom of economic irrationality, but views on the matter differ. A fair comment is that the research paper denies that the theory of rational expectations is of any significant help in understanding real-world cyclical volatility and asset price fluctuations.

(2) The theory was advanced in the research papers in the February 1993 and November 1997 issues of the *Review*. In 1993 the *Review* was called the *Gerrard & National Monthly Economic Review*, as Lombard Street Research was at that time a subsidiary of Gerrard & National. (See ‘Better economic prospects in the mid-1990s’, pp. 3 – 12, in February 1993 issue of *Gerrard & National Monthly Economic Review* and pp. 3 – 12, in November 1997 issue of *Lombard Street Research Monthly Economic Review*.)

(3) The hypothesis – subsequently corroborated by statistical tests – is that, because people alter their inflation expectations with a change in inflation, inflation accelerates without limit when unemployment is beneath a so-called “natural rate”. At the natural rate the demand for and supply of labour are balanced, and there is no tendency for the inflation rate to rise or fall.

(4) The concept of the “output gap” is still a little fuzzy. The sixth edition of a leading textbook on *Macroeconomics* by Rudiger Dornbusch and Stanley Fischer (published by McGraw-Hill in 1994) states on p.15 that the output gap is potential output minus actual output, after defining potential output as “full-employment output”. The Dornbusch and Fischer definition of the gap is common, but two problems arise. First, the assimilation of potential output with full employment is controversial. In the author’s view, the more normal usage takes “potential output” to be that level of output at which unemployment is at the natural rate. In accordance with Friedman’s ideas, that is the level with stable inflation. Secondly, the Dornbusch and Fischer definition has the consequence that - in those rare periods when output is above “potential” (by which is apparently understood some notion of maximum output) - the output gap is negative. So a very high level of output attracts the label of a “negative” output gap.

In its calculations of the output gap the OECD seems to have adopted the natural-rate-of-unemployment concept of potential output, not the full-employment concept, and to have defined the gap as actual output minus trend output. Reference to the awkward idea of potential output (which requires the measurement of “maximum output”) is thereby avoided. Lombard Street Research follows the OECD convention.

(5) To claim that a theory works “in casual-empirical terms” may not satisfy many people. The sample is very small, with only three complete cycles. In econometric testing, the smallness of the sample would almost certainly prevent a relationship “significant at the 5% level” from being identified. But that raises the question of the level of statistical significance relevant to the exercise. Most market participants would be happy to be right three times out of four or even two times out of three; they do not need a relationship significant at “the 5% level”. Criteria of statistical significance need to be related to circumstances. In the words of Robert Matthews (in an article on ‘Flukes and flaws’ in the November 1998 issue of *Prospect*), “data must take account of context, of prior knowledge and plausibility”.