Tracking Macroeconomic Responses to Accumulated Alpha and Changing Currency Dominance

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This paper examines the empirical outcomes of the policies of nine monetary authorities (eight OECD nations and the Euro zone) so as to infer the strength and stability of the economic relationships behind those policies. Governments, responding to earlier rampant inflation, have in recent decades avowed to pursue monetary policies to maintain inflation at a low stable rate. In recent decades, the relationship between inflation and money supply, that is postulated in the received wisdom and confirmed by decades of observation, appears to be breaking down. In examining possible causes of this instability, this paper sees on-going changes in the velocity-of-money to be less plausible than shifting dominance in world currencies or the creative destruction of technological progress. This paper suggests the relative monetary stability of recent decades may be less achievable in the future.

INTRODUCTION

In the closing decades of the 20th Century, after many Central Banks adopted policy stances that were consistent with Monetarist *price-stability*, Monetarism was widely credited with wrestling inflation down to single-digit levels. Once inflation was seen as a tamed force, maintaining non-zero inflation rates (typically, 2.0 % ± 2.0 %; Aiyagari, 1990 and 1991; Bank of Canada, 2005) were endorsed as a way to accommodate the down-ward stickiness in prices, wages, physical/human capital and employment tenure that is inherent in most modern economies and to allow competition in terms of real prices. Monetarism is currently in ascendance over *Keynesianism* (i.e. employment issues) and *productivity norms* (Dowd, 1995, 717-718).

Monetarism is buttressed by their finding of 100 years of stability in Fisher's money-supply-and-inflation theorem (Friedman and Schwartz, 1982). This paper assesses the stability of that relation in the 30 years subsequent to the period reviewed in the Monetarist studies.

The inflationary response to changes in broad money supply in eight OECD nations and the Euro–zone were considered—per Table 1 and Figures 1 and 2, it was found that:

- Australia and the UK are continuing aggressive monetary expansions that started in the mid to late 1980's. A common monetarist view suggests that these expansions should fuel run-a-way inflation — however, inflation in both countries over the last decade (1995 o 2005) was in the target range of 2.0 % ± 2.0 % (i.e. for Australia: 2.12 % and 3.33 %; And for the UK: 2.80 % and 1.92 %).
- The Euro started in 1998 and, after three relatively conservative years, its monetary authorities have become more aggressive in expanding the Euro (i.e. almost as Aggressive as Australia's monetary authorities). During 2000-2005, inflation in the Euro zone averaged 2.36 % per year, even though the inflation pressure per Fisher's money theorem would suggest rates of 5.59 %.
- Japan and Switzerland are continuing significant monetary expansions. Earlier efforts, in Japan, to maintain stable money growth (during the 1990's) appear to have been rewarded with a decade of deflation—a recent aggressive expansion of Japan's money supply, which may have been directed at re-inflating its economy, faltered in 2003 and it again suffered deflation in late 2005 and early 2006. On average, Japanese prices declined 0.40 % per year during 2000–2005 and Swiss prices increased by a minimal 0.88 % per annum.
- Sweden, Denmark and Canada, from 1983 to 2000, have pursued conservative monetary policies interspersed with extended periods of monetary contraction, but have had mixed outcomes in lowering inflation. All three have, since 2001, pursued much more aggressive monetary expansion with little effect on inflation, as yet. Average Inflation from 2000 – 2005 in these three countries were, respectively: 1.53 %, 1.96 % and 2.38%.
- The USA appears to have pursued a conservative monetary policy, since the late 1980s—with little visible contrast between its inflation rates and those of its trading partners. The average CPI changes in the USA from 1995-1999 and 2000-2005 were, respectively: 2.53 % and 2.64 %.

Thus, eight of nine monetary authorities reviewed have at times pursued and/or are pursuing mild to aggressive monetary expansion. However, the inflation profile in each of those nations/zones is surprisingly similar—both to each other and to the USA which until recently pursued a contractionary to stable monetary policy. The generally accepted notion of inflation being tightly related to changes in the money supply is not reflected in Figure 1. Specifically, after 1994, the annual CPI changes in the regions are moving along a relatively narrow band. Thus, there appears to be little difference in the long-run inflation outcomes of nations with significantly different monetary-expansion profiles (Table 1).

After considering the unexpected outcomes of these monetary-policies, this paper suggests that the traditional linkage between money supply and inflation is being buffeted by changing economic realities and counter balancing effects—such as:

a) An ongoing repatriation of US dollars (i.e. as foreign reserves and other US dollar holdings are partially swapped-out for other strong currencies), and/or
b) A growing need to offset a deflation vector caused by advancing technology favouring a succession of developed, emerging and developing nations (e.g. the UK, USA, Japan, Germany, the Asian Dragons, China, Brazil, India) with ever lower production costs, and/or
c) An ever growing number of industries adjusting to the realities of precipitous cost declines and output increases.

After a brief literature review and discussion of the methodology and model development, this paper lists and analyzes the findings to form conclusions and to suggest directions for future research.

LITERATURE REVIEW

Much of the received literature on the relationship between money supply and changes in price level is far too complex and extensive for the simple analysis in this study. While inventory and interest rates have important effects on the money supply and inflation relation, this study seeks to minimize inventory effects by using the broadest available measure of money supply and interest-rate effects are assumed to be subsumed in the measure of money supply changes.

This paper focuses purely on the linkage between broad-money supply and changes in price levels. As such, this paper uses a variant of the elegantly simple Fisher relationship (Laidler, 1969; Graham, 1988; Evans Lewis, 1995; Crowder and Hoffman, 1996) to evaluate the strength and the stability of the economic relationships supporting the policies being applied in the nine monetary zones under review. This paper is focused on the basic Fisher Relationship—Monetarists found a stable relation for a span of over 100 years (Friedman and Schwartz, 1982). An extensive literature and analysis flows from Fisher's money model on using rates to control the money supply. While this work is important, interest-rate effects, by definition (i.e. as an intermediary control-mechanism), are in the money supply measurement and, as such, are irrelevant to a review of the current dependability of Fisher's Relationship.

While there are many more complex models of money demand Fisher's *Transactions Demand for Money* (Laidler, 1969; Kennedy, 1975; Munro, 2004) is elegant in its simple focus on the long-run economic flows at issue in this paper:

$$M = PT/V \qquad (1)$$

M = money supply = money demand in equilibrium
P = price level
T = transactions in the economy
V = velocity of [money] circulation

Equation (1) is based on an assumed long-run *money-supply-and-money-demand* equilibrium — short-run inventory effects (speculative and precautionary balances are treated as white-noise). However, the elegant simplicity of this money model does not pass-through to the complications of defining what to measure and how to measure it. Specifically
:

1) **Money Supply** is defined through a continuum from narrow to broad.[i] This paper uses the broad money definition used by the Economist in its *Economic and Financial Indicators* tables (1983-2005) to avoid the complex irrelevancies of substitutions between the various types of money.
2) **Prices** vary over time and there are a plethora of indices to measure that change—this paper uses the Consumer Price Index (CPI) as reported by the Economist in its *Economic and Financial Indicators* tables (1983-2005).[ii]
3) **Transactions** are measured using money as the unit of measure. This paper uses Gross Domestic Product (GDP). While Gross National Product (GNP) is also a good measure of annual transactions, a number of problems with GNP (Pass et al., 1991, 221-222) make GDP a preferred measure.
4) **Velocity of Circulation** measures "…the average number of times each money unit is used to purchase the year's output…" (Pass et al., 1991, 544). Keynesian economists assert *Velocity* can change rapidly and Monetarists assert that *Velocity* is stable or changes only slowly over time.

Velocity (V) can be defined as mainly a function of the *Transactions Demand for Money* with some inventory considerations:

$$V = f(i, \pi, \rho, \Psi, Ç, \omega) \quad (2)$$

i = nominal interest rates; $\delta V/\delta i > 0.0$
π = actual & expected inflation; $\delta V/\delta \pi > 0.0$
ρ = money-shortfall risk; $\delta V/\delta \rho < 0.0$
Ψ = foreign money holdings; $\delta V/\delta \Psi < 0.0$
Ç = grey and black-market activities are intensive users of cash; $\delta V/\delta Ç < 0.0$
ω = counterfeiting, where $\delta V/\delta \omega > 0.0$

While a constant *Velocity-of-money* is assumed in the following analysis, Velocity changes are one of several effects evaluate as a potential cause for the observed irregularities in relationship between inflation and money-supply increases.

METHODOLOGY & MODEL DEVELOPMENT

The data in this study is drawn from the mid- and end-of-year "Economic and Financial Indicators" tables in the Economist. This data provides a cross-sectional and time-series consistency that is lacking in many more sophisticated data bases. Data was drawn on nine monetary authorities—Australia, Britain (UK), Canada, Denmark, Japan, Sweden, Switzerland, Euro Area, and USA)—the data series, started in May/83 and continuing to Jul/05, is tabulated in a database (available upon request) and are graphed in Figures 1 and 2.[iii] [iv] The Danish series started in 1993 and the Euro Area series started in 1998. The relationships analyzed in this paper include:

$$\delta M^{\sim} = [(1+\delta CPI)(1+\delta GDP)/(1+\delta V)] - 1 \quad (3)$$

$\delta M^{\sim}$ = inflation neutral change to M_3

Velocity estimates are an eternal source of conflict between neoclassical economists, Keynesians, and Monetarists (Piece and Shaw, 1974; Kennedy, 1975, 86; Dornbusch and Fischer, 1981, 240; Munro, 2004, 93). Assuming a constant *Velocity* allows the analysis to focus on the relationship between inflation and effective changes to the money supply. If δV is nil, eqn (3) simplifies to:

$$\delta M^{\sim} = (1 + \delta CPI)(1 + \delta GDP) - 1 \quad (3a)$$

According to the *Transaction Demand for Money* model, when *Velocity* is constant, money-illusion does not exist, and markets are perfect (i.e. frictionless—all transactions are costless, instant, and between perfectly-informed equals), eqn (3a) can be reorganized to:

$$\Pi = \delta CPI = (1+\delta M)/(1+\delta GDP) - 1 \quad (4)$$

Π = annual contribution to inflationary/(deflationary) pressure

However, it is well documented (Friedman, 1976, 229-232; Lipsey, et al., 1988, 779-788) that money illusion, transaction costs, friction and other effects delay inflation/(deflation). Thus, in

the short-run, Π is unlikely to equal δCPI and a measure of the difference is needed—when eqn (4) is adjusted for the actual inflation rate, the result is:

$$\alpha = (1+ \Pi)/(1+\delta CPI) - 1 \quad (5)$$

α = unrealized contribution to inflationary/(deflationary) pressure[v]

Also, a measure is needed of total accumulated inflationary/(deflationary) pressure.

$$\Omega_n = [(1+\alpha_{t+1})(1+\alpha_{t+2})(1+\alpha_{t+3})\ldots(1+\alpha_{t+n}) - 1 \quad (6)$$

Ω = accumulated unrealized inflationary pressure (the α)
n = number of periods after the index t

MONETARY MANAGEMENT IMPLICATIONS

Several policy approaches are suggested from the elegant simplicity of Fisher's relation:

Productivity Norms—the notion that prices (P, eqn (1)) should freely float with productivity (T) changes, first advocated by Baily (1837) has been backed by such leading lights of economics as: Marshall, Edgeworth, Giffen, Pigou, Davidson, Robertson, Lindahl, Myrdal, Mises, Hayek, Machlup, Taussig, Koopmans, Laughlin, Mints, Newcomb, and Warburton (Selgin, 1990, 270-271). Productivity Norms lost favour to Keynesian employment goals, in the 1930s, but appeared to have some regained favour as Keynesian policies were discredited in the closing decades of the 20th Century (Selgin, 1988, 1990, 1991 and 1995).

Many arguments pro (Selgin, 1990 and 1995) and con (Dowd, 1995), on the viability of Productivity Norms, focus on equity, fairness and efficiency in allocating the benefits and costs arising from productivity changes. Such theoretical issues are important, but they are above and beyond the empirical considerations of this paper. A structural issue, important to what is being examined in this paper, is that modern economies tend to have ratcheting mechanisms that make many prices downwardly sticky and, would thereby, defeat many of the benefits attributed to the Productivity Norm of expected annual price declines of one to three percent (Selgin, 1988, 62).

A low-stable-inflation variant of **stable-price levels** is the policy of choice for most monetary authorities. The basic policy mechanism involves controlling the money supply (M in eqn (1)) via interest rates and/or other policy tools.

Monetary authorities seeking price stability would adjust the money supply according to eqn (3a) to maintain a neutral inflation/(deflation) pressure and eqns (4), (5), and (6) would tend toward nil. However, the *low-stable-inflation*, now sought by many monetary authorities (i.e. 2.0 % ± 2.0 %), results in short-run monetary policies set so that eqn (4) becomes:

$$0.0\ \% \leq \Pi = \delta CPI \leq 4.0\ \% \quad (4a)$$

And intermediate- to long-run, policies set for an inflation pressure that tends toward 2.0 percent:

$$2.0\% \approx [(1 + \Pi_{t+1})(1 + \Pi_{t+2})(1 + \Pi_{t+3}) \ldots (1 + \Pi_{t+n})]^{(1/n)} - 1 \quad (7)$$

f the Fisher *Quantity Equation of Exchange* (eqn (1)) is valid, money *Velocity* will be constant and monetary policy lags reasonably short (e.g. a few years) then:

$$2.0\% \approx [(1 + \delta CPI_{t+1})(1 + \delta CPI_{t+2})(1 + \delta CPI_{t+3})\ldots(1 + \delta CPI_{t+n})]^{(1/n)} - 1 \quad (8)$$

and eqn (6) becomes:

$$\Omega_n \rightarrow 0.0\ \% \quad (6a)$$

Velocity of money could theoretically be used as an intermediate goal/tool of monetary policy. However, it would likely prove too elusive to be of practical use (e.g. easy substitutability from one type of money to another makes controlling the Velocity of any one type of money of little or no value). This paper uses the Monetarist view of Velocity being stable or changing only slowly over time. Further, while controllable variables may spur a desire for Velocity changes, actual changes tend depend on less uncontrollable factors—e.g. technology and extant communications systems.

EMPIRICAL RESULTS AND ANALYSIS

Table 1 shows the post 1995, the 2.0 % ± 2.0 % inflation target was achieved by eight of the nine monetary authorities reviewed—Japan suffered persistent deflation during 2000 to 2005 (e.g. an effective CPI rate of -0.40 % per annum). While, the average inflation pressure in the eight monetary authorities that met the inflation target nations/regions is very different (Table 1 and Figure 1), the post 1995 inflation profiles are so similar that it is difficult to separate the national trends out in Figure 1. This outcome is disturbing in that it suggests that eqn (4) is unreliable as a predictor of inflation and, unless the velocity of money is moving in opposite directions and at different rates across the economies of the nine monitory-authorities reviewed, implies that the long-run predictive power of Fisher's Money Model–i.e. the long-term relationship between money supply and inflation (eqn (1)) is suspect. Specifically, the inflation pressure in Australia and the UK were much greater than that in the USA but the inflation rates were similar. Further, in the recent past, there has been low inflation and deflation in Japan (Figure 1) even though it was relatively aggressive in expanding its money supply (Figure 2). These outcomes imply that money supply and inflation may no longer be tightly linked or the model is missing a link—e.g., changes to the Velocity of money or other effects are extinguishing or soaking-up part of the money supply.

TABLE 1:
AVERAGE CPI AND EFFECTIVE (FISHER) INFLATION PRESSURE DURING FOUR PERIODS (1983-2005)*

Monetary Authority	EFFECTIVE AVG. ANNUAL δCPI (EQN (8)):				INFLATION PRESSURE $[(1+\Pi_N)^{(1/5)}]$ (EQN (7)):			
	83-88	**89-94**	**95-99**	**00-05**	**83-88**	**89-94**	**95-99**	**00-05**
Australia	7.91	4.06	2.12	3.33	9.43	8.51	3.92	7.63
Britain (UK)	4.48	5.29	2.80	1.92	11.81	9.71	5.38	5.90
Canada	4.48	3.14	1.83	2.38	2.14	5.28	1.51	4.87
Denmark	na	na	2.33	1.96	na	na	***(0.12)***	5.20
Japan	1.83	2.11	0.25	***(0.40)***	4.56	2.07	2.42	0.76
Sweden	6.60	5.95	1.08	1.53	3.56	7.21	2.74	1.67
Switzerland	2.59	3.75	0.93	0.88	4.14	3.88	1.88	3.40
Euro Area	na	na	Na	2.36	na	na	na	5.59
USA	3.46	3.88	2.53	2.64	4.83	***(0.26)***	2.50	3.93
Average	4.48	4.03	1.98	1.84	5.78	5.20	2.53	2.25

* NB: Due to data limitations, this study uses three six-year periods and one five-year period.

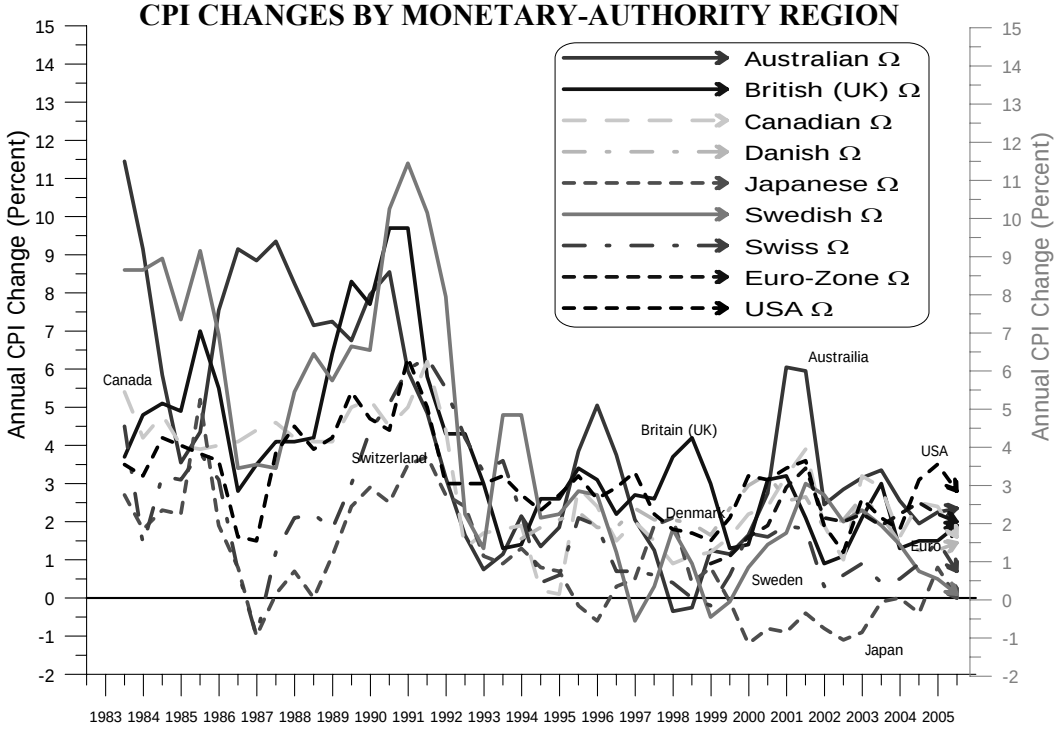
Regardless of any public policy statements, from Table 1 and Figures 1 and 2, it is clear that in real terms (e.g. eqns (4) through (5), after adjusting for increases in GDP and CPI):

- ☑ A zero inflation policy is not being achieved by any of the monetary authorities reviewed;
- ☑ Australia, Britain, Canada, Denmark, and the USA appear to have moved to a 2.0 % inflation policy after 1995—the Euro Zone appears to be following a similar policy;
- ☑ Switzerland, Japan, the Euro Zone, Australia, and Britain are, in rising order of aggression, pursuing expansionist monetary policies.
- ☑ The inflation levels in Switzerland, Japan, the Euro Zone, Australia, and Britain and are not consistent with their monetary expansion,
- ☑ Sweden, Denmark, and Canada have switched from contractionary monetary policies to expansionary monetary policies (Figure 2).
- ☑ The USA, in relative terms, significantly contracted its money supply; and
- ☑ The inflation levels in the USA are not consistent with its monetary policies.

It is clear from Table 1 and Figures 1 and 2, that:

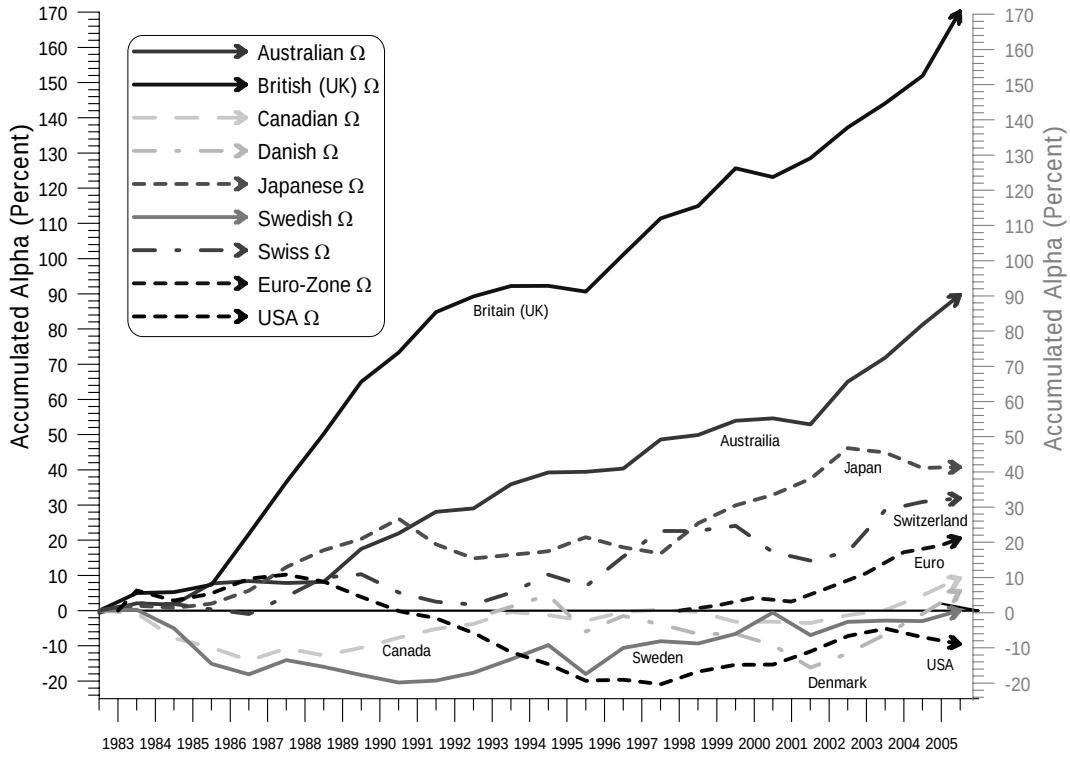
- ☑ There was relatively high inflation in the economies of Australia, the UK, Canada, and Sweden prior to and during 1983-1988;
- ☑ Except for the USA and Denmark, something is, and has for a long time been, soaking up/ diverting inflationary pressure from aggressive monetary expansion. In particular, Australia and the UK should, according to the current received wisdom, be heading into massive inflation; and
- ☑ Something appears to be driving Japan's economy into deflation, even though they are maintaining an expansionary monetary policy.

FIGURE 1:
CPI CHANGES BY MONETARY-AUTHORITY REGION



Source: The Economist 26 Jun/83 to 01 Jul/05

FIGURE 2:
ACCUMULATED ALPHA BY MONETORY-AUTHORITY REGION



Source: The Economist 26 Jun/83 to 01 Jul/05

Currency Repatriation

A possible explanation for a softening link between inflation and money supply changes is that vast amounts of US dollars are being repatriated to the US as other monetary authorities reduce their holdings of US dollars as reserves to back their currencies and increasingly their use of a basket of other hard and semi-hard currencies (Economist, 01 Oct, 2005; Chinn and Frankel, 2005; Eichengreen, B., 2005). This process increases the Velocity of US dollars (i.e. money in reserves has a near zero velocity) and other nations and the Euro-zone experience a declining Velocity as the share of their currencies is increased in other reserve baskets.

Japan is another interesting situation—modest real expansions of their money supply appear to be accompanied by deflation rather than modest inflation. This outcome may be due to velocity declines caused by an increased representation of Japan's currency in foreign reserves—e.g. Asian Central Banks increased Japanese Yen holdings from 13.9% to 17.5 %, during the 1980s (Tavlaz and Ozeki, 1992).

Importing Inflation

Denmark experienced inflation rates from 1983-2001 that appear to be unrelated to what was (then) a contractionary monetary policy (Figure 1). After 2001, Denmark pursued an aggressive expansionary monetary policy and, paradoxically, falling inflation rates. As a small open economy, Denmark is restricted in its ability to influence the inflation it imports from its trading partners and from commodity price shocks (e.g. the oil shocks in the early 1980s).

Productivity Gains

In the absence of money supply changes, productivity gains result in a price decline "…of between one and three percent per year...in normal times" (Selgin, 1988, 62). However, productivity (as evidenced by two centuries of rising World per capita GDP—Wright and Gradojevic, 2006—and a centuries of rising computation power—Wright and Dawood, 2005) is showing double-exponential -growth. This growth rate progression implies that Selgin's estimates of a steady state growth rate of "…one to three percent per year" may be far too conservative.

The Midas Plague (Pohl, 1954; Wright and Gradojevic, 2006) involves deflationary effects from technical advances favouring a succession of developed, emerging and developing nations (UK, US, Japan, Germany, the Asian Dragons, China, Brazil, India, and so forth) with ever lower-cost production and/or a rising number of industries that have to adjust to the realities of precipitous cost declines and output increases. The micro-effects of *the Midas Plague*, like bee stings, can accumulate into serious macro-shocks. A rising number of industries across different sectors are facing precipitous technology-driven cost declines and/or quality increases—for example:

- **Car tires** -- in the 1970s tire manufacturers had to adjust to the shift from bias-ply tires that lasted 12,000 miles to steel-belted radials that lasted 40,000 to 60,000 miles—the resulting shakeout eliminated three quarters of the previously extant tire manufacturing capacity.
- **Computer manufacturers** -- are facing falling margins in an industry famous for increasingly competent products at ever lower costs.
- **Lighting** -- Incandescent light bulbs have yielded to more efficient incandescent bulbs that are yielding to more efficient fluorescent bulbs that are giving way to even more efficient LED bulbs.
- **Disposable razor blades** – In the 1990s, a process of diamond annealing created the potential for disposable razor blades that could last decades instead of days. The patent holders responded by

creating comfort strips that wear-out in a week or so, shifting the blade angle to make it less comfortable—when the patents run out, others will have access the technology and the real adjustment/shakeout will occur.

- **Spark plugs** -- that were once replaced every year are giving way to plugs lasting 80,000 miles or more.
- **Communications** -- In the late 1990s, many communications firms had to adapt to an advance that increased signal-load capacity in extant fibre-optic networks by over a hundred fold – NB: the associated overcapacity problems were a major contributor to Worldcom's fraudulent response and eventual insolvency.
- **Industrial Agriculture** – Falling costs of mass-produced agricultural commodities, confounded with government cross-subsidization creates so much farm output, so cheaply, that many farmers increasingly seek assistance from governments (e.g. subsidies, countervailing duties, non-tariff barriers, and marketing boards) that artificially support domestic prices and/or further decrease prices in international markets.

Technology advances, allowing more to be made with less, can be a multi-edged sword—producers must adapt to a rising rate of *creative destruction* in their industries (Schumpeter, 1950, 83), employees become less secure in manufacturing sector jobs, and consumers competitively adjust for the rising real-balance effect by bidding up the prices of scarce real assets. Thus, *The Midas Plague* is a tiger ride carrying with it threats of deflation and mass unemployment—as King Midas found, there can be too much of a good thing.

Sustaining low-stable-inflation in the face of rising productivity and rapid globalisation may alter a nation's terms of trade. For example, a firm that buys inputs domestically and/or depends on non-tradables may face slow cost rises (i.e. inflation) while it tries to sell in competitive domestic and foreign market with prices set internationally (e.g. autos, computers, and commodities) where it faces slowly falling prices (i.e. deflation). This cost-price squeeze eventually forces a firm either out of business or into shifting some production to nations that do not artificially maintain prices. This process makes the Midas-Plague premise an important issue in the future global economy.

CONCLUSION & FUTURE RESEARCH

The received wisdom of a close link between inflation and increases in the money supply appears to be ever less applicable. Kent et al. 2005 assert that monetary policy, economic reform, innovation, and structural change (i.e. most of the major economies have or are evolving from agricultural to industrial to post industrial) have combined to reduce output volatility over the past few decades. Declining volatility is evident in that significant effective decreases in the money supply (i.e. relative to changes in real GDP) of the US (1989-1998 and 2003-2005) and Denmark (1995-2002) did not appear to translate to a corresponding drop in inflation, in those economies—this inflation outcome is contrary to the received wisdom, to the Fisher Model, and to the more complex monetary models that are used by many monetary authorities (e.g. inventory and other transitional effects are incorporated).

The nonzero, rising Alphas found in this paper are an enigma. Specifically, if the Fisher Relation (eqn (1)) is valid, the Alphas (unrealized inflationary pressure; eqn (5)) should cluster around a zero mean and the cumulative Alpha (eqn (6)) should tend toward nil. The finding of nonzero, rising cumulative Alphas indicates either an ongoing decline in the Velocity of money or that the Fisher relationship between money supply and inflation is degrading. The implications

of either condition are profound for monetary authorities, policy makers, investors and consumers.

While the cumulative Alphas may be explained, in part, by currency-reserve-holding shifts reducing the Velocity of some currencies and accelerating it for others, such effects should be transitory rather than ongoing. If this effect is transitory, monetary authorities in UK, Australia, Japan, Switzerland, and the Euro-zone should be preparing to fight significant inflation in their near future. However, the duration and escalation of the observed non-zero cumulative Alphas indicate that other factors should be considered.

The Midas Plague issues raised in this paper have profound implications for monetary authorities, in that their monetary prescriptions to expand the money supply to sustain low inflation may have been resolving deflation—not the inflation for which they were intended—and that underlying deflation may eventually out-strip their capacity to manage it. Proving deflation can be difficult in that the very approaches used to manage the economy and aggregate and gather data combine to frustrate measurement of the productivity and deflation effects.

While counter-balance effects need to be carefully examined in future research, all that is asserted in this paper is that the Fisher Relationship appears increasingly less stable over the last two decades —were the Monetarists, who found the relation to be stable over a span of 100 years, beneficiaries of chance and are they now becoming victims of chance, or are there other factors at work? In either situation, the relative monetary stability of recent decades may be ever less achievable in the future.

As economic trends change and the share of US dollars in foreign exchange reserves decline, the impact of these trends on US domestic money supply has to be analysed to for their velocity effects. These effects may have significant implications on monetary policies in the USA and in the beneficiary countries (e.g. the UK, Australia, Japan, etc.).

Also, monetary-policy implications may arise from rising US trade deficits—that deficit was in the range of $US 100 – 200 billion in 1980s, but has risen to around $US 700 billion in 2005 and must drive mass money flows and lag effects that are deemed to be outside this paper's scope.

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ENDNOTES

[i] Narrow Money = M_1 = currency plus near-money substitutes plus demand deposits; Broad money = M_3 = M_1 through M_3 = M_1 plus a range of term deposits and money substitutes.

[ii] CPI, a measure of end-user price experience, is superior to the many intermediate-user price indices. This study assumes that the annual CPI change is a fair estimate of inflation. However, it is increasingly being recognized that the CPI may tend to overstate inflation because of product improvement rather than inflation. This issue is common to most price indices and tends to be more severe in the intermediate-user indices.

[iii] During Dec/86 to Dec/91, the Economist used a mix of GNP and GDP to measure economic activity and prior to Dec/86 they used GNP. Also, the Economist estimates may be derived from partial year data. In a few cases, due to timing and other issues, early Jan/July data was used instead of late Dec/June data, however, those substitutions should not generate significant errors or bias in the analysis.

[iv] This analysis uses changes to the eqn (1) variable because models using changes to variables tend to be more sensitive to correlations between variables than models using the variable values.

[v] While alpha can have a value in the short run, it should tend toward nil in the long run, if eqn (1) is valid.