Federal Reserve Bank of Minneapolis
Research Department

Discussion of Larry Ball's Hysteresis in Unemployment

V. V. Chari *

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ABSTRACT

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*Chari, University of Minnesota and Federal Reserve Bank of Minneapolis. The views expressed herein are those of the author and not necessarily those of the Federal Reserve Bank of Minneapolis or the Federal Reserve System.

Larry Ball's paper contains two basic ideas. The first is a second generation Phillips Curve which relates *changes* in inflation to the *level* of the unemployment rate and the second is the idea that monetary policy has extremely persistent effects on the unemployment rate, well beyond effects over the business cycle.

Both ideas come from statistical relationships that Ball thinks he finds in the data, together with a presumption that these statistical relationships are invariant with respect to policy. This is the kind of paper which forces us back to some basic facts about the data and requires us to restate why mainstream macroeconomists use as a starting point models with certain basic features: *i*) business cycles are fluctuations around a balanced growth path, *ii*) sustained high inflation has only modest effects on the level of output in the balanced growth path. I review these facts in the attached figures. These figures show (for the United States) that to a first approximation, it makes sense to think of the U.S. as being on a balanced growth path with modest (other than the Great Depression) fluctuations around this path. Along this path, the capital-output ratio is remarkably constant and the employment rate (measured as the number of people working as a fraction of the population) has shown some modest changes. Labor compensation per hour tracks output remarkably well. Not displayed, but well known facts about the U.S. economy are that the real return to capital (measured from the National Income and Product Accounts) is remarkably constant. All this has occurred in the face of remarkably different inflation experiences.

Is there striking evidence regarding the association between inflation and real activity? The next figure is a plot of five year averages of inflation and output growth for a sample of 15 countries over the last 180 years ago. What I see here is a big blob. That is, I see no systematic relationship between inflation and real activity. Note that this time period

encompasses dramatically different monetary regimes, ranging from the gold standard to fixed exchange rate regimes to partially floating exchange rate regimes to pure floating regimes.

Is there striking evidence that changes in monetary regimes are associated with dramatic differences in real activity? One way of answering this question is to ask whether the adoption of inflation targeting by countries in the last twenty years or so has dramatically changed the behavior of real activity. The next set of figures and tables suggests it has not.

Is there striking evidence that when inflation rates are higher than average, unemployment rates are systematically below average? The next set of figures (under the label, the first generation Phillips Curve) provide no evidence of such an association.

The starting point for modern macroeconomics is some version of a Solow, Cass-Koopmans, Kydland-Prescott growth model. It is not blind resistance to obvious fact, or stubborn adherence to shopworn ideology that makes such a model a starting point. Rather, it is an attempt to distill what we know from this collection of figures and tables into an abstraction that is suitable for policy analysis. The key features of modern business cycle models are that they think of business cycle fluctuations as persistent fluctuations which ultimately revert to a balanced growth path. In many such models, monetary policy plays an important role over the business cycle, but has only a small effect on the growth path itself.

Every intelligent student in my first year graduate course in macroeconomic theory starts off being disappointed with the class of business cycle and growth models we all study as being too limiting a class. Every graduating student ends up admiring the great economists who created these powerful abstractions for having the ability to put a collection of disparate facts under the lens of this class.

What about the statistical relationships that Ball documents? I start with the relation-

ship between changes in inflation rates and unemployment rates. This statistical relationships belongs to a class that I call second generation Phillips Curves, that is statistical relationships of the form

$$(1) \qquad \pi_t - \pi_{t-1} = \alpha(u_t - u^*)$$

The next figure plots the left side of (1) against its right side for the United States over the postwar period. The coefficient α appears to be negative, and indeed a regression of $\pi_t - \pi_{t-1}$ on u_t yields a (statistically) significant negative value of the coefficient α. By now, we should be wary of statistical relationships which are thought to be invariant to policy. One way of asking whether the relationship is invariant to policy is to examine whether this relationship holds for other countries, many of which seem to pursue very different monetary policies than did the United States. The next set of figures repeats a plot of $\pi_t - \pi_{t-1}$ against unemployment for essentially all the industrialized countries. I see no stable relationship here.

A different way of asking whether rising inflation raises economic activity is to ask whether this relationship passes the smell test. If this relationship were robust, Zimbabwe today or Brazil and Argentina during their hyperinflations should have become incredibly prosperous. Most economists think of ever rising inflation rates as a threat, not a boon, to prosperity precisely because they are well aware of how damaging hyperinflations have been in a bewildering number of countries.

What about the second relationship: that between the so-called natural rate of unemployment or the NAIRU and inflation. Here I do not understand Ball's econometric procedure at all. Ball uses an iterative procedure to compute the time varying NAIRU, u_t^*. This iterative

procedure consists of running regressions of the form

(2) $\pi_t - \pi_{t-1} = \alpha(u_t - u_t^*) + \varepsilon_t.$

In the first iteration, u_t^* is assumed to be constant The fitted residuals together with the estimate of the coefficient α are used together with a Hodrick-Prescott filter to construct a series for u_t^*. This constructed series for u_t^* is simply the HP trend. The iteration is repeated until the coefficient α converges.

Ball uses the resulting values for u_t^* to ask whether u_t^* is affected by inflation. But if it is, then presumably the error term ε_t is correlated with u_t^* which makes running regressions a poor way of estimating the coefficient α!

Quite frankly, I am not sure what exactly we learn from this exercise.

Data

Figures with US Growth.

GDP per capita in 2000 chained dollars: BEA NIPA.

Capital/Output Ratio: Output: GDP in current dollars from BEA; Capital: Stock of Produced Assets (Fixed Assets and Inventories) BEA NIPA table 5.9

Employment Rate: Economic Report for the President 2007 Civilian Employment/Population

Productivity: Chari, Kehoe, McGrattan (2007) BCA, the logarithm of the efficiency wedge

Output Per Hour: Gross Domestic Income/Total CPS Hours Worked, NIPA table 1.10, file NIPAtable110Chari.xls

Labor Compensation Per Hour: (Compensation for Employees, paid + Proprietors' income with inventory valuation and capital consumption adjustment* Mean labor share)/Total

CPS Hours Worked, NIPA table 1.10, file NIPAtable110Chari.xls

Figure with Average Inflation and Real Output Growth.

Data taken from Atkeson & Kehoe (2004)

Their countries (with dates when data starts): Argentina (1885), Australia (1862), Brazil(1861), Canada(1870),Chile(1908), Denmark(1871), France(1820), Germany(1830), Italy(1867), Japan(1885),the Netherlands (1900), Norway (1865), Portugal (1833), Spain (1849), Sweden (1861), the UK(1870), the US (1820).

For all countries except Austrialia and Denmark, the data up to 1890 are from Rolnick & Weber (1997). Austrialia and Denmark up to 1890 are from Backus & Kehoe (1992). Data for 1890 on are from IMF IFS.

Figures with inflation targeting.

UK: CPI from IMF IFS, CPI All items, series 64...ZF, Monthly data: Jan 1980 - Dec 2005

Canada: CPI from Source OECD: CPI All items; Monthly data: Jan 1980 - Dec 2005

New Zealand: Quarterly Inflation Rate from the Federal Reserve Bank of New Zealand; 1980Q1-2006Q3

Sweden: CPI from Source OECD: CPI All items,Monthly data: Jan 1980 - Dec 2005

Years of adoption, targets and tolerance bands taken from individual countries' central bank webpages.

Tables with inflation targeting.

Inflation: IMF International Financial Statistics, computed from series CPI: All Items 64...ZF. Virtually the same as CPI % Change reported by IMF IFS (64.XZF)

Annual frequency, 1980-2005.

Real GDP: IMF IFS, series GDP Volume (year 2000=100), 99BVPZF and 99BVRZF.

Years of adoption of inflation targeting were taken from Truman

Figures with inflation and unemployment.

Inflation: IMF International Financial Statistics, series name CPI % Change from the Corresponding Period Last Year 64.XZF

Unemployment: IMF International Financial Statistics, series name Unemployment Rate, 67R.ZF

Both series at annual frequency.

US: 1949-2005

UK: 1982-2005

Australia:1983-2005

Spain:1984-2005