Capital Effects and Money Illusion: An Additional Reason for the Existence of Long Run and Short Phillips Curves

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Paper competed in April, 1995 at Auburn University in Comer Hall. Presented in Birmingham City Hall in at Conference in Spring, 1995

(This paper was also presented in Birmingham. Furthermore the above paper is what was used for a 1996 article. All of the papers researched by our group that concern Phillips Curves concerning Phillips Curves are about capital and labor being used as complementary factors of production. In the 1996 article, it does correctly state that in the conclusion. Also the 1996 article states that the real interest rate on capital is an additional effect. That was made clear in different parts of the article, including the title. But on occasions there are regrettable typos, concerning these points. Thanks to Professor Jim Novak and Professor Patricia Duffy for getting me through grad school.)

Abstract: The theory concerning short run and long run Phillips curves center on money illusion as it relates to labor. This article suggests that entrepreneurs can be affected by (short run) cost increases resulting from unexpected inflation. The increasing use of variable rate business loans, makes it plausible that the cost of capital and other inputs may be incorrectly estimated if interest rates rise unexpectedly. Aggregate adjustments in input mix resulting from this miscalculation have implications for employment in the economy. Indeed, the effect of interest rate volatility on both entrepreneur and the wage rate on labor may both be determinants of the ultimate shape of what has come to be known as the Phillips Curve.

Introduction

This paper examines the case of worker layoffs resulting from entrepreneurs' adjustment to increasing costs. Because of the increasing proportion of variable interest rate loans, entrepreneurs are posited to have become more susceptible to unexpected cost increases. Financial institutions have learned to hedge interest rate risk through variable interest rate loans linked to the money market. Landskroner and Ruthenberg (1989) stated that in a sample of 48 large U.S. banks, the percentage of business loans linked to market rates increased from 10 percent in 1977 to 90 percent in 1982." Given the large proportion of these types of loans, miscalculation by entrepreneurs of the effective interest rates on capital projects can result due to variable interest rate volatility. Rational expectationist scenarios of both anticipated and unanticipated inflations

impact on interest rates and on employment are examined.

Abstract

Capital and the Phillips Curve

From the inception, there has been disagreement as to the existence of Phillips curves (Harris 1981)[1]. However, there is the theoretic view that there are Short-Run (SRPC) and Long-Run Phillips Curves (LRPC) under attendant labor and capital theories. The difference between anticipated and unanticipated inflation is key to the capital theory approach to both the SRPC and the LRPC. Aggregate supply has been variously represented as a horizontal curve, a vertical curve and the intermediate case of a diagonal curve (DeLorme & Ekelund, 1983; Gordon, 1978). Argument presented in this paper holds in the case where the aggregate supply curve is upward sloping.

Equilibrium and the Phillips Curve

Milton Friedman's well known argument for the existence of long and short run Phillips curves centers on labor rather than capital markets (Friedman, 1976). As the money supply expands, short term decreases in unemployment are anticipated. In the long run, rates are expected to return to the "natural" level of unemployment (Friedman, 1968; Bellante and Garrison, 1988; Phelps, 1968). Beginning with the economy in equilibrium, at full-employment, and with stable wages and prices, suppose that the Central Monetary Authority expands the money supply[2]. In the short run, theory holds that, with the expansion of business activity nominal wages would rise due to the tightening of the labor market. As aggregate demand expands, the demand for both labor and capital factors of production could also be increased. The increase in capital from business expansion to meet aggregate demand would also require an increase in total employment. An increased demand for labor would in the short run bid up the wage rate and decrease the unemployment rate. It is recognized that where the firm is obligated under fixed interest rates or fixed wage rate contracts, a rational response to increases in the money supply would be to increase borrowing. Under this scenario, the real cost of capital and labor inputs become relatively cheaper under contractual constraints. Wages will not be immediately bid up nor costs increased in the short run. However, the affects of inflation and distortions in adjustment to natural rates of unemployment can also be characterized through the capital market and the complementary use of labor with capital. A case could be made that contracts and imperfect information have an effect on investment returns and those adjustments in capital and on labor use. Adjustments of labor back to "natural rates" of unemployment may be distorted, if not delayed. In the case where adjustments to inflation are not impeded, firms may, at the least, find themselves adjusting to an effect on capital through unanticipated higher costs and to reductions in anticipated investment returns. The question becomes, which affects on labor use are most compelling?

Factors Affecting Labor Use

Inflation

Central to the Rational Expectations argument, a distinction is made between

the effects of anticipated and unanticipated inflation [3]. Anticipated inflation is generally recognized as having "no impact on real economic activity" (Gauger, 1988; Modigliani, 1977; Barro, 1981). Entrepreneurs can plan for expected volatility in interest rates through risk analysis and risk mitigating techniques. However, the unexpected actions of the monetary authority cannot be anticipated.

Contracts

Barro (1978) and Tweeten (1983) succinctly stated the case in which producers' perceptions of long-run sustained demand resulted in their increasing output. With this perception there was also an associated increase in the demand for labor, which resulted in decreases in the unemployment rate (Tweeten, 1983). The authors recognized that the types of contractual arrangements in the economy, and the speed at which market adjustments take place significantly affected their study. According to Stanley Fischer (1977), an integral part of the "effectiveness of monetary policy," in influencing output and employment, is the "existence of long-term contracts in the economy." If contract terms were sufficient (in length and content) to minimize the risk exposure to unanticipated inflation, monetary expansion could be ineffectual in changing levels of output and employment. If contracts cover too long a period or if the terms of the contract are not flexible, economic agents can be locked into agreements concerning wages and prices built on erroneously anticipated inflation rates. Monetary stimulus would therefore not initially result in changes in wage rates or employment.

Product Homogeneity

Homogeneous products, such as agricultural commodities and those with auction markets or which are highly standardized., have a faster price response to monetary stimulus than do heterogeneous products (Bordo, 1980; Saunders, 1988). This is because durable goods producers are more likely to use long-term contracts. For example, in a study of the U.S. pork industry, Enders and Falk found that anticipated changes in the money supply had no significant effect on the pork industry. However, unanticipated increases in the money supply did result in increased pork output and sales at the retail level (Enders and Falk, 1989). Given the same demand elasticity, any output price adjustment to an increase in the price of inputs for durable good production would be expected to occur more slowly than that for perishable goods (Bordo, 1980). Again, wages and employment in the durable goods sector would be expected to adjust more slowly than those in the perishable goods sector of the economy because of long-term contractual arrangements. In general, competition and degree of differentiation affect the responsiveness of employment to changes in the money supply.

Imperfect Information

Imperfect information can cause at least short-term distortions in the equilibrium between relative wages and prices (Barro, 1976). If producers accurately anticipate the actions of the monetary authority, inflation expectations can be negotiated into price structures. However, even with flexible contractual arrangements, some lag in the restoration of equilibrium can be expected if the rate

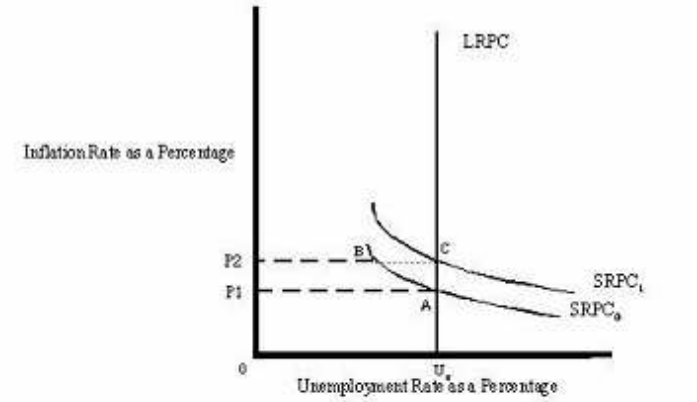
of inflation is not anticipated correctly.

Estimating the Impact of Inflation

Using the concept of net present value (NPV), one can show the impact of a miscalculation in determining the long-tern rate of interest (Levy and Sarnat, 1990)[3]. As characterized through NPV, when the money supply is unexpectedly increased, entrepreneurs may be caught unaware of inflation and the increase in interest rates that will decrease returns on investments of new projects. Incorporating the conditions of inflation, a net present value of "a project with infinite life" can be defined as:

NPVR=S/kR-Io

where NPVR is the NPV in real terms; S is the nominal cash flow each year; kR equals the predicted "real" interest rate; Io equals the dollars invested in order to obtain S (Levy and Sarnat, 1990). To determine optimal investment levels, it is important that entrepreneurs correctly predict kR . Many large entrepreneurial projects are financed by commercial loans that are renewed, but only after the lending institution has reviewed the interest rate. That means in the middle of a project, if the lending authority raises the interest rate in response to inflation, entrepreneurs will not have correctly predicted "the" interest rate for the project. If interest rates rise, the present value of a project will be much less than planned. With unanticipated decreases in returns, entrepreneurs can be expected to either curtail funding for a project or to scale back operations, with attendant increases in unemployment from laid off workers[4]. Increased costs will be immediately effective. Money illusion will not be as effective in providing entrepreneurs a higher real price cushion through the lowering of real wages. The influence of inflation on NPV and of capital labor complementing can also be described in graphic form (see Figure 1).



Assume the economy is operating at point A, with a relatively low expected inflation rate and natural rate of unemployment as shown by the curve SRPC. At some point the monetary authority expands the money supply. With money illusion, in the very short run, increased capital investment would result in reducing the unemployment rate to that shown at point B. Increases in aggregate demand decreases the unemployment rate. Eventually the increased money supply changes the rate of inflation and inflationary expectations (to SRPC 1) 'The higher inflation and resulting natural unemployment rate are shown at point C on the LRPC. At point C we have a situation similar to what happened in the United States during the 1970's; a relatively high inflation rate without a low unemployment rate. The LRPC remains stationary since no sustained real capital increase will continue. There has just been a money illusion that temporarily lowered the

unemployment rate. Alternatively, if lenders perceive their portfolios to be declining in value, passing along the effects of inflation to borrowers in the form of increased interest rates would create the banking version of indexation. Long term plans for capital expansion can be made in the case where inflation increases annually at some expected rate, for example P1 in Figure 1. If the price level changes to P2 unexpectedly, the aggregate demand curve would shift outward. Planned expansion would have to be redesigned to accommodate increased demand. However, if the bankers perceive their losses and pass along the higher interest costs, borrowers would be forced to internalize these costs. Rather than increasing output, the firm may choose to pass along capital costs to consumers or to curtail expansion. Indexed wages may serve to increase short-term demand in the economy. However, the braking effect of increased consumer costs and curtailed business expansion would shift the economy back towards the long run equilibrium point and natural rate of unemployment. Although seeming to support a vertical curve, transmitting capital cost effects through the economy may result in discrete jumps in the Phillips "curve" rather than a smoothly shifting curve

Conclusion

The effect of money illusion can be extended to include capital. We do not quarrel with the evidence indicating that commercial lenders have developed "rational expectations" due to past inflation cycles. This is borne out by the fact that many current loans have a variable interest rate. However, the risk and the uncertainty have been passed on to entrepreneurs through variable interest rate loans (and indeed to consumers through ARMS). Explanations for the existence of the SRPC and the LRPC are not therefore violated by the inclusion of the impact of inflation on entrepreneurs[5]. Lucas and Rapping (1981) demonstrated the short-run trade off between inflation and unemployment, "even though such a tradeoff need not exist in the long run" (Berndt, 1991). This paper is also cast in the view that there can be a short-term tradeoff between unemployment and inflation. Central to the main argument of this paper is that capital expansion by entrepreneurs can impact employment where labor and capital are complements. Surprise increases in capital costs are passed along immediately which cause managers to contract production. When production is contracted, the demand for labor decreases. Interest rates certainly affect the expected return on investment of entrepreneurs. The question remains whether the lack of inflation initially fools entrepreneurs into false expectations regarding return on investments. This paper has not empirically tested this premise nor has it attempted to separate the various effects of money supply, lags in information transfer and inflation on workers, lenders, or entrepreneurs. This paper suggests a possible impact on employment through capital which should be explored empirically. Suggestions for further research could consider which industries would experience a temporary decline in employment during a capital deepening process (substituting capital for labor) and which industries encounter a temporary increase in employment through a capital widening process

(capital complementary with labor).

END NOTES

1. Some members of the Rational Expectations School state that the Phillips's curve is "vertical even in the short run." See David H. Begg, pages 140-141. For a criticism of Rational Expectationists who believe that there is no Short Run Phillips's Curve, see Franco Modigliani, pages 1-19. In the article, "Two Types of Monetarism," by Kevin D. Hoover, it was stated that James Tobin, an eminent Keynesian economist, called Rational Expectationists, "Monetarists mark II." See Kevin T. Hoover, pages 58-76. The authors of this paper prefer to think of the different macroeconomic schools as an evolution of thought, with variations due to the economic history of the time period in which each theory was developed. The history of thought does not end with any school providing complete answers to all the dynamics of macroeconomics. For a discussion regarding the inflation premium aspect of interest rates see Milton Friedman (1970), pages 193-238. See A. W. Phillips for his description of the Phillips curve.
2. For a political business cycle rationale for such monetary policy see Richard E. Wagner, pages 395-409.& 215
3. Richard Fink uses the concept of Net Present Value to illustrate the Austrian School's view of how an expansional monetary policy creates an over-emphasis on investment in long run capital projects rather than short-term capital projects. See Richard H. Fink., pages 383-384.
4. In addition stockholders would want dividends that reflect the increased inflation rate, that has permeated the economy. If they do not get those dividends, the stock market will be affected adversely. The Austrian economist Hayek states, "Nothing is easier than creating additional employment for a time by drawing workers into activities made temporarily attractive by the expenditure of additional money created for that purpose." See Hayek, p. xvii. However, Von Mises may have not foreseen this development of rational expectations on the part of money lenders. Mises stated that the gross market (nominal interest) rate "continues to lag behind the height at which it would cover both ordinary interest plus the positive price premium." (Von Mises, 1963, p. 551) One balanced view advanced concerning both Austrian and Monetarist approaches is offered by Bellante and Garrison. The concluding paragraph of their published article is as follows: "From a broader perspective, Friedman's story represents a recognition of the intertemporal substitutability of labor and of the possibility that monetary' disturbances can interfere with allocation of labor. Hayek's story represents recognition of the intertemporal complimentarity of capital and of the possibility that monetary disturbances can interfere with the intertemporal allocation of capital. Viewed as such, the stories are themselves not substitutes, but complements." From Bellante and Garrison, p. 232.
5. Refer to Lucas and Sargent (1981) and Sargent (1979) for rational expectationist models concerning SRPC and LRPC theories.

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