To the Graduate Council:

I am submitting herewith a dissertation written by Randy Allen Springer entitled "The Distribution of Unemployment: A Case Study of the Disproportionate Effect of Monetary Policy on the Tennessee Valley." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Economics.

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THE DISTRIBUTION OF UNEMPLOYMENT: A CASE STUDY OF THE DISPROPORTIONATE EFFECT OF MONETARY POLICY ON THE TENNESSEE VALLEY

A Dissertation

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Doctor of Philosophy

Degree

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ABSTRACT

Coincident with the development of the Post Keynesian argument that money is not neutral has been an emphasis on the endogeneity of the money supply. The major implication of this reconceptualization of monetary theory is that monetary policy has real effects on output and employment in historical time. Descriptive statistics on economic growth in the Tennessee Valley indicate that employment in the region has suffered disproportionately from the restrictive intentions of monetary policy because of its dependence on the manufacturing sector. An econometric model was developed and applied to various aggregations of national and regional employment data to compare the adverse effects of monetary policy over the period between 1969 and 1987. The hypothesis motivating the study is that the disproportionate effect of monetary policy on the region is actually due to the disproportionate effect on rural areas within the Tennessee Valley, which constitute approximately fifty percent of the region's population.

The results indicate that monetary policy has had a disproportionate effect on employment in the Tennessee Valley, and support the hypothesis that the effect on rural areas within the Valley explains this vulnerability. The central reason offered for this pronounced vulnerability to monetary policy is the region's growing dependence on manufacturing employment relative to the rest of the United

States in the context of a relatively underdeveloped regional service sector.

The results have profound implications for the capacity of monetary policy to regulate the national rate of inflation. The study suggests that the inability of the monetary authorities to deliberately localize the adverse of effects of policy in the context of structural change in the economy diminishes the success that can be expected, and that an alternative approach to the problem of inflation be developed which recognizes the critical relationship between nominal wages and productivity.

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CHAPTER 1

INTRODUCTION: THE NON-NEUTRALITY OF MONETARY POLICY

The outstanding feature of monetary policy over the last decade, broadly conceived to encompass the activities of the Federal Reserve Board and legislation deregulating the financial services industry, has been the encouragement of historically high levels of real interest rates. The extreme increase in nominal rates engineered by the Federal Reserve at the beginning of the decade and the more aggressive liability management by financial institutions has been coincident with a decline in the rate of domestic inflation due to recession and significantly lower energy costs (Davidson, 1988). The consequences of higher real interest rates in the United States are quite real, if not always threatening, as significant discrepancies have emerged in the cost of financial capital between the United States and industrial competitors such as Japan, and the United States is saddled with growing non-discretionary, non-entitlement interest payments on the government debt.

The effect of these institutional developments in the financial system on economic growth have presented a considerable challenge to the axiomatic monetarist foundations of the traditional approach to the expansion of the economy. The challenge has been largely forsaken,

however, as the development of real business cycle models in the general equilibrium literature over the last decade completely subjugates financial forces in the explanation of the expansion of the economy to the forces of technology, resources, and non-financial shocks to the productive capacity of the system (Long and Plosser, 1983). This mainstream literature is in stark contrast to the Post Keynesian literature, which has flourished in the opportunity to examine the consequences of the evolution of the financial system and the implications for macroeconomic policies (Arestis, 1988b, 1988c).

The implications of structural change in the financial system for the theory of monetary policy has become one of the most urgent policy problems on this emerging Post Keynesian agenda. Curiously, though, Post Keynesian economists do not dominate the Federal Reserve Board, despite their concern for institutional developments in the financial system. Monetary policy in the United States is dominated by more traditional economists who, despite espousing the axiomatic theories of the neoclassical tradition, deal with structural change in the financial system on a daily basis. The consequence of this state of affairs has been a reactionary emphasis in the Post Keynesian literature on the foundations of economic analysis, emphasizing the theoretical non-neutrality of money, with little demonstration of alternative approaches

to the study of monetary policy and its effect on the economy.[1] While much of the Post-Keynesian literature continues to focus on the secular trends in the functional, personal, and international distribution of income (Davidson and Kregel, 1989), the cyclical movements in output, employment, and prices continue to dominate the policy decisions of the monetary authorities and the federal government.

The overwhelming limitation of the traditional analytical foundations of the theory of monetary policy, which govern the expected relationship between monetary policy initiatives and inflation, is the critical dependence upon the conception of the money supply as exogenous to the expansion of the economy. This conception remains characteristic of the theory of monetary policy, despite its consistent erosion by both theoretical and empirical developments in the 1980s. The presumed control over the supply of money is neither consistent with the process through which money is observed to be created, nor with the observed capabilities of the central bank authorities.

The assumption of the exogeneity of the money supply is critical to the analytical tradition of monetarism, out

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[1]Moore (1989c) conducted an electronic data-base search of the economics literature for articles covering the distributional implications of monetary policy and found that this literature is negligible.

of which rational expectations theories and real business cycle theories have emerged, because it provides for the analytical determinacy of these macroeconomic models, and its abandonment presents serious conceptual problems (Jarsulic, 1988, p. 77). It is instructive to look at a descriptive account of the elements of this tradition and the emphasis on the concept of the money supply:

> In line with Poole (1978, pp. 1-2) and Kaldor (1982 pp. 42-8), the basic tenets of Monetarism can be set out as follows:
> 1 Real forces determine long-run real output.
> 2 Changes in the **money supply** can affect the level of real output in the short run, but only until prices adjust.
> 3 Inflation is caused by increases in the **money supply** alone.
> 4 Changes in the **money supply** alone are responsible for business cycle fluctuations.
> 5 Because of (3) and (4), government is responsible for business cycle fluctuations, since it is in control of the **money supply.**
> (Jarsulic, 1988, p. 72, emphasis added)

Business cycle models incorporating rational expectations depend even more critically on the concept of the money supply by emphasizing the distinction between changes that are anticipated, and those that are unanticipated, which presumes that private sector decisions as well as governmental decisions involve the identification of the money supply. Though these models have been criticized extensively on many grounds, their decline within the mainstream literature can be traced to their failure to successfully incorporate descriptive

monetary foundations. The rational expectations models have failed to adequately account for the relationship between monetary policy and the duration of business cycles, leaving traditional macroeconomists with a choice between examining the institution of money more thoroughly, or dismissing it altogether as a causal force in the expansion of the economy. Since real business cycle models completely subjugate monetary forces to nonmonetary forces, they can be viewed as a traditional alternative to dealing with the endogenous nature of the money supply. As Hamouda has noted in a recent survey of macroeconomic theory:

> Real business-cycle theories combined the Lucas framework [rational expectations] with growth theory and kept assumptions that markets were competitive and complete (so all information was public), while technological shocks drove the system.... Monetary policy was relegated to a mainly passive role with money supply largely accommodating demand. (Hamouda, 1988, p. 203)

This theoretical "passivity" concerning monetary policy in this latest variant of classical economics is quite distinct, however, from Post Keynesian monetary analysis. The recent controversies over the proper conception of the money supply process, and the capabilities of the Federal Reserve in regulating this process, have been treated comprehensively by Moore (1988). The developments over the last decade which controvert the assumption that the money supply is exogenously controlled by the monetary authorities have profound implications for

the analysis of inflation and the role of monetary policy--implications which are not forthcoming from the traditional general equilibrium analysis. The traditional analytical foundations of monetary policy are indeed exemplified in the general equilibrium approach to macroeconomic analysis, in which inflation viewed as the direct result of a discretionary change in the money supply, and output and employment subsequently deviate from their natural or trend levels:

> Changes in the stock of money, induced by imperfectly anticipated and analyzed policy, is the major source of ... shocks. The shocks induce auto-correlated movements in economic aggregates because they induce confusion about the movement of relative prices, the source of information for agents in the economy. (Jarsulic, 1985, p 158)

Moore's conclusion concerning these controversies reinforces an argument that has taken shape in the Post Keynesian literature over the last two decades: the expansion of the economy depends critically on the endogenous creation of credit money.

The argument that the money supply should be treated as endogenous to the expansion of the economy must not be viewed, however, as merely exchanging an axiomatic assumption of endogeneity for the traditional assumption of money supply exogeneity. The recognition that an increase in the supply of money fundamentally involves the endogenous creation of credit money does not immediately, and may not ever afford an elaborate and mathematically

sophisticated alternative to the general equilibrium framework. The significance of the endogeneity argument is rather that inflation must be conceived as a process, in historical time, where the system of credit money enables employers in the aggregate to grant or extend increases in nominal wages that are not commensurate with changes in productivity.

Moore argues that the role of the Federal Reserve in this process has been misconstrued to a great extent by the traditional assumption of a direct link between monetary policy and inflation (Moore, 1988, Chapter 14). As the financial system endogenously creates the credit that is required for production in the aggregate to expand, the function of the central bank authorities is to maintain the liquidity of the financial system. In the process of accommodating the demand for reserves by financial institutions, the central bank can routinely control the price at which accommodation takes place, or nominal short-term interest rates. The control over nominal short-term interest rates has in turn become a powerful demand-management tool, enabling the Federal Reserve to entertain the relationship between its policies and inflation. Since monetary policy directly affects the cost of credit, it directly affects the expansion of the economy in historical time, and can not therefore be viewed as neutral in either the short or the long run. The relation between monetary

policy and inflation, however, remains, as always, indirect and uncertain.

There can be no doubt that the axiomatic approach of the rational expectations literature to the study of monetary policy has placed a well-defined template over the questions that can be asked in macroeconomic analysis, and, moreover, what constitutes an acceptable answer. The dominant feature of this template is the explicit aggregation over microeconomic foundations, which take the form of axioms. The exigencies of quantitative aggregation over microeconomic processes require, however, the extreme homogenization of the microeconomic processes involved in macroeconomic outcomes. The overwhelming limitation of such models for the analysis of policy is that many aspects of microeconomic processes are excluded from the representative view, since they are not amenable to the exigencies of aggregation. Distributional considerations, which are the substance of the aggregate view required in macroeconomic policy decisions, are an unfortunate casualty of the traditional method.

The traditional approach of aggregating over microeconomic foundations has remained, however, the preferred method, leaving the distributional implications of monetary policy largely unexplored. The lack of development of distributional foundations for monetary policy is especially problematic since what we recognize as

inflation, which is the explicit target of monetary policy, is actually the aggregation of price movements in divergent microeconomic processes. The impact of monetary policy on inflation can be expected to vary to the extent that monetary policy does not uniformly effect microeconomic processes.

An exact model of the firm-level microfoundations for monetary policy is a prize sought even within the Post Keynesian literature.[2] One of the fundamental tenets of the Post Keynesian approach, however, is that economic processes take place in historical time. The successful pursuit of microfoundations in macroeconomic analysis is frustrated by at least two features of historical time: economic processes are profoundly diverse in any period of time, and they change over time. The recognition and discovery of divergent processes is exactly the problem facing the successful implementation of macroeconomic policies such as the containment of inflation.

As the conception of the money supply as endogenously determined is increasingly incorporated into macroeconomic policy analysis, the traditional emphasis on the neutrality of money in the expansion of the economy will be supplanted by investigations of the direct effects of monetary policy

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[2]See for example Rousseas (1985), Palley (1988), Dymski (1988), and Moore (1989a).

on production and employment, and the financial system.[3] The traditional assumption of a direct link between monetary policy and inflation has indeed suppressed the examination of the indirect links that characterize the relationship.

This study is directed toward identifying the distributional implications of demand-management monetary policies designed to contain inflation, which in the contemporary economy refers to the distribution of unemployment. The cyclical increase in aggregate employment has become a key indicator for the Federal Reserve of impending inflationary pressures.[4] This study integrates the argument that credit money is endogenous to the expansion of the economy with the Post Keynesian theory of effective demand in order to ascertain empirically whether monetary policy has had a disproportionate effect on employment in the Tennessee Valley. While an acceptable distribution of unemployment is a complex political problem, the identification of its distribution remains a relatively straightforward task.

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[3]The distributional effects of monetary policy within the financial system remains an unexplored topic in the literature.

[4]In the Spring of 1989 the Federal Reserve Board actually made a discretionary change in policy to encourage economic growth based on ominous preliminary employment data, which was subsequently revised to reflect higher levels of employment.

Chapter 2 focuses on the conceptual relationship between monetary policy and aggregate employment, providing a framework for the investigation of the distributional implications of monetary policy. This relationship will be examined in the context of two related processes which will be explored through aggregate, as compared to representative, or microeconomic views. The first process is that of money creation, which is fundamentally the process of the creation of credit. The second and related process is that of the provision of employment, which is fundamentally the commitment to produce in anticipation of demand. The Post Keynesian model of effective demand is introduced to bring together the three fundamental propositions developed in the chapter: 1) the quantity of credit money supplied is demand determined, 2) monetary policy effectively sets the price at which short term credit is supplied, and 3) the expansion of employment in the aggregate depends upon the expansion of credit money in the aggregate.

The model is intended to provide the analytical foundations for the econometric investigation of the disproportionate or nonuniform effects of monetary policy on employment in the Tennessee Valley presented in Chapter 3. Descriptive statistics indicate that the Tennessee Valley has indeed been more severely affected by monetary policy over the last two decades relative to the

average effect on the United States economy. This vulnerability of the regional economy to national business cycles coincides with the increased dependence of the regional economy on employment in the manufacturing sector relative to the nation. Rural areas of the Valley in particular have been severely affected by the national business cycle, as the expansion of regional manufacturing employment in the region is located principally in these areas. The objective of the econometric analysis presented in Chapter 3 is to examine the hypothesis that the disproportionate effect of monetary policy on employment in the Tennessee Valley is due to the effect of monetary policy on employment in rural areas within the Valley.

Yet another feature of historical time is that governmental agencies such as the Federal Reserve must continue to design and implement policies despite their incomplete knowledge of the exact dynamic processes affected by their policies. In this study the roles of conceptualization and correlation in macroeconomic analysis will be viewed as serving one another in making the effects of policies explicit. The discovery that monetary policy does indeed disproportionately affect rural areas in the Tennessee Valley has serious implications for the Federal Reserve's goal of containing inflation through restrictive demand management policies, since inflation does not appear to emanate from these areas. The implications of the

analysis for the conduct of monetary policy are discussed in Chapter 4.

CHAPTER 2

MONETARY POLICY AND THE DISTRIBUTION OF UNEMPLOYMENT

The assumption that monetary policy controls the supply of money pervades almost all of the mainstream (or neoclassical) macroeconomic literature. This assumption, however, is neither consistent with, nor descriptive of, the process through which money is created in the United States economy. As an analytical simplification, it is more descriptive of monetary systems in which commodity or fiat money finances the expansion of aggregate demand. In the United States economy, the money that allows for the expansion of aggregate demand is not commodity money, or fiat money, but credit money.

The significance of this fact for modern macroeconomic analysis has been the subject of much discourse in the Post Keynesian literature, with the most recent and comprehensive analysis coming from Moore (1988). His analysis makes it clear that the role of monetary policy in a system of credit money is to effectively set the price at which credit is supplied, which is a fundamentally different proposition from the conventional argument that the Federal Reserve controls the quantity of credit money supplied.

The conventional argument assumes that a change in

reserves induced by monetary policy initiates a change in the money supply by some multiple of the change in reserves. The implication is that banks themselves initiate the creation of new assets in the form of loans:

> Although the credit multiplier functions on the basis of an expansion of credit, **deposits make loans** in the orthodox context. The usual sequence of events is as follows: the central bank buys some security from a member of the public; the deposits of this person are increased; the bank which benefits from these increased deposits now disposes of excess reserves and can make new loans. (Lavoie, 1985, p. 67, emphasis his)

Financial institutions are typically assumed to create loans to the extent of their excess reserves, such that the Federal Reserve can correctly anticipate the change in the money supply given a particular change in reserves supplied to the system.

A change in reserves is not, however, the catalyst for a change in the credit money supplied by financial institutions. The expansion of credit is entirely endogenous to the financial system, i.e. at the initiative of individuals and companies seeking credit for transactions purposes. The individual or company that is willing to incur the liability of credit initiates the creation of a new asset for the financial institution in the form of a debt instrument or loan. The desire on the part of individuals and companies to have command over resources which are not available out of current income is the driving force in the expansion of the supply of credit

money. The creation of assets is a routine part of the production process in a monetary economy, as "the supply of money and contracts are intimately and inevitably related." (Davidson, 1978, p. 226) The endogenous nature of credit is readily apparent in the use of overdraft facilities such as lines of credit.

The demand for credit money is conceptually distinct from the conventional notion of the demand for money, and the failure to recognize that they are different concepts has led to some confusion over the meaning of an endogenous money supply. The demand for money, as conventionally defined, refers to the relationship between the interest rate and the amount of a stock asset held in a particular form, i.e. transactions balances held as currency and/or non-interest bearing demand deposits. The supply of money, as conventionally defined, referred to a multiple of the amount of reserves the monetary authorities were willing to make available. In this conception the demand and supply of money are independent, and their interaction determined the interest rate obtainable on other financial assets.

The demand for credit money, however, is not the demand for a stock asset made available by the monetary authorities, but rather the demand for transactions balances which are made available through the creation of new assets by financial institutions. The cost of these transaction balances is likewise not the forgone interest

from holding a non-interest bearing financial asset, but rather the cost incurred in acquiring the transaction balances that are otherwise unavailable. The desired transaction balances are the deposits which are created in the act of extending credit.

As Moore has repeatedly argued, banks should be viewed as setting prices in both their retail loan and deposit markets, and as otherwise passive with regard to the quantity of loans they extend and deposits they receive:

> If a bank's demand for loans exceeds the demand for its deposits, it will be in a deficit position, and must rely on the wholesale markets to borrow the necessary funds, i.e. liability management. (Moore, 1989b, p. 481)

Given a supply price set by financial institutions, the supply of credit money is therefore conceptually perfectly elastic. The significance of this assertion of perfect elasticity is not, however, that an infinite supply of credit is available in any period, but rather that the quantity of credit money supplied is demand determined within the range set by existing financial arrangements. What is observed as the quantity of credit money supplied in any period is equivalent to the quantity of credit money demanded at the prevailing supply price set by financial institutions.

It is the creation of new financial assets in the form of loans which create the increase in transaction deposits that are required for more resources to be brought into

production, i.e. for the economy to expand, and not the reserves supplied by the monetary authorities. The act of making reserves available to financial institutions at a lower price does not itself create transactions balances, and transactions balances are required for the economy to expand since they are the means of contractual settlement (Davidson 1988). The acquisition of reserves should therefore be viewed as a result of the process of credit money creation, and not a driving force. The role of monetary policy is to make reserves more or less available through open market operations in the accommodation of the existing demand for reserves.

The Effect of Monetary Policy on the Flow of Credit

In the aggregate, the simultaneous acceptance of deposits and creation of loans by financial institutions has given rise to an intensive system of liability management at the heart of which are the reserves that banks keep on account at the Federal Reserve. Buying and selling government securities in the open market is the major channel through which monetary policy can and does affect the reserves available to the financial system.[5]

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[5]In 1987, security holdings constituted 96 percent of funds available domestically for bank reserves. Nonborrowed reserves, which excludes the discount borrowing of banks, constituted over 98 percent of total bank reserves (Board of Governors of the Federal Reserve System, 1988).

Since all depository institutions are required to have reserves on account with the Federal Reserve, the trading of government securities affects the amount of reserves available to the financial system. As financial institutions simultaneously manage their liabilities, a market is created for the short-term trading of the system's excess reserves. The federal funds market exists for financial institutions to trade reserves depending on their requirements (Moore, 1988, Chapter 6).

The more intensive liability management observed over the last few decades is consistent with the argument that reserves are sought by financial institutions after the creation of credit money, and are therefore not a causal force in the expansion of the credit money supply. For an individual financial institution, the cost of creating new assets is the cost of acquiring the liquid reserves to satisfy its cash flow and legal requirements. These liquid reserves can only be acquired at some cost from the Federal Reserve or other financial institutions:

> In the United States depository institutions possess several ways of acquiring wholesale funds: the federal funds market, the discount window, certificates of deposit, repurchase agreements, and the Eurodollar market. (Moore, 1988, p. 113)

Borrowing reserves from the Federal Reserve is typically entertained only in unexpected circumstances, and involves non-pecuniary surveillance costs (Moore, 1988, p. 117). Borrowing reserves from other financial institutions

through the federal funds market is the most expedient channel through which banks can satisfy their short-term demand for reserves, and so the rate established in this market has become the wholesale standard. Reserves can also be acquired at the expense of other financial institutions through more aggressive pricing in retail markets which attracts deposits, but this can be an unstable source of funds.

Whereas the production of commodity money (such as gold) involves the use of real resources, and can therefore be expected to respond in a predictable way to movements in its price, the creation of credit money does not require any particular movement in its supply price, i.e. interest rates. The resource cost of creating new financial assets to finance the acquisition of real resources on the part of those engaging in deficit spending is negligible relative to the volume of credit money created. The supply price of credit money is therefore not governed by the technology of its production, but the willingness of the central bank, i.e. the Federal Reserve, to accommodate the demand for reserves on the part of financial institutions.

Movements of the wholesale price of short-term credit, or the price at which financial institutions can acquire the excess reserves of other institutions, are the best source of information concerning the position that the Federal Reserve is taking with regard to the accommodation

of the demand for credit. Monetary policy should be viewed, therefore, as attempting to influence the expansion of credit money by manipulating the nominal price of short term credit.[6] The movement of short term interest rates over time, while seemingly the results of various market forces, reflect the decisions of the Federal Reserve in the accommodation of the expansion of credit money:

> To sum up, it can be said that in normal times commercial banks are ready to provide all loans, and central banks are ready to provide all reserves or advances, which are demanded at the existing interest rate. (Lavoie, 1985, p 71)

While the intended effect of monetary policy is to influence the demand for credit, the expected long run effect is to stabilize the price level. The fact that the Federal Reserve has experimented with different targets to successfully contain inflation should not obscure the focus on the means through which they achieve any target result, i.e. a change in the price of short-term credit.

The Federal Reserve's ability to influence the demand for credit money is limited to the effect of changes in

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[6]The work of Eichner and Arestis (1988) in delineating the various market forces that 'determine' short-term interest rates need not be viewed as conflicting with the thesis that the central bank 'determines' the price of short-term credit. To effectively control short-term interest rates, the central bank must be capable of anticipating these market forces on a daily basis, and through discretionary reserve accommodation it either permits or does not permit the market forces to cause a discrete change that will influence expectations in the economy.

nominal short-term interest rates on the quantity of credit money demanded (which is always equal to the quantity of credit money supplied). A change in nominal short-term interest rates channels, however, through both short and long-run expectations. Transactions balances are sought in the current period because the discounted income stream resulting from the acquisition of real resources equals or exceeds the cost of purchasing the real resources. The effect of an increase in short-term interest rates in the short run, given the expectation on the rate of inflation and the efficiency of existing production processes, is to decrease the quantity of transactions balances demanded, i.e. the quantity of credit demanded. Since the cost of acquiring real resources involves the cost of acquiring the necessary transaction balances, an increase in the real price of credit will decrease the quantity of credit money demanded in the aggregate.[7]

The effect of monetary policy, however, is not confined to the period in which a discrete change is observed in short run real interest rates.[8] Monetary

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[7]The wholesale cost of funds, which is controlled by the Federal Reserve, becomes the primary determinant of retail rates and therefore the expectations of individuals and companies concerning the relation between interest costs and income flows. The more intensive use of variable rate loans such as with residential mortgages in the mid-eighties has obviously strengthened this relationship.

[8]Monetary policy should be viewed as changing nominal short-term interest rates, with the real rate determined by

policy also channels through the long-term expectations that create the short-term demand for working capital in different periods. Since the efficiency of production processes over time is dependent upon the anticipated income stream, an adverse shock to the level of aggregate demand will affect the subjective decisions of producers concerning future revenues. This process can be summarized by reference to the Keynesian concept of the marginal efficiency of capital (MEC), which, in the context of investment expenditures, refers to the juxtaposition of expected income flows and the supply price of capital equipment:

> Let P = the cost of an investment project; let A_t = the returns, net of intermediate costs, expected in year t; and let r = the MEC. Then given the values of P and A_t, r can be calculated from $P = \Sigma_t[A_t/(1+r)^t]$. As P rises or some A_t falls, r must fall. (Jarsulic, 1988, p. 28)

Since the rate of interest represents the cost of acquiring the transactions balances necessary to purchase the durable goods, in the short run where P and A_t are given, a rise in the rate of interest will overwhelm the expected return.

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the concurrent rate of inflation. The monetary authorities, however, through the compilation of industrial production indices are in a better position than any other public or private agency to judge the current rate of inflation, and are therefore quite aware of whether a change in nominal rates constitutes a change in real rates. In this discussion, for analytical simplicity, monetary policy will be viewed as designed to change the real rate of interest by manipulating nominal rates given current information on inflation.

Over time, since the A_t's are subjective magnitudes, a discrete rise in the rate of interest will lead to the revision of expected returns.[9]

The formation of expectations is fundamentally heterogeneous, however, and since there is no institutional arrangement to coordinate the changes in expectation of future revenue, the timing of the effects of discrete changes in monetary policy is not identifiable analytically.[10] Moreover, this expectational heterogeneity also precludes the analytical determination of the magnitude of the effects of discrete changes in monetary policy in historical time. The direction of change in the demand for credit due to monetary policy is identifiable, however, since the price of credit and the quantity of credit demanded are inversely related in the short run, and producers' expectations of income in future periods will be adversely affected by diminished returns.

The demand for credit money, which changes over time as expectations of income change, will therefore be viewed

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[9]Vickers (1989) discusses the theoretical implications of viewing the rate of interest as a factor in the decisions of businesses affecting the marginal cost of debt financing.

[10]The heterogeneity of expectations that accounts for variability in the timing of the effects of monetary policy is an institutional necessity in a monetary economy (Davidson, 1988b).

as inversely related to monetary policy.[11] Figure 1 presents a simplified static representation of this relationship. An increase in the price of short-term credit in the current period, from r_0 to r_1, can be expected to decrease the quantity of credit money demanded, given short-run expectations, from D_{t0} to D_{t1}. It can also be expected to have an impact on long-run expectations, such that in subsequent periods, the demand for credit money will be adversely affected, falling to D_{t2}, D_{t3}, etc.

The sheer amount of resources that are devoted to monitoring the cyclical movements in the economy betray the fact that expectations are inextricably tied to the anticipation of changes in aggregate demand.[12] An elaborate theory of expectations is not necessary, however, to understand the directional relationship between monetary

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[11]The degree to which the type of assets that financial institutions are willing to acquire changes discontinuously over time, such as lines of credit secured by equity in homes in depressed areas, will be a significant factor in the volatility of this adverse relationship.

[12]Even though expectations are a major factor in determining the level of credit demanded over time, and therefore the level of employment observed, they are hardly stable or predictable enough to warrant viewing them as a parameter, which is essentially how they have been trivialized in the rational expectations literature. As Torr remarks, "The expectations of the agents in the model and the expectations of the model-builder--who, after all, built the supply and demand model in the first place--therefore amount to the same thing." (Torr 1988, p. 90)

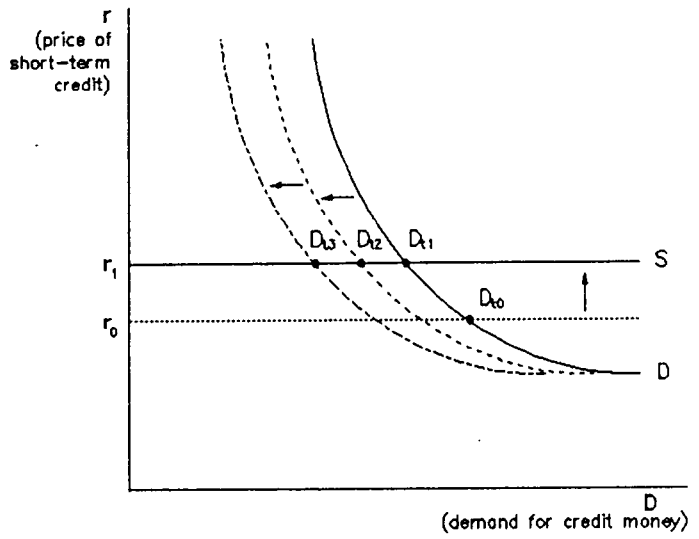

Figure 1. The inverse relationship between a discrete change in the price of short-term credit and the demand for credit money.

policy and employment. In the context of analyzing the effects of monetary policy, the discretionary accommodation of the demand for reserves through monetary policy will be viewed as having a direct effect on the expectation of cyclical movement in the economy. The variation in short-term interest rates that result from the accommodation of the demand for reserves will therefore be viewed as an exogenous factor inversely influencing both the quantity of credit money demanded in the short-run and the demand for credit money in historical time.[13] Monetary policy

[13]Long-term interest rates (or yields on long-term debt) become a a function of expectations of future short-

necessarily acts through this expectational nexus, since it is not capable of setting the quantity of credit money demanded and therefore supplied.

The expectations that are involved in the expansion of the demand for credit money are either accommodated or thwarted by the reserve accommodation involved in the operation of monetary policy. The possibility that these expectational forces may react to an increase in the supply price of credit by creating new forms of credit which are outside of the traditional system must not be discounted. This relationship between the restrictive intentions of monetary policy and the resilience of expectations in the demand for credit has certainly been a factor in the development of numerous financial innovations in the last two decades.[14] The recurrence of innovation in the United States financial system over the past several decades, however, implies that monetary policy should be viewed as attempting to manipulate the demand for traditional credit, where traditional credit is defined to be that which the

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term interest rates, i.e. the term structure of interest rates. "Since the funding requirement is related to the supply price of new capital, which, in turn, includes the cost of borrowing from the banks to finance working capital loans by producers (cf. Davidson, 1972, Chapters 11-13), therefore, the costs of funding, liquidity, and short-term bank loans for financing production flows are inevitably interrelated." (Davidson, 1988, p. 76.)

[14]Podolski (1986) provides one of the few contemporary accounts of the relationship between financial innovation and the money supply, but his effort is incomplete with regard to the development of this hypothesis.

Federal Reserve monitors through reserve accounting. Reserves are sought after new assets have been created, which themselves create transaction balances. Since the 1960s, however, the demand for transaction balances has often been satisfied by avenues outside of the traditional system of credit, i.e. accepting deposit liabilities that at least initially did not require a corresponding reserve liability at the Federal Reserve.

There have been several periods where financial instruments that have provided the service of financial intermediation have not been properly included in the Federal Reserve's definition of the money supply and were therefore not subject to reserve requirements.[15] Conceptually, at any point in time the process of intermediation can be split into traditional and nontraditional components. In historical time, however, processes of financial intermediation that were once non-traditional can quickly become integrated into the traditional system. The availability of non-traditional intermediation will therefore be viewed as an exogenous influence on the use of credit. Monetary policy is then

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[15]Eurodollars, mutual funds, and repurchase agreements are examples of financial innovations that have at one time remained outside of the formal system of reserve accounting in the Federal Reserve system. A full account of financial innovation is beyond the scope of this study, but the implications must nevertheless be incorporated into the analysis.

viewed as supplying reserves through the traditional system of credit, the definition of which changes when innovations are brought more formally into the purview of the Federal Reserve system. The use of credit in the aggregate will therefore be a function of both monetary policy and the non-traditional credit that emerges in any period.

Credit and the Expansion of Aggregate Employment

Employment in the aggregate, like credit money, is fluid. It is entirely dependent upon the aggregate flow of expenditures:

> Aggregate demand can exceed last period's income only if economic units in aggregate spend more than their current income. Such expenditure can be financed either by a reduction in accumulated stocks of monetary assets (dishoarding) or nonmonetary assets (asset sale) or by the sale of newly created financial assets (borrowing). The fact that the ratio of broad money balances to income is fairly stable over time implies that newly issued financial assets over the longer run finance the bulk of increases in aggregate demand. (Moore, 1988, p. 297)

Since the aggregate flow of expenditures changes incrementally through the use of credit, the expansion of aggregate employment involves incremental job loss and job creation. Moreover, only a small part of what we observe as aggregate employment is affected by the change in expenditure flows in historical time.[16] The expansion of

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[16]Though analysis in logical time focuses on the determination of absolute levels, the introduction of historical time changes the focus to the expansion of pre-determined stocks (Eichner and Kregel, 1975).

employment therefore involves that fraction of the labor force whose employment is vulnerable to the creation or lack of creation of new financial assets by financial institutions. In governing the expansion of credit money, monetary policy simultaneously governs the expansion of employment and income in the economy.[17]

Monetary policy is designed to affect the ease with which credit is required, i.e. the cost of credit, depending upon the direction of change in target variables, most notably the rate of inflation. The effect of monetary policy on the price of short-term credit will therefore be viewed as an exogenous factor in the formation of the level of aggregate expenditures, or effective monetary demand, in historical time. The level of monetary demand is the aggregate nominal flow of expenditures that is enabled by the financial system, and therefore varies as the use of credit varies over historical time. The level of monetary demand is a concept distinct from the demand for money as used in traditional analysis, and is also distinct from the demand for credit money. The observed level of monetary demand is the aggregate demand for goods and services that results from the complex set of heterogeneous processes involved in financial intermediation.

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[17]Since price increases can only be realized through increases in expenditures, the expansion of employment becomes a key variable in the successful containment of inflation.

The forces promoting job loss and job creation that result from financial intermediation in any period are not confined to one sector, one industry, or one type of labor. There emerges, then, in any model of employment an implicit distributional dimension concerning the effect of various forces on the expansion of employment. This distributional dimension in the expansion of employment is prohibitively difficult to recognize in an algebraic conception of the determination of employment. As Blinder has noted, neoclassical models which attempt to circumvent the assumption of a homogeneous labor supply remain inapplicable for the analysis of cyclical changes in employment:

> ...these new models have so far contributed little to explaining the **changes** in unemployment that we observe in time-series and that we call business cycles. Indeed, some see ill-suited to the task. (Blinder, 1988, p. 4, emphasis his)

When used for the analysis of macroeconomic policies, models which do not recognize a distributional dimension are limited to the suggestion for institutional change rather than accounting for the effects of modern institutions. As Kregel has noted,

> [The] elimination of involuntary unemployment by the 'natural rate of unemployment' has restricted discussion of employment policy to elimination of imperfections and creation of increased flexibility in labor markets. (Kregel, 1987, p. 133)

While we are confined to an aggregate perspective in the discussion of macroeconomic policy, it is not possible to

meaningfully sum over the multitude of distinct processes without assuming away much of the problem which has motivated the analysis. The uncomfortable but unavoidable conclusion is that an aggregate model suitable for the analysis of the effect of policy on employment must involve implicit dynamic processes.

Traditional theories of the determination of aggregate employment attempt to circumvent the problem of heterogeneous dynamic processes by making assumptions that permit quantitative aggregation. These assumptions, while expedient for mathematical analysis of a theoretical relationship, are not expedient for the analysis of the effects of government policies. The effects of government policies in the aggregate are only discernable through the study of what we are capable of observing. A choice must be made, then, concerning the theory of aggregate employment: it must become either the quantitative analysis of a dimensionless quantity. i.e. labor, or it becomes a broad conceptualization of the forces affecting that which we observe, i.e. employment:

> Although output across firms in the same industry may be homogeneous and therefore can be aggregated to obtain the industry supply schedule in terms of prices (p) and quantities (q), this homogeneity of output assumption cannot be accepted as the basis for summing across industries or across firms in monopolistic competition to obtain the aggregate supply function (Keynes, 1936, chapter 4). Accordingly, each firm's Marshallian supply function must be transformed into Keynes's (1936, p. 44) micro-firm supply function, which relates each firm's expected sales proceeds in money terms ($z_f = p_f \times q_f$) with the firm's employment hirings (n_f). (Davidson, 1987, p. 222)

Since monetary policy does not involve the manipulation of a homogeneous input to an aggregate production function, the variation in employment becomes the relevant measure for the analysis of policy.

Monetary policy affects employment on the margin, as a movement in the unemployment rate from 6 to 10 percent may be all that is required to bring about the desired change in the rate of inflation. The focus of monetary policy is on the growth of the economy, and the expansion of employment serves as an indicator of both the present rate of growth and the pressure that this growth will put on the rate of inflation. Since the explicit aggregation of behavioral relations as the basis for the analysis of macroeconomic policy is both logically problematic and empirically difficult, a conception of employment in the aggregate that is analogous to behavioral microeconomic relationships becomes the appropriate basis for the analysis of policy.

The Keynesian model of effective demand will therefore

be used to relate monetary policy to the expansion of aggregate employment.[18] Monetary policy will be viewed as designed to manipulate the cyclical flow of aggregate expenditures through the manipulation of short-term interest rates. In this model the observed level of employment over time is determined by the expectations of producers concerning the level of aggregate demand and is not necessarily an equilibrium level of employment. The observed level of employment is held as conceptually distinct from the potential for an equilibrium level to be attained, defined to be one at which there is no tendency for change. As Schmitt (1988) argues, demand and supply must be identities in the real world, and so the object of theoretical analysis is to understand how the identity moves over time. The observed level of employment will be viewed as depending critically on the changing level of proceeds realized by producers:

> The essential character of a monetary economy is the realization in terms of money of the value of the real output produced by business firms. In a dynamic setting of changing technology, foreign competition, changes in tastes, and other uncertain factors, the initial expectations made at the time of investment may prove disappointing, that is, the conversion of output into money may be on unfavourable terms, and lead to money losses by the firm. (Dillard, 1988, p. 56)

The average nominal wage will be viewed as exogenously

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[18]This model is developed comprehensively in Davidson (1978), with refinements in Kregel (1985,1988).

determined through the myriad of explicit and implicit contractual arrangements that characterize a monetary production economy. In this conception of the determination of aggregate employment, the level of nominal wages is therefore not simultaneously determined with the level of aggregate employment, but is viewed as a constraint on the decisions of producers. The components of aggregate expenditures and the level of proceeds expected by producers will be expressed in units corresponding to the average nominal wage, or wage units. The use of wage units to express nominal magnitudes is analogous to the traditional focus on real magnitudes, but is conceptually distinct since the unit elicits behavioral responses from households and firms more directly than the overall price level (Kregel, 1989, p. 44).

The expansion of aggregate expenditures over time is not, however, exogenous in the model and will be viewed as depending upon the expansion of aggregate employment. Expenditures in the aggregate are traditionally divided into consumption and investment components, and most conceptual formulations of Keynes' model of effective demand treat consumption as that component which is functionally related to the level of aggregate employment, and investment as that component which is independent to the level of employment (Wells, 1977). The conceptual distinction between household and firm use of credit is not

necessary, however, to analyze the design of monetary policy, since the variation in short-term interest rates can not be targeted to specific sectors of the economy. This formulation of the model of effective demand will therefore distinguish between that part of aggregate expenditures which is functionally related to employment, and the planned deficit spending of the private sector. The level of monetary demand over time will therefore be viewed as directly related to the level of aggregate employment, given the planned deficit spending of the private sector, the planned deficit spending of the government, and the foreign demand for domestic production:

[2.1]

$$D_W = \underset{+}{D_W}(N; C_W, G_W, X_W)$$

where D_W = the level of monetary demand
N = the level of employment
C_W = the deficit spending of the private sector
G_W = the deficit spending of the government
X_W = foreign demand for domestic production

Producers in the aggregate will be viewed as providing employment given their expectations of the level of monetary demand. As the level of monetary demand varies over time due to the deficit spending of the private and public sector, and foreign demand for domestic production, producers in the aggregate receive an average return on the use of credit, i.e. working capital, depending on the wage costs associated with that level of employment:

[2.2]

$Z = Py = wN + \pi$

where Z = the aggregate proceeds realized by producers
P = the aggregate price level
y = real output of goods and services
w = the average nominal wage
π = the return over the wage bill

In the short-run, producers will be viewed as expecting a target level of return on the use of the money capital in production. Given a target level of return, and the nominal wage, there is a level of proceeds that producers' in the aggregate require to make the provision of any particular level of employment worthwhile. The level of employment that producers in the aggregate provide will therefore be viewed as depending upon the target markup over the money capital required to provide this level of employment:

[2.3]

$Z = Py = k(wN)$, with $k>1$.

where k = the target markup over money capital.

The aggregate price level is therefore viewed as depending on the target markup, the level of nominal wages, and the average product of the labor force:

[2.4]

$P = k(wN)/y = k[w/(y/N)]$

Since (y/N) represents the average product of labor, in this model the price level becomes a function of the target markup and the level of efficiency wages, or the unit labor

cost of production:

[2.5]

$$P = k(w/A)$$

where $A = y/N$,
and (w/A) = the efficiency wage

In the short run, given the level of efficiency wages and the target markup over money capital, any particular level of expected proceeds (expressed in wage units) results in a particular level of aggregate employment. The changes observed in the relationship between producers' expected proceeds and employment over time are a function of the changing costs of production. Supply shocks which affect the non-wage costs of production will be viewed as having a direct impact upon the target level of return on money capital, and therefore an inverse effect on the level of employment corresponding to any particular level of expected proceeds.[19] Changes in capacity of the system over time will be viewed as enabling producers in the aggregate to provide more employment at the existing supply conditions, or, in the context of an unchanging level of aggregate demand, the same level of output with less workers. Aggregate supply in the model therefore

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[19]In Post Keynesian models which are concerned more directly with the distribution of income among capitalists and laborers, the markup is often viewed as varying procyclically with changes in interest rates (Eichner and Kregel, 1975).

becomes:[20]

[2.6]

$$Z_W = Z_W(N;k,R) \quad ,$$
$$\qquad\quad +$$

where N = the level of aggregate employment
k = the target markup on money capital used in production
R = the resource capacity of the system.

In this model the actual level of monetary demand becomes the constraint on any tendency for an equilibrium level of aggregate employment. The expectations of producers concerning the level of monetary demand is, however, the constraint determining the level of employment observed in any particular period. As producers realize the level of monetary demand that has become effective through forward contracting, we observe in the aggregate a level of employment consistent with their expectations in the use of credit. The level of employment observed in each period is that level consistent with the proceeds expected by producers, and will only be at an equilibrium when the level of monetary demand has stabilized and sufficient time has elapsed for producers in the aggregate to adjust their expectations to this level of realized proceeds. The observed level of employment, which is not necessarily an equilibrium level, will be viewed as determined by the point at which producers expectations,

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[20]Vickers (1987) discusses the implications of various assumptions for the slope of aggregate supply function.

D^*_w, are consistent with aggregate supply:

[2.7]

$$D^*_w(N;C_w,G_w,X_w) = Z_w(N;k,R)$$

In this model, the equilibrium level of aggregate employment, N_e, will only be observed when $D_w = D^*_w = Z_w$.

The observed level of employment will therefore be treated conceptually as depending upon the factors governing the level of monetary demand and the relation between expected proceeds and employment:

[2.8]

$$N = N(Cw,Gw,Xw,k,R)$$
$$\quad\;\; + \;\; + \;\; + \;\; - \;\; +$$

A static framework representing this conceptualization is presented in Figure 2. Producers expectations concerning the level of monetary demand is denoted by the curve D_w^*. This expectation will result in an aggregate level of employment N*, which is consistent with the target markup on money capital, k. If the planned deficit spending of the private and public sectors, C_w and G_w, and the level of foreign demand, X_w, create an actual level of monetary demand of D_w, there will be some tendency for producers to revise their expectation of aggregate demand and thereby increasing the level of employment. If producers expect this level of monetary demand to be stable, their revised expectations will lead to an increase in employment toward the equilibrium level of employment, N_e.

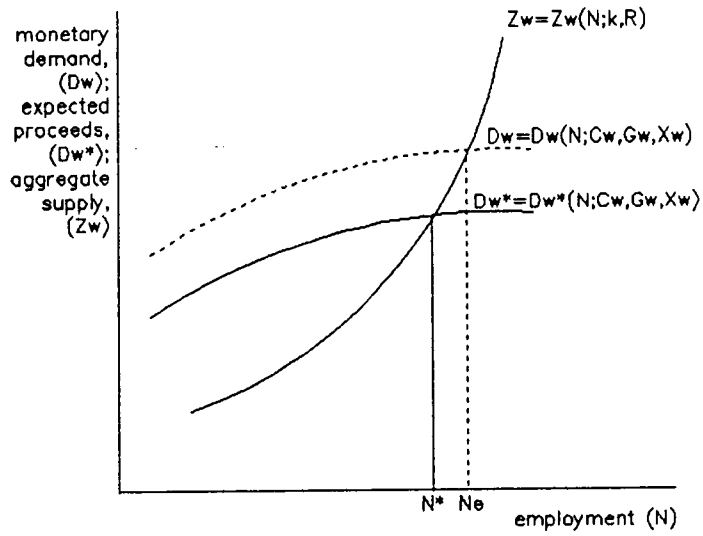

Figure 2. The level of proceeds expected by producers, D_W*, determines the observed level of employment, N*, given the nominal wage, w, the target markup, k, and the resource capacity of the economy, R.

In historical time this equilibrium level, referred to as the point of effective demand, is the conceptual constraint on the observed level of employment:

> Equilibrium with involuntary unemployment could thus be said to result from the rational choice of individual entrepreneurs, based on objective market experience, of the level of output and employment which maximizes profits; this decision has nothing to do with costs or competition, nor with the behavior of labor supply, but rather with the behavior of consumption and investment expenditures relative to changes in income.
> (Kregel, 1987, p. 139)

Since planned deficit spending in any period is dependent on the price of short-term credit as set by the monetary

authorities and the development of non-traditional forms of intermediation, employment in the aggregate will therefore be viewed as depending on variation in the price of short-term credit and the level of non-traditional credit:

[2.9]

$$N = N(I, Sw, Gw, Xw, k, R)$$
$$\quad\; - \; + \; + \; + \; - \; +$$

where I = the price short term credit
S_w = the development of non-traditional credit

Monetary policy in this model is therefore viewed as varying the price of short-term credit, I, which is the nominal price of short-term credit adjusted for the exogenous annual rate of increase in nominal wages.

Conclusion

Macroeconomic analysis that is conceived in historical time must address the process through which the level of monetary demand in the economy expands. This process is fundamentally comprised of the new creation of financial assets which serve the purpose of intermediation between those seeking to spend more than their current income. The monetary authorities, since they effectively set the price of financial intermediation through the manipulation of the reserves made available to financial institutions, should be viewed as attempting to influence the demand for credit and therefore the level of monetary demand.

The level of monetary demand that is made effective by

The level of monetary demand that is made effective by the planned deficit of the private and public sectors, and the foreign demand for domestic production, is the constraint on the expansion of employment in historical time. The negative effects of monetary policy are therefore limited to the deficit spending of the private sector, and more specifically that part of the labor force whose employment is affected by the demand for credit.

The negative effects of monetary policy will be distributed non-uniformly, or disproportionately, throughout the economy to the extent that industries are affected differently by a decline in the demand for credit. Since producers expectations concerning the profitability of production are fundamentally involved in both pricing and employment decisions, the distribution of the negative effects of monetary policy is critical to the success of discretionary monetary policy in containing the rate of inflation. The disproportionate effect of monetary policy on certain industries also implies that employment in regions which are more dependent on interest-sensitive industries will be disproportionately affected. The implication for the design of monetary policy is that the relationship between monetary policy and the rate of inflation will be constrained by this distribution.

CHAPTER 3

A CASE STUDY OF THE DISPROPORTIONATE EFFECTS OF MONETARY POLICY ON THE TENNESSEE VALLEY

For much of the 1980s, unemployment rates throughout the Tennessee Valley have served notice that the effects of a national recession are not transitory. Indeed, most measures of economic growth indicate that the regional recession in the early eighties was more severe in both magnitude and duration than the recession observed in the national economy. The recession in rural areas within the Tennessee Valley appears to have been even worse than that observed in the overall Valley economy. With almost fifty percent of the region's population in rural counties, this discrepancy in the effects of a national recession leads directly to intra-regional discrepancies in economic welfare. The devastating effects of the recession on the standard of living of the inhabitants of rural areas in the Tennessee Valley become even more pronounced when compared to the average effect on the rest of the United States.

The fact that one region within the United States was affected more than other regions in the recession of the early eighties would be less controversial if the national recession had not been engineered by monetary policy. Neither published statements by the Federal Reserve, nor economic theory, suggest that the disproportionate

distribution of the negative effects of recession is either a goal or a requirement of monetary policy. Moreover, the predominant target of monetary policy, inflation, has not been shown to emanate from areas such as the rural counties of the Tennessee Valley, and so it is not clear that the distribution we are in fact observing is consistent with the objective of discretionary monetary policy.

The apparent non-uniform distribution of the negative effects of monetary policy would also be less controversial if they were confined solely to our economic history. The Federal Reserve's responsibility for managing the economy, however, has been indefinitely legitimized by the inability of Congress to manage discretionary changes in the federal budget over the last decade. The seemingly uncontrollable budget deficits make the prospect of countercyclical discretionary fiscal policies in the near future very unlikely. Even though the national economy continued to expand in 1989 and the beginning of 1990 despite a move toward more restrictive monetary policy, the fact that certain regions and industries were characterized by recession is evidence that the Federal Reserve has interpreted this implicit proprietorship as a license to make monetary policy more preemptive, i.e. to create unemployment in anticipation of accelerating inflation.

The apparent disproportionate effects of monetary policy will become even more controversial, however, if our

national resources are increasingly devoted to rural development. Issues such as the educational preparedness of the national labor force to compete in a global economy constantly refocus our attention on the inadequate infrastructure of rural areas. And yet the success of future initiatives may be seriously undermined by monetary policies designed to contain inflation.

The objective of this analysis is to examine the hypothesis that the observed disproportionate effect of monetary policy on employment in the Tennessee Valley is due to the disproportionate effect on employment in rural areas within the Valley. The econometric model developed is first used to confirm that monetary policy has had a disproportionate effect on employment in the Tennessee Valley between 1969 and 1987. The model is then used to test the hypothesis that this disproportionate impact on employment in the Valley over this period can be accounted for by the disproportionate effect of monetary policy on employment in rural areas within the Valley. The descriptive evidence that has led to this hypothesis is outlined first, and then the results of the econometric analysis are presented.

A Descriptive Account of The Effect of the National Business Cycle on the Tennessee Valley Economy

Since the early seventies, it has been apparent that the national business cycle is amplified in the regional economy of the Tennessee Valley. The Tennessee Valley region consists of 201 counties, including the entire state of Tennessee, and contiguous counties in the six surrounding states of Kentucky, Virginia, North Carolina, Georgia, Alabama, and Mississippi. This region is historically significant because of the charter granted to the Tennessee Valley Authority (TVA) to undertake flood control and other measures promoting regional development.[21] As part of the TVA's corporate effort to forecast regional economic development, extensive employment and labor force data on the counties comprising the Tennessee Valley has been collected dating back to the early sixties, as well as output estimates for the region. In 1982, in the midst of a national recession, TVA Economists began to use this data to calculate the gap between potential regional output and actual gross regional product (GRP).[22] Figure 3 reproduces their comparison of

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[21]More recently, that part of TVA that receives appropriations from the Congress has focused on the economic development of the region. Detailed analyses of regional economic data have been presented annually in TVA's **Economic Outlook.**

[22]Tennessee Valley Authority (1982), p. 12.

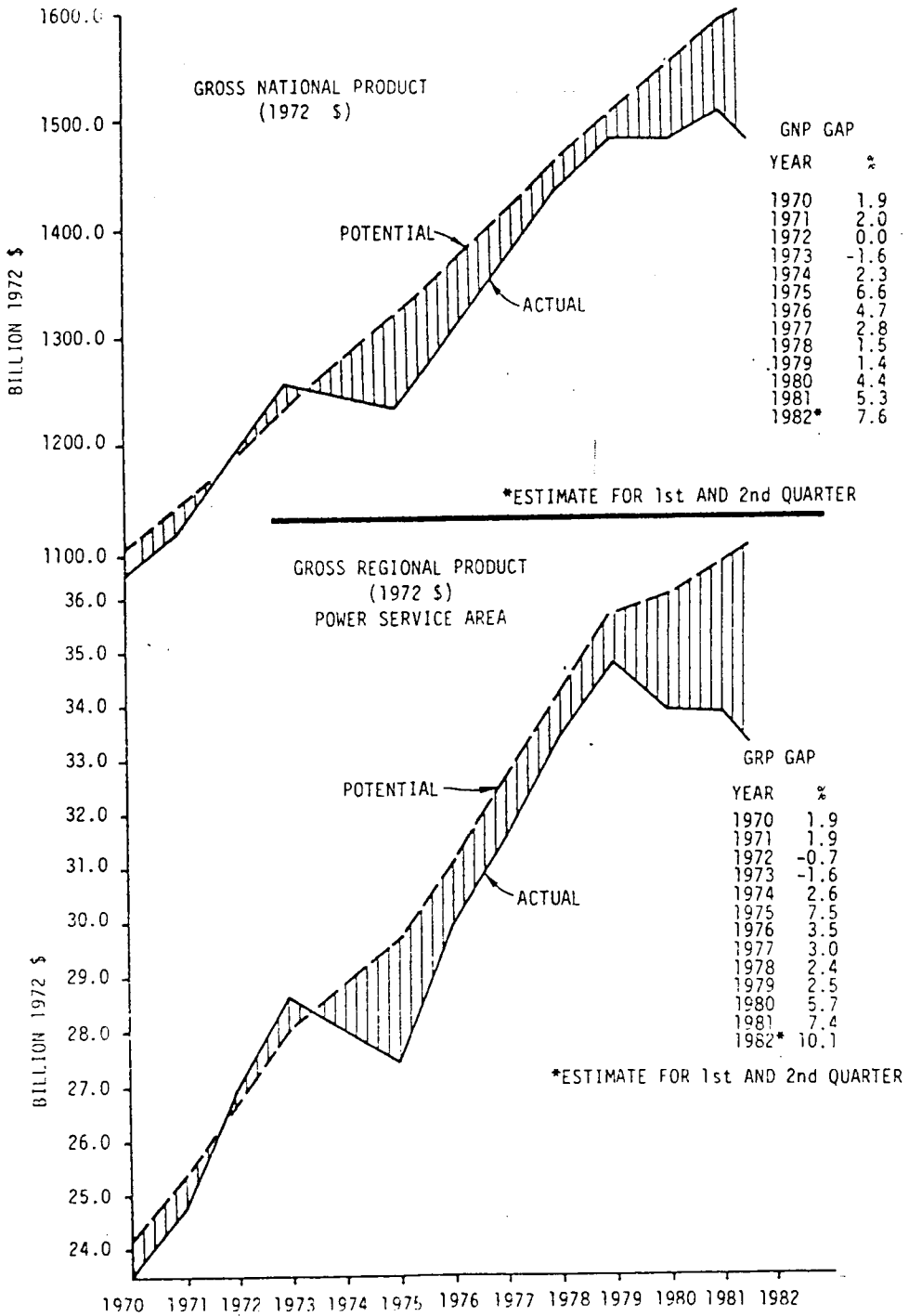

Figure 3. The difference between potential and actual product estimates for the United States and the Tennessee Valley as calculated by TVA economists in 1982.

the results of their analysis for the period between 1970 and the first two quarters of 1982 with the gap between potential and actual Gross National Product (GNP) as calculated by the President's Council of Economic Advisers.[23]

These calculations indicated that the cyclical changes in GNP were generally exaggerated in the movements in regional output. To make this finding more clear, the difference between the potential GNP gaps and the potential GRP gaps that resulted from their analysis is presented in Figure 4. If the cyclical movements in regional output were either the same in percentage terms, or proportional to the cyclical movements in GNP, the difference between the regional and national gaps would appear as a straight line in Figure 4. The shaded areas in the figure indicate, however, an oscillating pattern in the difference between the gaps. These calculations suggest that the cyclical movements in regional output over this period were more volatile than the corresponding movements in GNP. Figure 4

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[23]Potential GNP and the potential Gross Regional Product (GRP) are estimates of the trend output of the national and regional economies, given the growth in the labor force, capital stock, and natural resources. Even though these magnitudes are speculative, they are used to judge to what extent the cyclical movement in output is deviating from the trend. The comparison here of regional and national estimates of potential output is intended as documentary evidence of the suggestion of a difference between the regional and national business cycles, and so the estimates have not been examined for technical differences.

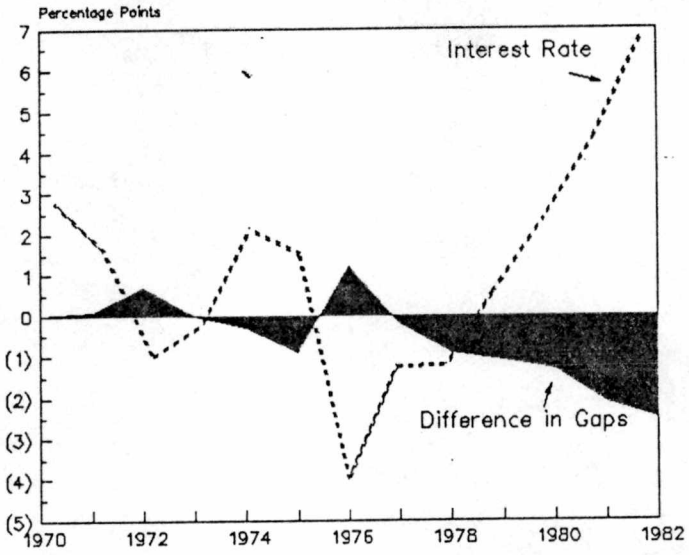

Figure 4. The relationship between the federal funds rate (adjusted for the rate of change in the GNP deflator and leading by one year) and the difference between the GNP and GRP gaps, as calculated by TVA economists in 1982.

also indicates that the difference in the regional and national potential gaps is inversely correlated with the direction of change in real short-term interest rates. Short-term interest rates have exhibited considerable volatility over the course of the last two decades.[24] While there is still no theoretical consensus in the literature on the causes of national business cycles, changes in interest rates are generally held to be

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[24]Zarnowitz (1985) discusses this and other stylized facts of the business cycle in the context of recent developments in business cycle theory.

inversely related to the rate of expansion of the economy. To the extent that volatility in short-term interest rates affects the expansion of the national economy, it will also be a major determinant of regional business cycles such as those observed in the Tennessee Valley.

TVA Economists have also formally considered the differential impact of fiscal and monetary policies on the region. Figure 5 is a reproduction of a map constructed by TVA Economists in 1982 in which individual states were ranked according to their vulnerability to the higher interest rates that result from monetary policy.[25] The deviation of an individual state's index value from 100 represents the extent to which the individual state's industrial mix at the time made it more or less susceptible to monetary policy compared to average for the United States. An index value below 100 indicates that employment in the state suffers disproportionately from monetary policy relative to the rest of the United States. From

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[25]Tennessee Valley Authority (1983), p. 25. The index was computed from data and measurements made by Browne (1982) of the Federal Reserve Bank of Boston. The index was calculated by 1) hypothetically assuming that employment in particular industries in every state changed by the same proportion as the United States average over the period from March 1980 to Marc 1982, 2) calculating the resulting percent change in total employment that would have occurred in each state, and 3) dividing the state percent changes by the percent change in the United States employment. An index greater than 100 indicates that employment in that state would have increase by more than the increase observed in the United States, and therefore is less vulnerable to monetary policy.

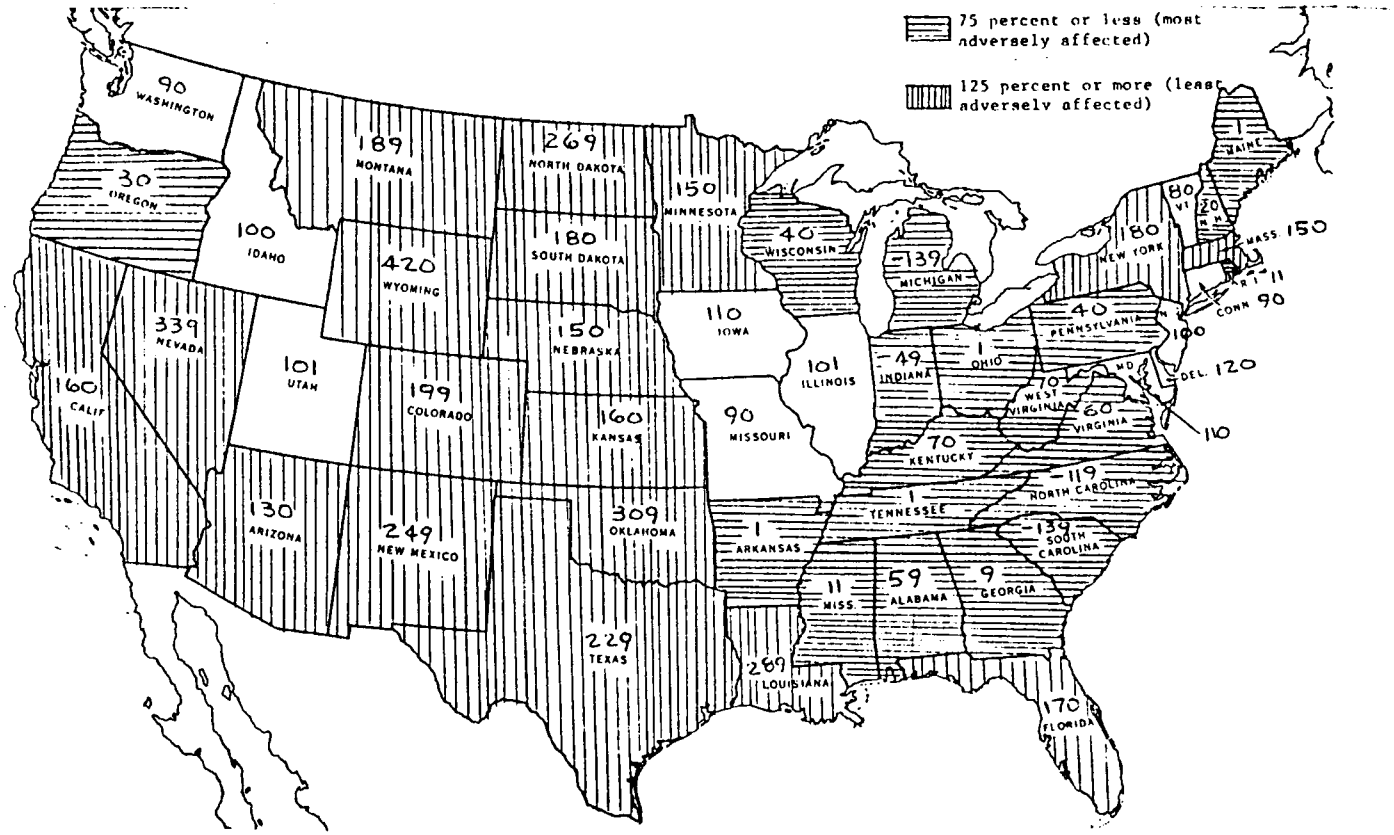

Figure 5. Index of effects of monetary policy on individual states' industrial mix, as calculated by TVA economists in 1983.

these calculations it was clear that the industrial mix of the state of Tennessee and most of the other states in the Southeastern part of the United States made the regional economies extremely vulnerable to the effects of monetary policy.

The effect of the national business cycle on output in the Tennessee Valley economy became even more evident over the last decade. The regional economy was severely affected by recession in the national economy in the early eighties, and did not recover as it had in past recessions due to the slow recovery of the United States manufacturing sector. Between 1979 and 1985, GRP grew at an average annual rate of only 2.1 percent, compared to an average of 4.2 percent between 1970 and 1979. After the historically high real interest rates in the United States began to fall in early 1985, the dollar began a two-year decline and United States exports grew rapidly. Domestic consumption led the expansion of the national economy in the second half of the decade, with domestic investment expenditure stimulated by both foreign and domestic demand. The Tennessee Valley economy grew rapidly under the improved national conditions, with gross regional product averaging a much stronger 5.2 percent average annual increase between 1985 and 1988.[26]

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[26]The expansion of the regional economy in recent years is fully documented in Tennessee Valley Authority

Before the national recession in the early eighties, regional unemployment rates were very similar to the United States average. Unemployment rates in metropolitan areas within the Tennessee Valley were slightly below the national average, while unemployment rates in rural areas were only slightly above. The changes in regional unemployment rates between 1979 and 1987 are presented in Table 1. The changes in regional unemployment rates over the last decade reveal that short-run changes in employment in the Tennessee Valley are correlated with the national

Table 1

Unemployment Rates in the United States and the Tennessee Valley

	1973	1979	1982	1985	1987
United States	4.9	5.9	9.7	7.2	6.2
Tennessee Valley	4.0	6.0	12.2	8.5	7.0
Metropolitan Areas	3.5	5.4	10.3	6.7	5.8
Rural Areas	4.5	6.9	14.5	10.9	8.7

business cycle.[27] The effects of recession and lingering high domestic real interest rates left the Valley with

(1989).

[27]The relation of selected national economic variables to growth in the Tennessee Valley economy is explored in Gilmer and Pulsipher (1989), formerly of TVA's Chief Economist's Office.

unemployment rates well above the United States average through 1985. This discrepancy between the region and the United States average can be attributed entirely to the double digit rates observed in rural areas. Unemployment rates in the Tennessee Valley improved dramatically by 1987, but the discrepancy between metropolitan and rural areas within the Tennessee Valley remained considerably larger than before the onset of recession earlier in the decade.

The vulnerability of a region to monetary policy stems from the proportion of the state's industry that is sensitive to the higher interest rates and restricted credit that accompany cyclical downturns. Industries such as residential and business construction are extremely sensitive to variations in interest rates because of the magnitudes of credit involved in purchasing the industry's output. Though these industries are extremely sensitive, their contribution to the calculation of an index such as that presented above in Figure 5 is limited by the relatively small proportion of the regional labor force employed in construction. The more devastating effects of higher interest rates in particular regions stems from their dependence on manufacturing employment, which is affected not only by decreasing construction activity, but diminished demand for consumer and producer durables.

The effect of the national business cycle on the

Tennessee Valley can be traced to the dependence of regional income on manufacturing employment. In the Tennessee Valley, manufacturing employment is a larger proportion of total employment than the average for the United States. Figure 6 compares the level of manufacturing employment as a percentage of total employment in the Valley and the U.S over the last two decades. Even though the proportion of manufacturing

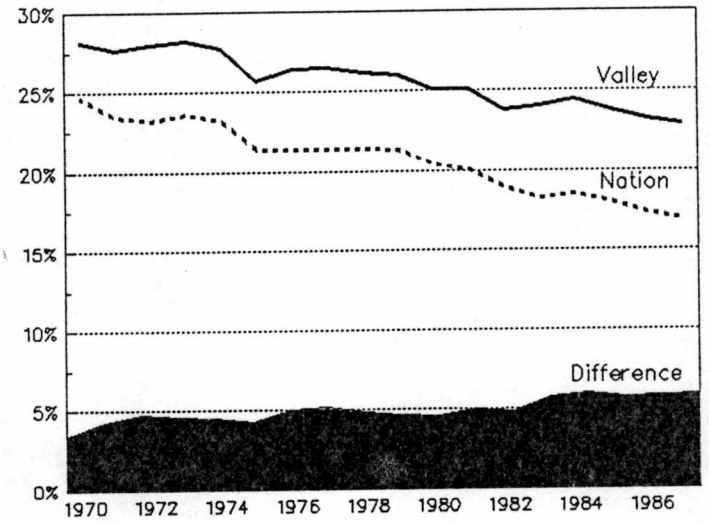

Figure 6. Manufacturing employment as a percentage of total employment in the Tennessee Valley and the United States.

employment is declining in both the regional and national economies, the difference between the two proportions has

increased steadily over the last two decades. The regional economy is not only more dependent on manufacturing employment relative to the nation, but this relative dependence has grown. With as much as 40 percent of total employment in rural counties within the Valley found in the manufacturing sector, it is clear that the impact of recession in the national economy on income within the Valley would be particularly severe.

Despite the trend of decline in percentage terms, manufacturing employment in the region has grown steadily since the early eighties. This growth is made even more remarkable by the overall decline in the level of manufacturing employment in the United States of over two million workers between 1979 and 1987. The strong growth in regional income that has resulted from employment growth in the manufacturing sector of the regional economy in the late eighties has in turn created service sector employment opportunities throughout the Valley. In the Tennessee Valley, however, a smaller fraction of employment in the regional service sector is found in less cyclical sectors such as insurance, medical and professional services, or business and producer services.[28] The strong dependence of the regional service sector on trade, personal services, and other service industries responsive to local incomes

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[28]The evolution of the service sector of the state of Tennessee is discussed in Gilmer and Pulsipher (1989).

must be considered as one of the factors which has created a discrepancy between the regional and national business cycles.

The problem of the Tennessee Valley economy's dependence on the national business cycle is further exacerbated by the different composition of growth in the Valley's metropolitan and rural areas. While the importance of manufacturing employment appears to be declining in the central counties of the major metropolitan areas in the Valley--Memphis, Nashville, Knoxville, Chattanooga, and Huntsville--manufacturing employment is increasing in the Valley's rural areas. The location quotients presented in Table 2 illustrate the shift of the Valley's manufacturing employment base into rural counties.[29] Despite a larger concentration of manufacturing employment in the Tennessee Valley compared to the United States average and the Southeast as far back as 1969, metropolitan areas within the Valley have had a below average concentration for the Valley. In rural areas, however, manufacturing employment comprises a larger percentage of total employment than the average for the Valley or the United States. While the Valley's concentration of manufacturing employment has grown

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[29]A location quotient is the proportion of a sub-region's employment in a specific industry divided by the corresponding proportion for the entire region.

Table 2

Location Quotients for Manufacturing Employment In the Tennessee Valley and the Southeast[30]

	Southeastern United States	Tennessee Valley	Valley Metropolitan Areas	Valley Rural Areas
1969	0.94	1.24	0.85	1.22
1979	1.00	1.34	0.81	1.26
1985	1.03	1.46	0.77	1.34
1987	1.05	1.49	0.75	1.38

relative to the United States, within the Valley it has steadily shifted out of metropolitan counties and into rural areas.

The Econometric Identification of the Disproportionate Effects of Monetary Policy on Employment in the Tennessee Valley

The target of monetary policy in engineering the recession of the early eighties was the accelerating rate of inflation, which subsequently slowed and has remained below 4 percent for most of the eighties. In the last few years, however, inflation has begun to accelerate, and the Federal Reserve is again assuming the responsibility to contain inflationary pressures. The use of discretionary

[30]In this table the location quotient for the Southeastern states and the Tennessee Valley is a comparison with the United States, and the location quotients for metropolitan and rural areas within the Valley are a comparison with the Tennessee Valley.

monetary policy, i.e. discrete changes in short-term interest rates, has become the politically expedient solution to the problem of inflation, but the potential for monetary policy to succeed is by no means clear.

From the perspective of macroeconomic policy, some recognition and analysis of the disproportionate effects of monetary policy appears to be warranted. If the negative effects of restrictive monetary policy are localized in particular regions and industries, as is suggested by the experience of the Tennessee Valley, the overall rate of inflation can be expected to reflect a coincidence of price increases and price stabilization, leaving the net effect on inflation ambiguous. It is conceivable that the source of the overall rate of inflation, nominal wage increases, is left largely unaffected by recession-like conditions in interest-sensitive industries, with the result that the desired change in the rate of inflation will not be observed following a discrete increase in short-term interest rates.

Such a scenario is particularly alarming to regions such as the Tennessee Valley, which remain dependent on the manufacturing sector. Moreover, this dependence is expected to grow relative to the national average in the nineties, with employment gains in rural areas limited to the growth in the manufacturing sector, and the service sector jobs that are tied to the income from local

manufacturing. This implies that economic development in the Tennessee Valley will remain very sensitive to the national business cycle and especially higher interest rates. As the structure of the United States economy changes toward a service-oriented economy, metropolitan economies are diverging more than ever from rural economies. The relationship between the conduct of monetary policy and the stated goals may well be affected by this divergence, and some theoretical insight into the distributional implications of monetary policy will be required to frame our expectations of its potential success in the containment of inflation.

As is generally the case with the analysis of macroeconomic policy, there is also a political significance to the argument that monetary policy affects the Tennessee Valley economy disproportionately. The large proportion of the Valley's population living in rural areas requires that some consideration be given to the intraregional differences in economic welfare that result from macroeconomic policies. This fact has elicited some attention in the Congress on the plight of rural development independent of agriculture, and through Congressional appropriations the Tennessee Valley has served as a laboratory for rural development. If indeed the Tennessee Valley is disproportionately affected by monetary policy, and if the development of rural areas

within the Tennessee Valley is at all representative of other rural areas in the United States, the accession of Federal Reserve management may be in direct conflict with the commitment of funds to the promotion of rural development.

The econometric model developed in this section is an attempt to test whether the observed disproportionate effect of national business cycles on employment in the Tennessee Valley economy is actually the result of the disproportionate effect of monetary policy on employment in rural areas within the region. Monetary policy is viewed as directly responsible for the variation in the price of short-term credit, as argued in chapter 2. A model relating the variation in the federal funds rate to employment was first estimated to confirm that monetary policy has had a disproportionate effect on total employment in the Tennessee Valley, and was then used to test whether this disproportionate effect is due to a disproportionate impact on employment in rural areas within the Valley.

The comparisons of the relationships between the price of short-term credit and various aggregations of employment are made using an index of proportionality. The index calculation is very similar to the ratio of long term

elasticities.[31] In the context of confirming that monetary policy has had a disproportionate effect on total employment in the Tennessee Valley, the estimated effect of variation in the price of short-term credit on employment in the region, expressed as a percentage, is divided by the estimated proportional effect on total employment in the United States. An index value significantly greater than one suggests that the effect of variation in the price of short-term credit has had a greater effect on employment in the Tennessee Valley than the average effect observed in the national economy.

To test whether this disproportionate effect of monetary policy on total employment in the Tennessee Valley can be accounted for by the disproportionate effect on employment in rural areas within the Valley, an index is calculated comparing the estimated effect of variation in the price of short-term credit on employment in rural areas to the average effect on regional employment. Since the division of regional employment between metropolitan and rural areas is comprehensive, an index value for rural areas significantly greater than one confirms that rural areas are responsible for the Valley's overall vulnerability to monetary policy.

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[31]As will be explained below, the distributed lag technique employed involves summing over adverse lagged effects, and is conceptually, but not mathematically, equivalent to the calculation of a long term elasticity.

Indices are also calculated for employment in the commercial and manufacturing sectors of the Tennessee Valley, and for the metropolitan and rural commercial and manufacturing sectors within the Valley. The objective here is to further explain the overall results for total employment. Indices greater than one in this context would indicate that the effect of monetary policy on employment in the Tennessee Valley is at least partially explained by structural differences in the manufacturing sectors. For the case of the Tennessee Valley, the results indicate that the combination of the adverse effect of variation in the price of short-term credit on rural manufacturing sectors, and the effect of declines in manufacturing employment on local commercial employment, are responsible for the estimated disproportionate effect of monetary policy.

The econometric model will be presented conceptually first, so that the method of comparing the aggregate results can be outlined independently of the estimation of the relationships. The exact specification used to estimate the relationships will then be presented, along with the results of the estimation.

The theoretical model developed in Chapter 2 presented a general but comprehensive set of exogenous factors which affect the expansion of aggregate employment:

$$N = N(I, S_w, G_w, X_w, k, R)$$
$$\quad\; - \; + \; + \; + \; - \; +$$

were N = aggregate employment
I = the price of short-term credit
S_w = the level of non-traditional credit
G_w = discretionary government deficit spending
X_w = foreign demand for United States production
k = target markup over money capital
R = the resource capacity of the economy

While the focus of the empirical analysis is to estimate the adverse effect of variation in the price of short-term credit on employment in the Tennessee Valley, the objective in developing an econometric model is to make comparisons of the estimated effect on one aggregation of employment with that on another. Since the timing and duration of the adverse effects of variation in the price of short-term credit can not be ascertained analytically, the econometric specification needed to be general enough to incorporate possible differences in timing and duration. A distributed lag technique known as the Laguerre lag was used to account for these differences.[32] The advantage of this technique is that it allows the lag weights, i.e. the successive effects of a discrete change in the price of short-term credit on employment, to be specified through the maximum likelihood technique, which does not arbitrarily impose a lag structure on the data. This

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[32]This model is discussed in the context of other distributed lag models in Kmenta (1986), p. 543, and was introduced in Schmidt (1974).

maximum likelihood technique simultaneously incorporates both the possibility of no lagged effect, and the possibility that the lagged effect of a discrete change in the price of short-term credit increases initially before dissipating over time.

Assuming that all of the influences on aggregate employment outlined above can be perfectly accounted for in a time series, and that the variation in the price of short-term credit is the only factor which has a lagged effect on employment, the econometric model becomes:[33,34]

[3.1]

$$N_t = \beta_1 + \sum_{i=0}^{\infty} w_i I_{t-i} + \beta_3 S_t + \beta_4 G_t + \beta_5 X_t + \beta_6 k_t + \beta_7 R_t + \epsilon_t,$$

where $w_i = (\delta_0+\delta_1 i+\delta_2 i^2)\mu^i \quad (0\leq\mu<1 \ , \ i=0..\infty)$,

and $\epsilon_t = p\epsilon_{t-1} + \tau_t \quad [\tau_t \text{--} N(0,\sigma_\tau^2)]$.

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[33]The assumption that the price of short-term credit is the only factor having a lagged effect on employment is an arbitrary but necessary limitation on the econometric model. Given the technology of applied econometric technique, there is a trade-off between the introduction of an infinite lagged structure on other variables and the successful estimation of the lagged effect of the variation on the price of short-term credit on employment. For this analysis, the assumption is made with the expectation that the true lag structure of the other exogenous influences on employment involves a rapidly diminishing lagged effect, such that the entire effect of variation in these forces is meaningfully approximated by their first period effects.

[34]From this point the subscript reference to the denomination of nominal magnitudes in wage units will be dropped to avoid confusion with the lag weight, w_i.

Substituting in for w_i, the model becomes

[3.2]

$$N_t = \beta_1 + \sum_{i=0}^{\infty}(\delta_o+\delta_1 i+\delta_2 i^2)\mu^i I_{t-i}$$

$$+ \beta_3 S_t + \beta_4 G_t + \beta_5 X_t + \beta_6 k_t + \beta_7 R_t + \epsilon_t.$$

The infinite summation over the price of short-term credit can be divided between what is observed, given t observations, and what is not observed, as follows:

[3.3]

$$\sum_{i=0}^{\infty}(\delta_o+\delta_1 i+\delta_2 i^2)\mu^i I_{t-i}$$

$$= \delta_0 \sum_{i=0}^{t-1}\mu^i I_{t-i} + \delta_o\mu^t \sum_{i=1}^{\infty}\mu^i I_{-i}$$

$$+ \delta_1 \sum_{i=0}^{t-1} i\mu^i I_{t-i} + \delta_1\mu^t \sum_{i=1}^{\infty} i\mu^i I_{-i} + \delta_1 t\mu^t \sum_{i=1}^{\infty}\mu^i I_{-i}$$

$$+ \delta_2 \sum_{i=0}^{t-1} i^2\mu^i I_{t-i} + \delta_2\mu^t \sum_{i=1}^{\infty} i^2\mu^i I_{-i} + \delta_2 2t\mu^t \sum_{i=1}^{\infty} i\mu^i I_{-i}$$

$$+ \delta_2 t^2\mu^t \sum_{i=1}^{\infty}\mu^i I_{-i}$$

$$= \delta_0 \sum_{i=0}^{t-1} \mu^i I_{t-i} + \delta_1 \sum_{i=0}^{t-1} i\mu^i I_{t-i} + \delta_2 \sum_{i=0}^{t-1} i^2 \mu^i I_{t-i}$$

$$+ \mu^t \left(\delta_0 \sum_{i=1}^{\infty} \mu^i I_{-i} + \delta_1 \sum_{i=1}^{\infty} i\mu^i I_{-i} + \delta_2 \mu^t \sum_{i=1}^{\infty} i^2 \mu^i I_{-i} \right)$$

$$+ t\mu^t \left(\delta_1 \sum_{i=1}^{\infty} \mu^i I_{-i} + \delta_2 2 \sum_{i=1}^{\infty} i\mu^i I_{-i} \right)$$

$$+ t^2 \mu^t \left(\delta_2 \sum_{i=1}^{\infty} \mu^i I_{-i} \right)$$

$$= \delta_0 [W_{t0}^{(I)}] + \delta_1 [W_{t1}^{(I)}] + \delta_2 [W_{t2}^{(I)}]$$

$$+ \phi_1 \mu^t + \phi_2 t\mu^t + \phi_3 t^2 \mu^t$$

where $W_{t0}^{(I)} = \sum_{i=0}^{t-i} \mu^i I_{t-i}$

$W_{t1}^{(I)} = \sum_{i=0}^{t-i} i\mu^i I_{t-i}$

$W_{t1}^{(I)} = \sum_{i=0}^{t-i} i^2 \mu^i I_{t-i}$

In matrix notation the model becomes:

[3.4]

$y = Z\beta + \epsilon$, where $\epsilon_t = p\epsilon_{t-1} + \tau_t$, with $\tau_t \sim N(0, \sigma_\tau^2)$

where

$y' = [\ N_1\ N_2\ N_3\ \ldots\ N_t\ ]$

$$Z = \begin{vmatrix} 1 & W_{10}^{(I)} & W_{11}^{(I)} & W_{12}^{(I)} & \mu & \mu & \mu & S_1 & K_1 & G_1 & X_1 & R_1 \\ 1 & W_{20}^{(I)} & W_{21}^{(I)} & W_{22}^{(I)} & \mu^2 & 2\mu^2 & 4\mu^2 & S_2 & K_2 & G_2 & X_2 & R_2 \\ 1 & W_{30}^{(I)} & W_{31}^{(I)} & W_{32}^{(I)} & \mu^3 & 3\mu^3 & 9\mu^3 & S_3 & K_3 & G_3 & X_3 & R_3 \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\ 1 & W_{t0}^{(I)} & W_{t1}^{(I)} & W_{t2}^{(I)} & \mu^t & t\mu^t & t^2\mu^t & S_t & K_t & G_t & X_t & R_t \end{vmatrix}$$

$$\beta' = [\ \beta_1\ \delta_0\ \delta_1\ \delta_2\ \phi_0\ \phi_1\ \phi_2\ \beta_3\ \beta_4\ \beta_5\ \beta_6\ \beta_7\ ]$$

and

$$E(\epsilon\epsilon') = \Omega = \frac{\sigma_\tau^2}{1-p^2} \begin{vmatrix} 1 & p & p^2 & p^3 & \cdot & \cdot & \cdot & \cdot & \cdot & p^{n-1} \\ p & 1 & p & p^2 & p^3 & \cdot & \cdot & \cdot & \cdot & p^{n-2} \\ p^2 & p & 1 & p & p^2 & p^3 & \cdot & \cdot & \cdot & p^{n-3} \\ p^3 & p^2 & p & 1 & p & p^2 & p^3 & \cdot & \cdot & p^{n-4} \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ p^{n-1} & p^{n-2} & p^{n-3} & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \end{vmatrix}$$

The likelihood function of (y) becomes:

[3.5]

$$l = f(y) = f(\epsilon) = 2\pi^{-\frac{1}{2}n}|\Omega|^{-\frac{1}{2}}\exp[-\tfrac{1}{2}\epsilon'\Omega^{-1}\epsilon]$$

$$\ln(l) = L = -\tfrac{1}{2}n(\ln 2\pi) - \tfrac{1}{2}(\ln|\Omega|) - \tfrac{1}{2}\epsilon'\Omega^{-1}\epsilon$$

$$= -\tfrac{1}{2}n(\ln 2\pi) - \tfrac{1}{2}\ln|\Omega| - \tfrac{1}{2}(y-Z\beta)'\Omega^{-1}(y-Z\beta)$$

The maximum likelihood estimation of β involves searching over the parameters μ ($0 \le \mu < 1$) and p ($0 \le p < 1$) simultaneously and choosing the estimator b that maximizes L:

[3.6]

$$b = (X'\Omega^{-1}X)^{-1}(X'\Omega^{-1}y)$$

$$\text{var}(b) = (X'\Omega^{-1}X)^{-1}$$

Given the estimate of μ which maximizes L, the estimates of the lag weights, w_i, can be calculated from the estimates

of δ_0, δ_1, and δ_2 contained in the b matrix.

Of the five non-cyclical exogenous factors accounted for above, only two lend themselves directly to econometric estimation: the discretionary deficit spending of the government, and foreign demand. The discretionary deficit spending of the government is given by the level of the structural budget deficit, which is a calculation of the deficit that would exist at full employment. The level of real exports is also readily available.

To incorporate the concepts of non-traditional credit, the target mark-up over money capital, and the capacity of the economy, some approximation in a quantitative index is required. The main criteria for choosing a suitable index is that it approximates the non-cyclical variation in these forces. The ratio of the broad money aggregate M3 to the narrow money aggregate M1 was chosen to approximate the development of non-traditional credit over time. An index of real energy prices was calculated to approximate the variation in the target markup that is due to supply shocks. And finally, an index of population in the United States economy was used to approximate the trend increase in the resource capacity of the economy over time.

While this specification represents a very narrow set of the exogenous influences on employment, some uniform reduction of the exogenous influences on employment is required to meaningfully apply the model to different

aggregations of employment. This necessarily introduces the possibility of misspecification into the analysis, but only to the extent that an exogenous non-cyclical influence on a particular aggregation is not correlated with one of the non-cyclical variables in the specification. Moreover, this exclusion of a relevant non-cyclical influence would only limit the interpretation of the results to the extent that introducing the variable into the specification would significantly alter the estimated lagged cyclical effect of variation in the federal funds rate. Since the isolated effect of variation in the federal funds rate on different aggregations is being compared in the calculation of the index, and not analyzed in isolation, the conclusions of the study would only be affected to the extent that the aggregations of employment under study were affected differently by the excluded noncyclical influence. The possibility that these conditions are present in sufficient magnitude to render the results misleading is remote, and so the results presented in this case study will be viewed as a useful first approximation to the actual relationships.

The following specification was estimated using the technique outlined above for quarterly data between 1969 and 1987:[35]

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[35]The employment data available for the national economy was deseasonalized according to the standard

[3.7]

$$N_t = b_1 + \sum_{i=0}^{\infty} w_i I_{t-i} + b_3 S_t + b_4 G_t + b_5 X_t + b_6 k_t + b_7 R_t + e_t,$$

where $w_i = (s_0 + s_1 i + s_2 i^2) u^i \quad (0 \leq u < 1)$,

and $e_t = p e_{t-1} + v_t \quad (v_t \text{--} N(0, \sigma_v^2))$,

with
N = aggregate employment,
I = the federal funds rate (adjusted for the percentage increase in the GNP deflator)
S = index of non-traditional credit (M3/M1)
G = the real structural budget deficit,
X = real exports of the United States,
k = index of real energy prices,
R = index of United States population.

From the estimates of the lag weights, w_i, which indicate the lagged effect of a variation in the federal funds rate, it is possible to calculate the total adverse effect on employment over a specific time horizon. Theoretically, an increase in the federal funds rate can be expected to have little or no effect in the current period, since the current period involves plans made in previous periods. The negative effect of the increase in the federal funds rate can then be expected to grow larger in successive periods, as the change in the federal funds rate raises retail loan rates and has an adverse impact on

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techniques used in publication of national statistics. A similar procedure was therefore used to deseasonalize the regional employment data. To the extent that the deseasonalization is accurate, the correct scheme of autocorrelation to incorporate would be the first order autoregressive scheme presented in the text. An alternative scheme incorporating quarterly autocorrelation was also incorporated, however, and in both cases the maximum likelihood estimate for p was equal to 0.

expectations of future demand. At some point the negative effect of a discrete change in the federal funds rate can be expected to dissipate as other factors affect expectations and economic growth.

The expected results from the estimation of the lag weights with this model, however, does not exactly correspond to this theoretical expectation on the correlation between employment and the federal funds rate. Since monetary policy acts in the context of the cyclical expansion of the economy, and this model does not force any particular lag structure on the data, a discrete change in the federal funds rate will be initially positively correlated with employment. This does not imply that an increase in the federal funds rate has a beneficial effect on employment, but rather that the immediate impact of monetary policy is overwhelmed by the commitments from previous plans. This feature of the model estimation is shown in Figure 7, where the estimated quarterly lag weights, w_i, for total employment in the Tennessee Valley and the United States are shown as a percentage of average employment in the respective sectors between 1969 and 1987. The estimated weight on the federal funds rate in the current period, t_0, when the discrete change is made, is positive, reflecting the correlation of current policy and planned commitments. The impact of the increase in the federal funds rate is clearly seen in successive periods,

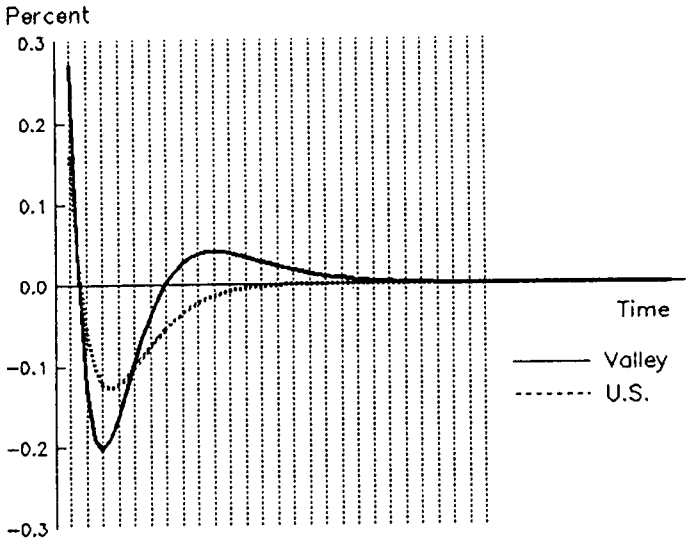

Figure 7. The estimated pattern of the quarterly lag weights for the total employment in the Tennessee Valley and the United States, expressed as a percentage of average employment over the period between 1969 and 1987.

however, as the estimated effect grows increasingly negative. As the negative effect begins to diminish at some point, it is also possible that the estimated weights again show positive correlation as the economy cyclically expands. This feature is desirable in the estimation of the lagged effect of monetary policy precisely because a better estimate of the true lag structure emerges, compared to the imposition of an arbitrary lag structure on the estimation.

This feature of the model makes the complete summation

of the lag weights an inappropriate measure of the effect of monetary policy on employment, since from a policy perspective we are concerned with the magnitude of the adverse effect. Some criteria must then be established to combine the estimated negative lag weights to arrive at a total in order to compare the effect of monetary policy on regional and national employment. Since monetary policy is designed with some expectation of a change in economic growth, which is ultimately expected to change the rate of inflation, a relevant time horizon appears to be the best criteria for comparisons using the model. In the case of the Tennessee Valley, the results of the estimation indicate that the full adverse effect of an increase in the federal funds rate occurs within 12 quarters, or three years, and so this time horizon was used to delimit the relevant lag weights.[36]

Using this criterion of a three year time horizon, the total adverse effect of monetary policy on aggregate employment in various sectors can then be expressed as a percentage of the average level of employment, N_a, in the

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[36]An alternative statistical criterion, such as the ratio of the estimated lag weight to its standard error, corresponding to the conventional t-test, was also considered and found to be broadly consistent with the criterion of a relevant time horizon. In only three of the twelve estimations detailed below would such a criterion change the magnitudes involved in the comparisons, and even then the changes are small, and do not controvert the implications of the analysis.

aggregate sector:

[3.8]

$$\Gamma = \left(\sum_{i=0}^{11} w_i\right) / N_a \text{ , for } w_i<0$$

The estimated adverse effect of a one percent change in the federal funds rate on the various aggregations of employment was then used to calculate an index of proportionality:

$$I = \Gamma_{(region)} / \Gamma_{(nation)} ,$$

in the context of confirming that monetary policy has had a disproportionate effect on the Tennessee Valley; and

$$I = \Gamma_{(subregion)} / \Gamma_{(region)}$$

in the context of testing whether monetary policy has had a disproportionate effect on rural areas within the Valley.

The index values can be interpreted as follows:

$I > 1$ indicates a more than proportionate effect;

$I = 1$ indicates a proportionate effect; and

$I < 1$ indicates a less than proportionate effect;

The significance of the index calculations was confirmed by carrying out a likelihood ratio test where the estimated parameters for μ, δ_0, δ_1, and δ_2 for the smaller sector are restricted to the maximum likelihood estimates for the larger sector:

[3.9]

$$LR_{test} = -2[L_r - L_u] \approx X^2_4$$

where L_r is the value of the restricted likelihood

function, and L_u is the value of obtained from the maximum likelihood estimates.

This specification was initially used to estimate the effect of variation in the price of short-term credit on total employment in the United States, the Southeastern United States, and the Tennessee Valley. The objective in the comparison of these results is to establish that monetary policy, as manifested in the variation of the price of short term credit, has had a disproportionate effect on employment in the Tennessee Valley. An index of proportionality is calculated, as described above, using the estimated adverse effects over the first three years. The indices calculated for the comparison of the estimated adverse effect of variation in the price of short-term credit on total employment in the Tennessee Valley and the Southeast are presented in Table 3, and the detailed results of the estimation of the model for total employment in the United States, the Southeast and the Tennessee Valley follow in Tables 4, 5, and 6.

The index value of 1.25 indicates that monetary policy has had a disproportionate effect on total employment in the Tennessee Valley. An index value for the comparison of the estimated effect of variation in the price of short term credit on total employment in the Valley and the United States would not be significantly different from 1.0 if the effects were equal in percentage terms. The

Table 3

Indices for Total Employment

	Index Value	Likelihood Ratio Test	
Southeast	0.97	290.8	(0.01)
Tennessee Valley	1.25	659.5	(0.01)
Metropolitan Areas	0.74	322.2	(0.01)
Rural Areas	1.43	93.2	(0.01)

likelihood ratio test statistics indicate the estimated relationship between the price of short-term credit and employment in the Tennessee Valley is significantly different from the relationship estimated for the United States. The index value of 0.97 for the comparison of the estimated effect on total employment in the Southeast States and the United States indicates that the Southeast is not affected differently than the United States average, which suggests that the Tennessee Valley is somewhat unique even within the Southeast.

To test the hypothesis that the disproportionate effect of monetary policy on the region is actually due tothe disproportionate effect on rural areas within the Valley, the model was further applied to metropolitan and rural aggregations of employment. An index was then calculated comparing the estimated adverse effect of variation in the price of short-term credit on metropolitan and rural areas to the average for the Tennessee Valley.

Table 4

Results of the Model Estimation for Total Employment in the United States

Maximum Likelihood Estimates		Calculated Lag Weights	Γ
b_1 = -17512500.0 (16235900.0)		w_0 = 148781.0 (86821.1)	-0.98%
s_0 = 148781.0 (86821.1)	$[W_{0t}^{(I)}]$	w_1 = 23997.9 (50367.0)	
s_1 = -122979.0 (46953.8)	$[W_{1t}^{(I)}]$	w_2 = -51453.3 (36742.6)	
s_2 = 4195.3 (4789.3)	$[W_{2t}^{(I)}]$	w_3 = -93387.9 (32571.0)	
o_0 = 12812400.0 (3863330.0)	$[u^t]$	w_4 = -113054.0 (29762.3)	
o_1 = 743868.0 (1593600.0)	$[tu^t]$	w_5 = -118368.0 (26637.1)	
o_2 = 503404.0 (231788.0)	$[t^2u^t]$	w_6 = -114835.0 (23732.1)	
b_3 = 6450270.0 (2450310.0)	$[S_t]$	w_7 = -106221.0 (21751.5)	
b_4 = 15097.1 (11793.5)	$[G_t]$	w_8 = -95051.6 (20926.9)	
b_5 = 38299.8 (14651.9)	$[X_t]$	w_9 = -82974.9 (20971.5)	
b_6 = -21279800.0 (4958530.0)	$[k_t]$	w_{10} = -71025.8 (21391.5)	
b_7 = 91070100.0 (27499000.0)	$[R_t]$	w_{11} = -59816.6 (21782.5)	
u = 0.8[a]			
p = 0.0[b]			
L = -1185.4			
R^2 = 0.98			

[a] Searched over $0 \leq u < 1.0$ by 0.1

[b] Searched over $-1.0 < p < 1.0$ by 0.1

Table 5

Results of the Model Estimation for
Total Employment
in the Southeast

Maximum Likelihood Estimates			Calculated Lag Weights		Γ
b_1 =	-7199550.0		w_0 =	41561.8	-0.95%
	(4484110.0)			(23978.6)	
s_0 =	41561.8	$[W_{0t}^{(I)}]$	w_1 =	8793.2	
	(23978.6)			(13910.6)	
s_1 =	-32079.2	$[W_{1t}^{(I)}]$	w_2 =	-10599.1	
	(12967.9)			(10147.7)	
s_2 =	1508.9	$[W_{2t}^{(I)}]$	w_3 =	-21041.1	
	(1322.7)			(8995.6)	
o_0 =	2422600.0	$[u^t]$	w_4 =	-25646.3	
	(1066990.0)			(8219.9)	
o_1 =	-19487.4	$[tu^t]$	w_5 =	-26578.9	
	(440127.0)			(7356.7)	
o_2 =	109737.0	$[t^2u^t]$	w_6 =	-25321.5	
	(64016.3)			(6554.5)	
b_3 =	1528220.0	$[S_t]$	w_7 =	-22871.1	
	(676738.0)			(6007.4)	
b_4 =	3047.5	$[G_t]$	w_8 =	-19881.7	
	(3257.2)			(5779.7)	
b_5 =	9436.2	$[X_t]$	w_9 =	-16768.1	
	(4046.6)			(5792.0)	
b_6 =	-5997900.0	$[k_t]$	w_{10} =	-13780.7	
	(1369470.0)			(5908.0)	
b_7 =	23898100.0	$[R_t]$	w_{11} =	-11058.3	
	(7594800.0)			(6016.0)	
u =	0.8[a]				
p =	0.0[b]				
L =	-1087.6				
R^2 =	0.98				

[a]Searched over $0 \leq u < 1.0$ by 0.1

[b]Searched over $-1.0 < p < 1.0$ by 0.1

Table 6

Results of the Model Estimation for
Total Employment
in the Tennessee Valley

Maximum Likelihood Estimates			Calculated Lag Weights		Γ
b_1 =	-81239.3		w_0 =	7834.0	-1.22%
	(470983.0)			(2518.6)	
s_0 =	7834.0	$[W_{0t}^{(I)}]$	w_1 =	343.0	
	(2518.6)			(1461.9)	
s_1 =	-8026.9	$[W_{1t}^{(I)}]$	w_2 =	-3669.2)	
	(1362.1)			(1065.9)	
s_2 =	621.7	$[W_{2t}^{(I)}]$	w_3 =	-5453.5	
	(138.9)			(944.8)	
o_0 =	205174.0	$[u^t]$	w_4 =	-5868.1)	
	(112070.0)			(863.4)	
o_1 =	-40041.2	$[tu^t]$	w_5 =	-5491.3	
	(46228.2)			(772.7)	
o_2 =	15400.2	$[t^2u^t]$	w_6 =	-4704.5	
	(6723.9)			(688.4)	
b_3 =	116577.0	$[S_t]$	w_7 =	-3752.0	
	(71080.3)			(631.0)	
b_4 =	-101.6	$[G_t]$	w_8 =	-2783.7	
	(342.1)			(607.1)	
b_5 =	1407.2	$[X_t]$	w_9 =	-1885.8	
	(425.0)			(608.4)	
b_6 =	-396608.0	$[k_t]$	w_{10} =	-1102.2	
	(143841.0)			(620.5)	
b_7 =	2467940.0	$[R_t]$	w_{11} =	-449.8	
	(797711.0)			(631.9)	
u =	0.8[a]				
p =	0.0[b]				
L =	-916.3				
R^2 =	0.98				

[a]Searched over $0 \leq u < 1.0$ by 0.1

[b]Searched over $-1.0 < p < 1.0$ by 0.1

These subregional index calculations are also presented in Table 3 above, with the detailed results of the model estimation for total employment in the metropolitan and rural areas within the Valley presented in Tables 7 and 8.

These index calculations strongly support the hypothesis that the disproportionate effect of monetary policy on the Tennessee Valley economy is actually due to the relatively severe effect of monetary policy on employment in the Valley's rural areas. The index value of 1.43 for the comparison of the estimated adverse effect on the Valley's rural areas and the Valley average suggests that total employment in rural areas of the Valley will decline by almost 50 percent more than the overall decline observed in the Valley. Even more unsettling is the fact that this comparison actually understates the relative disproportionate effect of monetary policy on rural areas compared to the average effect on the U.S, since the index comparing total employment in the Valley to total employment in the United States indicates an overall disproportionate effect. The index value of 0.74 for the comparison of total employment in metropolitan areas within the Valley to the Valley average, which indicates a less than proportionate effect on these areas, suggests that considerable discrepancies exist between the adverse effect of variation in the price of short-term credit on metropolitan and rural areas.

Table 7

Results of the Model Estimation for
Total Employment
in Metropolitan Areas within the Tennessee Valley

Maximum Likelihood Estimates			Calculated Lag Weights		Γ
b_1 =	-15851.8		w_0 =	3998.0	-0.90%
	(273549.0)			(1430.6)	
s_0 =	3998.1	$[W_{0t}^{(I)}]$	w_1 =	4059.2	
	(1430.6)			(1113.6)	
s_1 =	5270.9	$[W_{1t}^{(I)}]$	w_2 =	1629.2	
	(2531.7)			(845.6)	
s_2 =	-2503.5	$[W_{2t}^{(I)}]$	w_3 =	-587.8	
	(644.4)			(497.5)	
o_0 =	-168686.0	$[u^t]$	w_4 =	-1940.8	
	(131012.0)			(406.0)	
o_1 =	226486.0	$[tu^t]$	w_5 =	-2506.7	
	(121617.0)			(466.6)	
o_2 =	-67141.5	$[t^2u^t]$	w_6 =	-2543.0	
	(29149.7)			(491.2)	
b_3 =	-37152.4	$[S_t]$	w_7 =	-2289.3	
	(40580.6)			(461.0)	
b_4 =	333.9	$[G_t]$	w_8 =	-1915.8	
	(150.8)			(398.9)	
b_5 =	715.5	$[X_t]$	w_9 =	-1525.3	
	(256.4)			(325.9)	
b_6 =	-396937.0	$[k_t]$	w_{10} =	-1170.9	
	(69903.0)			(255.4)	
b_7 =	2076230.0	$[R_t]$	w_{11} =	-874.2	
	(493736.0)			(193.8)	
u =	0.6[a]				
p =	0.0[b]				
L =	-874.9				
R^2 =	0.98				

[a]Searched over $0 \leq u < 1.0$ by 0.1

[b]Searched over $-1.0 < p < 1.0$ by 0.1

Table 8

Results of the Model Estimation for
Total Employment
in Rural Areas within the Tennessee Valley

Maximum Likelihood Estimates			Calculated Lag Weights		Γ
b_1 =	-147810.0		w_0 =	2899.3	-1.74%
	(221819.0)			(1186.2)	
s_0 =	2899.3	$[W_{0t}^{(I)}]$	w_1 =	-601.9	
	(1186.2)			(688.1)	
s_1 =	-3959.8	$[W_{1t}^{(I)}]$	w_2 =	-2424.2)	
	(641.5)			(502.0)	
s_2 =	308.1	$[W_{2t}^{(I)}]$	w_3 =	-3177.9	
	(65.4)			(445.0)	
o_0 =	96306.4	$[u^t]$	w_4 =	-3280.8)	
	(52781.6)			(406.6)	
o_1 =	-12963.4	$[tu^t]$	w_5 =	-3013.4	
	(21772.1)			(363.9)	
o_2 =	9661.7	$[t^2u^t]$	w_6 =	-2560.2	
	(3166.7)			(324.2)	
b_3 =	80460.0	$[S_t]$	w_7 =	-2038.5	
	(33476.6)			(297.2)	
b_4 =	-147.3	$[G_t]$	w_8 =	-1519.7	
	(161.1)			(285.9)	
b_5 =	489.6	$[X_t]$	w_9 =	-1044.1	
	(200.2)			(286.5)	
b_6 =	-94485.7	$[k_t]$	w_{10} =	-631.8	
	(67744.5)			(292.3)	
b_7 =	961622.0	$[R_t]$	w_{11} =	-289.8	
	(375697.0)			(297.6)	
u =	0.8[a]				
p =	0.0[b]				
L =	-859.1				
R^2 =	0.97				

[a]Searched over $0 \leq u < 1.0$ by 0.1

[b]Searched over $-1.0 < p < 1.0$ by 0.1

To investigate possible empirical explanations for the estimated disproportionate effect on total employment in the Tennessee Valley and especially rural areas within the Valley, the model was also estimated for the commercial and manufacturing employment sectors. There are two ways, however, to calculate an index comparing the adverse effect of the variation in the price of short term credit on these employment sectors. The first is to use the index calculation to test for structural differences in particular sectors. Structural differences such as a lower concentration of basic service sector employment, or a higher concentration of manufacturing industries producing capital equipment, would make employment in the Tennessee Valley more susceptible to variation in the price of short-term credit. The existence of such differences would be accounted for by comparing the adverse effects of variation in the price of short-term credit as a percentage of employment in particular sectors:

[3.10]

$$\Gamma = \sum_{i=0}^{11} w_{i(sector)} \; / \; N_{(sector)} \quad , \text{ for } w_i<0, \text{ with}$$

$$\text{Index}_{(region)} = \Gamma_{(region)} \; / \; \Gamma_{(nation)} \quad , \text{ or}$$

$$\text{Index}_{(subregion)} = \Gamma_{(subregion)} \; / \; \Gamma_{(region)}.$$

An index calculation making this structural comparison, if significantly greater than one, would indicate that the disproportionate effect of Federal Reserve policy on the

Tennessee Valley is at least in part due to the differences in the type of employment.

The index values comparing the estimated effect of the variation in the price of short term credit on employment in the commercial and manufacturing sectors of the Southeast and the Tennessee Valley to estimated average effect on the United States average are presented in Tables 9 and 10, along with the structural index calculations comparing the metropolitan and rural areas to the Valley average. The results from the estimation of the model for the commercial and manufacturing employment sectors of the Unites States, the Southeast, the Tennessee Valley, and the metropolitan and rural areas within the Valley are presented in Tables 11-20.

The index values comparing the estimated effect of variation in the price of short term credit on employment in the commercial and manufacturing sectors in the Tennessee Valley and the United States do not indicate that structural differences in the respective sectors are responsible for the overall disproportionate effect. The results do indicate, however, that there are considerable structural differences between the estimated effects on employment in the commercial and manufacturing sectors in metropolitan and rural areas. The index value of 1.65 for commercial employment in rural areas indicates that the type of commercial employment in rural areas is much more

Table 9

Structural Indices for the Commercial Sector

	Index Value	Likelihood Ratio Test	
Southeast	0.95	274.0	(0.01)
Tennessee Valley	1.09	703.6	(0.01)
Metropolitan Areas	0.85	364.7	(0.01)
Rural Areas	1.65	104.4	(0.01)

Table 10

Structural Indices for the Manufacturing Sector

	Index Value	Likelihood Ratio Test	
Southeast	1.01	331.4	(0.01)
Tennessee Valley	1.02	594.8	(0.01)
Metropolitan Areas	0.89	290.2	(0.01)
Rural Areas	1.13	58.8	(0.01)

responsive to the effects of monetary policy than metropolitan commercial employment.

An alternative approach to investigating the disproportionate effect of monetary policy is to use the index to account for compositional differences between the Tennessee Valley and the United States. This calculation involves comparing the adverse effect of variation in the price of short-term credit on particular sectors as a percentage of total employment:

Table 11

Results of the Model Estimation for
Commercial Employment
in the United States

Maximum Likelihood Estimates			Calculated Lag Weights		Γ
b_1 =	-96523700.0		w_0 =	382.9	-0.74%
	(40136300.0)			(50574.7)	
s_0 =	382.9	$[W_{0t}^{(I)}]$	w_1 =	-19065.1	
	(50574.7)			(34749.9)	
s_1 =	-22849.4	$[W_{1t}^{(I)}]$	w_2 =	-32548.7	
	(15687.3)			(24323.8)	
s_2 =	1283.1	$[W_{2t}^{(I)}]$	w_3 =	-41274.3	
	(916.2)			(18858.0)	
o_0 =	18298900.0	$[u^t]$	w_4 =	-46245.6	
	(9195040.0)			(17255.2)	
o_1 =	2039940.0	$[tu^t]$	w_5 =	-48294.6	
	(674554.0)			(17596.8)	
o_2 =	33163.0	$[t^2u^t]$	w_6 =	-48107.6	
	(79590.6)			(18388.7)	
b_3 =	5755950.0	$[S_t]$	w_7 =	-46247.6	
	(1720840.0)			(19002.2)	
b_4 =	10461.0	$[G_t]$	w_8 =	-43174.0	
	(8435.6)			(19302.2)	
b_5 =	20088.8	$[X_t]$	w_9 =	-39258.4	
	(11431.8)			(19345.4)	
b_6 =	-14176000.0	$[k_t]$	w_{10} =	-34799.4	
	(3791640.0)			(19244.3)	
b_7 =	135792000.0	$[R_t]$	w_{11} =	-30034.4	
	(40334500.0)			(19110.6)	
u =	0.9[a]				
p =	0.0[b]				
L =	-1152.8				
R^2 =	0.99				

[a] Searched over $0 \leq u < 1.0$ by 0.1

[b] Searched over $-1.0 < p < 1.0$ by 0.1

Table 12

Results of the Model Estimation for
Manufacturing Employment
in the United States

Maximum Likelihood Estimates		Calculated Lag Weights		Γ
b_1 = 23390300.0		w_0 = 93105.1		-1.74%
(5527290.0)		(29557.0)		
s_0 = 93105.1	$[W_{0t}^{(I)}]$	w_1 = 29142.9		
(29557.0)		(17146.8)		
s_1 = -58993.7	$[W_{1t}^{(I)}]$	w_2 = -9992.8		
(15984.8)		(12508.5)		
s_2 = 2317.1	$[W_{2t}^{(I)}]$	w_3 = -32267.2		
(1630.4)		(11088.4)		
o_0 = 3315940.0	$[u^t]$	w_4 = -43333.9		
(1315220.0)		(10132.2)		
o_1 = 419891.0	$[tu^t]$	w_5 = -47164.7		
(542518.0)		(9068.2)		
o_2 = 91896.8	$[t^2u^t]$	w_6 = -46515.0		
(78909.1)		(8079.3)		
b_3 = 3302820.0	$[S_t]$	w_7 = -43266.7		
(834174.0)		(7405.0)		
b_4 = 971.8	$[G_t]$	w_8 = -38679.6		
(4014.9)		(7124.3)		
b_5 = 11451.2	$[X_t]$	w_9 = -33574.7		
(4988.0)		(7139.5)		
b_6 = -6529080.0	$[k_t]$	w_{10} = -28467.0		
(1688060.0)		(7282.5)		
b_7 = -16543900.0	$[R_t]$	w_{11} = -23661.3		
(9361650.0)		(7415.5)		
u = 0.8[a]				
p = 0.0[b]				
L = -1103.5				
R^2 = 0.71				

[a]Searched over $0 \leq u < 1.0$ by 0.1

[b]Searched over $-1.0 < p < 1.0$ by 0.1

Table 13

Results of the Model Estimation for Commercial Employment in the Southeast

Maximum Likelihood Estimates			Calculated Lag Weights		Γ
b_1 =	-27622300.0		w_0 =	2709.4	-0.70%
	(10072800.0)			(12692.5)	
s_0 =	2709.4	$[W_{0t}^{(I)}]$	w_1 =	-2380.8	
	(12692.5)			(8721.0)	
s_1 =	-5707.9	$[W_{1t}^{(I)}]$	w_2 =	-5908.1	
	(3937.0)			(6104.4)	
s_2 =	353.1	$[W_{2t}^{(I)}]$	w_3 =	-8191.3	
	(229.9)			(4732.7)	
o_0 =	4993890.0	$[u^t]$	w_4 =	-9495.4	
	(2307640.0)			(4330.5)	
o_1 =	456072.0	$[tu^t]$	w_5 =	-10039.8	
	(169290.0)			(4416.2)	
o_2 =	20328.8	$[t^2u^t]$	w_6 =	-10005.0	
	(19974.5)			(4614.9)	
b_3 =	1296630.0	$[S_t]$	w_7 =	-9539.0	
	(431871.0)			(4768.9)	
b_4 =	1510.5	$[G_t]$	w_8 =	-8762.2	
	(2117.1)			(4844.2)	
b_5 =	4111.6	$[X_t]$	w_9 =	-7771.7	
	(2869.0)			(4855.0)	
b_6 =	-3564830.0	$[k_t]$	w_{10} =	-6645.5	
	(951572.0)			(4829.7)	
b_7 =	35595200.0	$[R_t]$	w_{11} =	-5445.2	
	(10122600.0)			(4796.1)	
u =	0.9[a]				
p =	0.0[b]				
L =	-1047.8				
R^2 =	0.99				

[a] Searched over $0 \leq u < 1.0$ by 0.1

[b] Searched over $-1.0 < p < 1.0$ by 0.1

Table 14

Results of the Model Estimation for
Manufacturing Employment
in the Southeast

Maximum Likelihood Estimates			Calculated Lag Weights		Γ
b_1 =	2211260.0		w_0 =	24522.0	-1.77%
	(1171460.0)			(6264.4)	
s_0 =	24522.0	$[W_{0t}^{(I)}]$	w_1 =	6730.2	
	(6264.4)			(3634.1)	
s_1 =	-17142.8	$[W_{1t}^{(I)}]$	w_2 =	-3602.7	
	(3387.8)			(2651.1)	
s_2 =	1033.6	$[W_{2t}^{(I)}]$	w_3 =	-9013.3	
	(345.6)			(2350.1)	
o_0 =	549807.0	$[u^t]$	w_4 =	-11268.8	
	(278749.0)			(2147.4)	
o_1 =	-102385.0	$[tu^t]$	w_5 =	-11584.1	
	(114982.0)			(1921.9)	
o_2 =	41032.0	$[t^2u^t]$	w_6 =	-10780.7	
	(16724.1)			(1712.3)	
b_3 =	568301.0	$[S_t]$	w_7 =	-9401.7	
	(176796.0)			(1569.4)	
b_4 =	-449.5	$[G_t]$	w_8 =	-7796.3	
	(850.9)			(1509.9)	
b_5 =	1499.1	$[X_t]$	w_9 =	-6179.5	
	(1057.2)			(1513.2)	
b_6 =	-1196130.0	$[k_t]$	w_{10} =	-4675.6	
	(357771.0)			(1543.5)	
b_7 =	273198.0	$[R_t]$	w_{11} =	-3348.6	
	(1984130.0)			(1571.7)	
u =	0.8[a]				
p =	0.0[b]				
L =	-985.6				
R^2 =	0.85				

[a]Searched over $0 \leq u < 1.0$ by 0.1

[b]Searched over $-1.0 < p < 1.0$ by 0.1

Table 15

Results of the Model Estimation for Commercial Employment in the Tennessee Valley

Maximum Likelihood Estimates			Calculated Lag Weights		Γ
b_1 =	-1092820.0		w_0 =	2597.2	-0.80%
	(185427.0)			(991.6)	
s_0 =	2597.2	$[W_{0t}^{(I)}]$	w_1 =	-52.3	
	(991.6)			(575.2)	
s_1 =	-2937.5	$[W_{1t}^{(I)}]$	w_2 =	-1394.0	
	(536.2)			(419.6)	
s_2 =	274.9	$[W_{2t}^{(I)}]$	w_3 =	-1915.4	
	(54.7)			(372.0)	
o_0 =	138602.0	$[u^t]$	w_4 =	-1947.2	
	(44122.3)			(339.9)	
o_1 =	-207.4	$[tu^t]$	w_5 =	-1709.5	
	(18200.1)			(304.2)	
o_2 =	6477.1	$[t^2u^t]$	w_6 =	-1344.9	
	(2647.2)			(271.0)	
b_3 =	6526.8	$[S_t]$	w_7 =	-942.4	
	(27984.5)			(248.4)	
b_4 =	-75.0	$[G_t]$	w_8 =	-554.8	
	(134.7)			(239.0)	
b_5 =	551.6	$[X_t]$	w_9 =	-210.8	
	(167.3)			(239.5)	
b_6 =	-247639.0	$[k_t]$	w_{10} =	76.8	
	(56630.4)			(244.3)	
b_7 =	2440490.0	$[R_t]$	w_{11} =	305.1	
	(314061.0)			(248.8)	
u =	0.8[a]				
p =	0.0[b]				
L =	-845.5				
R^2 =	0.99				

[a]Searched over $0 \leq u < 1.0$ by 0.1

[b]Searched over $-1.0 < p < 1.0$ by 0.1

Table 16

Results of the Model Estimation for Manufacturing Employment in the Tennessee Valley

Maximum Likelihood Estimates			Calculated Lag Weights		Γ
b_1 =	638504.0 (242904.0)		w_0 =	4696.7 (1298.9)	-1.77%
s_0 =	4696.7 (1298.9)	$[W_{0t}^{(I)}]$	w_1 =	592.7 (753.5)	
s_1 =	-4322.2 (702.5)	$[W_{1t}^{(I)}]$	w_2 =	-1588.6 (549.7)	
s_2 =	366.4 (71.7)	$[W_{2t}^{(I)}]$	w_3 =	-2545.8 (487.3)	
o_0 =	78840.9 (57798.8)	$[u^t]$	w_4 =	-2756.4 (445.3)	
o_1 =	-23519.5 (23841.6)	$[tu^t]$	w_5 =	-2540.9 (398.5)	
o_2 =	8530.5 (3467.7)	$[t^2u^t]$	w_6 =	-2109.1 (355.1)	
b_3 =	109428.0 (36658.8)	$[S_t]$	w_7 =	-1594.8 (325.4)	
b_4 =	-266.0 (176.4)	$[G_t]$	w_8 =	-1078.9 (313.1)	
b_5 =	410.7 (219.2)	$[X_t]$	w_9 =	- 607.2 (313.8)	
b_6 =	-122745.0 (74184.0)	$[k_t]$	w_{10} =	-202.3 (320.0)	
b_7 =	-299920.0 (411409.0)	$[R_t]$	w_{11} =	127.9 (325.9)	
u =	0.8[a]				
p =	0.0[b]				
L =	-866.0				
R^2 =	0.82				

[a]Searched over $0 \leq u < 1.0$ by 0.1

[b]Searched over $-1.0 < p < 1.0$ by 0.1

Table 17

Results of the Model Estimation for
Commercial Employment
in Metropolitan Areas within the Tennessee Valley

Maximum Likelihood Estimates			Calculated Lag Weights		Γ
b_1 =	-1793880.0		w_0 =	1348.6	-0.69%
	(496952.0)			(626.2)	
s_0 =	1348.6	$[W_{0t}^{(I)}]$	w_1 =	541.0	
	(626.2)			(430.3)	
s_1 =	-799.5	$[W_{1t}^{(I)}]$	w_2 =	-34.4)	
	(194.2)			(301.2)	
s_2 =	52.0	$[W_{2t}^{(I)}]$	w_3 =	-424.2	
	(11.3)			(233.5)	
o_0 =	372685.0	$[u^t]$	w_4 =	-667.5)	
	(113850.0)			(213.6)	
o_1 =	26538.1	$[tu^t]$	w_5 =	-796.5	
	(8352.1)			(217.9)	
o_2 =	2409.1	$[t^2u^t]$	w_6 =	-837.8	
	(985.5)			(227.7)	
b_3 =	63536.4	$[S_t]$	w_7 =	-813.0	
	(21306.8)			(235.3)	
b_4 =	-29.3	$[G_t]$	w_8 =	-740.1	
	(104.4)			(239.0)	
b_5 =	210.8	$[X_t]$	w_9 =	-633.3	
	(141.5)			(239.5)	
b_6 =	-146520.0	$[k_t]$	w_{10} =	-504.3	
	(46946.7)			(238.3)	
b_7 =	2389360.0	$[R_t]$	w_{11} =	-362.0	
	(499407.0)			(236.6)	
u =	0.9[a]				
p =	0.0[b]				
L =	-819.1				
R^2 =	0.99				

[a]Searched over $0 \leq u < 1.0$ by 0.1

[b]Searched over $-1.0 < p < 1.0$ by 0.1

Table 18

Results of the Model Estimation for
Manufacturing Employment
in Metropolitan Areas within the Tennessee Valley

Maximum Likelihood Estimates			Calculated Lag Weights		Γ
b_1 =	428598.0		w_0 =	1741.5	-1.58%
	(117212.0)			(613.0)	
s_0 =	1741.5	$[W_{0t}^{(I)}]$	w_1 =	1667.9	
	(613.0)			(477.2)	
s_1 =	2055.7	$[W_{1t}^{(I)}]$	w_2 =	642.1)	
	(1084.8)			(362.3)	
s_2 =	-1017.3	$[W_{2t}^{(I)}]$	w_3 =	-269.5	
	(276.1)			(213.2)	
o_0 =	-74117.8	$[u^t]$	w_4 =	-818.2)	
	(56137.2)			(174.0)	
o_1 =	70539.5	$[tu^t]$	w_5 =	-1043.1	
	(52111.5)			(200.0)	
o_2 =	-22138.6	$[t^2u^t]$	w_6 =	-1052.0	
	(12490.3)			(210.5)	
b_3 =	18901.4	$[S_t]$	w_7 =	-943.9	
	(17388.3)			(197.5)	
b_4 =	26.6	$[G_t]$	w_8 =	-788.1	
	(64.6)			(170.9)	
b_5 =	114.8	$[X_t]$	w_9 =	-626.5	
	(109.9)			(139.7)	
b_6 =	-98165.6	$[k_t]$	w_{10} =	-480.3	
	(29952.5)			(109.4)	
b_7 =	-57255.5	$[R_t]$	w_{11} =	-358.2	
	(211560.0)			(83.1)	
u =	0.6[a]				
p =	0.0[b]				
L =	-810.5				
R^2 =	0.70				

[a]Searched over $0 \leq u < 1.0$ by 0.1

[b]Searched over $-1.0 < p < 1.0$ by 0.1

Table 19

Results of the Model Estimation for
Commercial Employment
in Rural Areas within the Tennessee Valley

Maximum Likelihood Estimates			Calculated Lag Weights		Γ
b_1 =	-410902.0		w_0 =	226.0	-1.33%
	(84412.7)			(451.4)	
s_0 =	226.0	$[W_{0t}^{(I)}]$	w_1 =	-530.8	
	(451.4)			(261.9)	
s_1 =	-985.2	$[W_{1t}^{(I)}]$	w_2 =	-871.5)	
	(244.1)			(191.0)	
s_2 =	95.6	$[W_{2t}^{(I)}]$	w_3 =	-956.8	
	(24.9)			(169.3)	
o_0 =	44922.6	$[u^t]$	w_4 =	-894.8)	
	(20086.0)			(154.7)	
o_1 =	11281.3	$[tu^t]$	w_5 =	-756.6	
	(8285.3)			(138.5)	
o_2 =	2313.4	$[t^2u^t]$	w_6 =	-587.8	
	(1205.1)			(123.4)	
b_3 =	12110.6	$[S_t]$	w_7 =	-416.1	
	(12739.5)			(113.1)	
b_4 =	-65.6	$[G_t]$	w_8 =	-257.5	
	(61.3)			(108.8)	
b_5 =	115.2	$[X_t]$	w_9 =	-120.0	
	(76.2)			(109.0)	
b_6 =	-46559.6	$[k_t]$	w_{10} =	-6.7	
	(25780.0)			(111.2)	
b_7 =	800257.0	$[R_t]$	w_{11} =	82.5	
	(142971.0)			(113.3)	
u =	0.8[a]				
p =	0.0[b]				
L =	-785.7				
R^2 =	0.98				

[a]Searched over $0 \leq u < 1.0$ by 0.1

[b]Searched over $-1.0 < p < 1.0$ by 0.1

Table 20

Results of the Model Estimation for
Manufacturing Employment
in Rural Areas within the Tennessee Valley

Maximum Likelihood Estimates			Calculated Lag Weights		Γ
b_1 =	167009.0		w_0 =	2643.9	-2.00%
	(130238.0)			(696.4)	
s_0 =	2643.9	$[W_{0t}^{(I)}]$	w_1 =	185.3	
	(696.4)			(404.0)	
s_1 =	-2650.6	$[W_{1t}^{(I)}]$	w_2 =	-1090.5)	
	(376.6)			(294.7)	
s_2 =	238.3	$[W_{2t}^{(I)}]$	w_3 =	-1619.4	
	(38.4)			(261.3)	
o_0 =	56281.9	$[u^t]$	w_4 =	-1697.8)	
	(30990.0)			(238.7)	
o_1 =	-18630.1	$[tu^t]$	w_5 =	-1523.9	
	(2783.2)			(213.7)	
o_2 =	6272.0	$[t^2u^t]$	w_6 =	-1226.7	
	(1859.3)			(190.4)	
b_3 =	57593.1	$[S_t]$	w_7 =	-887.5	
	(19655.3)			(174.5)	
b_4 =	-174.0	$[G_t]$	w_8 =	-554.9	
	(94.6)			(167.9)	
b_5 =	202.6	$[X_t]$	w_9 =	-255.9	
	(117.5)			(168.2)	
b_6 =	-56760.6	$[k_t]$	w_{10} =	-3.1	
	(39775.2)			(171.6)	
b_7 =	11524.5	$[R_t]$	w_{11} =	199.8	
	(220585.0)			(174.7)	
u =	0.8[a]				
p =	0.0[b]				
L =	-818.6				
R^2 =	0.89				

[a]Searched over $0 \leq u < 1.0$ by 0.1

[b]Searched over $-1.0 < p < 1.0$ by 0.1

[3.11]

$$\Gamma = \sum_{i=0}^{11} w_{i(sector)} \; / \; N_{(total)} \;, \text{ for } w_i<0, \text{ with}$$

$$Index_{(region)} = \Gamma_{(region)} \; / \; \Gamma_{(nation)} \;, \text{ or}$$

$$Index_{(subregion)} = \Gamma_{(subregion)} \; / \; \Gamma_{(region)} \;.$$

The results for the comparison of the estimated effect of the variation in the price of short term credit on employment in the commercial and manufacturing sectors as a percentage of total employment are presented in Tables 21 and 22.

These results strongly suggest that the composition of employment within the Tennessee Valley is responsible for the overall disproportionate effect of variation in the price of short-term credit. The compositional index value of 1.39 for the comparison of the adverse effect on employment in the manufacturing sectors in the Tennessee Valley and the United States average reveals that the effect of the same percentage decline in employment in the manufacturing sectors leads to a significantly greater effect on total employment in the Tennessee Valley. It is also clear that the structural differences in rural areas alluded to above are compounded by the composition of rural employment.

Table 21

Compositional Indices for the Commercial Sector

	Index Value	Likelihood Ratio Test	
Southeast	0.99	274.0	(0.01)
Tennessee Valley	0.76	703.6	(0.01)
Metropolitan Areas	0.98	364.7	(0.01)
Rural Areas	1.31	104.4	(0.01)

Table 22

Compositional Indices for the Manufacturing Sector

	Index Value	Likelihood Ratio Test	
Southeast	1.02	331.4	(0.01)
Tennessee Valley	1.39	594.8	(0.01)
Metropolitan Areas	0.72	290.2	(0.01)
Rural Areas	1.44	58.8	(0.01)

Conclusion

The calculation of the indices of proportionality given the results of estimating the model for total employment in the United States, the Southeast, and the Tennessee Valley, confirm that monetary policy has had a disproportionate effect on the Tennessee Valley. The indices comparing the estimated adverse effect of variation in the price of short-term credit on total employment in metropolitan and rural areas within the Valley suggest that the disproportionate effect of monetary policy on the

region is due to the relatively severe effect of monetary policy on rural areas within the Valley. These results are consistent with descriptive statistics which indicate that employment in the interest-sensitive manufacturing sector is concentrated in rural areas.

These results for the analysis of total employment in the region are further explained by the compilation of structural and compositional indices comparing the estimated adverse effect of variation in the price of short-term credit on employment in the commercial and manufacturing sectors in the region. The structural index calculation is instructive as to whether monetary policy has a disproportionate effect due to institutional differences in the type of employment. The calculations indicate that structural differences in manufacturing employment do not account for the overall disproportionate effect of monetary policy on the region, but that structural differences in the commercial sector in rural areas contribute to the problem.

The alternative compositional index calculations take into account the fact that manufacturing comprises a larger proportion of total employment in the Tennessee Valley than in the nation, and so the same percentage decline in the manufacturing sector given a discrete change in the price of short-term credit will affect the Valley economy more severely. The compositional indices comparing the

estimated adverse effect of variation in the price of short-term credit on commercial and manufacturing employment in rural areas are particularly instructive, indicating that a 1 percent change observed in the regional sectors will be matched by a 1.3 percent decline in commercial employment and a 1.4 percent decline in manufacturing employment in rural areas. The percentage decline in employment in metropolitan areas, in contrast, has been significantly smaller than that observed in the region.

CHAPTER 4

IMPLICATIONS OF THE CASE STUDY FOR THE CONDUCT OF MONETARY POLICY

The argument that money is not neutral in either the short or long run has been a recurrent theme in the Post Keynesian literature. The recognition that credit money predominates in modern financial flows makes this conclusion even more evident, since the expansion of a monetary production economy depends critically upon the expansion of deficit spending. Policy prescriptions based on the presumed neutrality of money are simply inapplicable, if not irrelevant.

Neutrality arguments are entirely dependent upon the assumption that the money supply is exogenously determined by monetary policy, and the maintenance of this assumption can only be explained by the powerful analytical expediency afforded in the implementation of technically sophisticated models. The real effects of monetary policy in historical time are not the focus of this technical sophistication, but rather the assumed general equilibrium tendencies of the system. The conclusion that neutrality arguments have shifted our disciplinary attention away from the problems that confront the implementation of policies in historical time is inescapable.

The expansion of credit money can not be neutral in

the short-run because it is critical for the expansion of aggregate demand to expand in historical time. The expansion of credit money can not be neutral in the long-run because it results in employment and income that is otherwise not forthcoming. Discretionary monetary policy is indeed designed to be non-neutral, and to the extent that it affects the expansion of credit, it affects the expansion of employment.

This study has attempted to integrate the argument that the supply of credit money is endogenously determined at a price effectively set through monetary policy Federal Reserve with the theory of effective demand, in the context of investigating the disproportionate effect of monetary policy on the Tennessee Valley. The results of the econometric analysis presented in Chapter 3 confirm that monetary policy has had a disproportionate effect on total employment in the Tennessee Valley relative to the average for the United States, and indicate further that this overall effect on the Tennessee Valley is due to the disproportionate effect on rural areas within the Valley.

The results of this analysis have implications for both the economic theory that lies at the foundation of monetary policy, and the political process through which monetary policy is granted its authority. These implications will be entertained generally in this chapter with the intention of recapitulating the Post-Keynesian

arguments which providing some direction out of the negative consensus concerning monetary policy that characterizes the current literature.

Implications for the Economic Analysis of Monetary Policy

An analytically relevant framework for monetary policy is one that attempts to take into account the processes which are fundamentally involved in creating what we observe. The focus of monetary policy on inflation is currently driven by theoretical propositions that are not descriptive of the processes which create inflation, but rather serve to make solutions to the policy problem of inflation consistent with the capability of mathematical logic. Traditional analysis has assumed that inflation results from an unwarranted increase in the money supply, and that monetary policy should therefore be directed at the optimal control of the money supply. This argument ignores, however, the empirical reality that the Federal Reserve does not control the money supply, and can not therefore contain the rate of inflation by manipulating the supply of money.

Chairman Greenspan has publicly stated that the long run objective of monetary policy is to remove inflation as a factor economic decisions:

> The primary role of monetary policy in the pursuit of this goal [maximum sustainable growth] is to foster price stability. For all practical purposes, price stability means that expected changes in the average price level are small enough and gradual enough that they do not materially enter into business and household financial decisions. (Greenspan, 1989, p. 273.)

This statement should be viewed as emanating entirely from the axiomatic approach of the mainstream literature, in which monetary policy is viewed as controlling the supply of money, and the discretionary changes in the money supply are the source of households' and firms' misperception of relative prices. Aside from the inapplicability of the assumption that monetary policy controls the money supply, this transmission mechanism is difficult to construe in the analysis of the expansion of the economy in historical time, since the expansion of the economy necessarily involves the competition for scarce and heterogeneous resources.

The control over the price of short term credit is, however, within the capabilities of monetary policy. The monetary authorities can target a level of short term interest rates by accommodating the demand for reserves that results from the demand for credit on the part of businesses and households. The problem, of course, in routinely accommodating the demand for credit is the repercussions on the rate of inflation, which the Federal Reserve has accepted the responsibility to contain. While it is appropriate to entertain the relationship between the

demand for credit money and inflation, it is inappropriate to assume that a relationship exists that is manageable by the monetary authorities.

The relationship between the demand for credit and inflation exists only because there is a relationship between credit and real economic activity. The intention of producing output and the simultaneous decision to employ resources is what creates the possibility of an increase in the price level. Any attempt to contain inflation through monetary policy is necessarily achieved at the expense of the employment of resources in production:

> Keynes's skepticism concerning the ability of monetary policy to halt an increase in the price level caused by an 'income inflation' derives from the fact that restrictive monetary policy must first cause a profit deflation by reducing investment below saving by a sufficient amount to lead entrepreneurs to attempt to reduce the level of efficiency wages. As Keynes points out, the monetary authority cannot decree the appropriate changes in wages, it can only act indirectly on expectations of profits. (Kregel, 1989, p. 75)

Moreover, to the extent that moderate restrictive demand management monetary policies do not successfully contain the rate of inflation, the increase in the level of unemployment (stagflation) will inhibit the future success of monetary policy (Wallich and Henry, 1989).

As the cost of labor resources is the pivotal resource cost in a monetary production economy, the successful containment of inflation involves containing the rise in

nominal wages. Since the expansion of employment perpetuates the flow of production and the expansion of the economy, it is the deficit spending of households and businesses that legitimize the price increases sought by producers. The rate of inflation will only be affected by restrictive monetary policy to the extent that it is successful in universally restraining deficit spending on goods and services.

The significance of the results of this study for the economic analysis of monetary policy is that the Federal Reserve does not uniformly affect the process through which inflation is created, i.e. the acquisition of transactions balances that leads to the competition for labor resources. While it is clear that the competition for labor resources which emanates from rural areas of the Tennessee Valley is seriously undermined by higher interest rates, the competition for resources in metropolitan areas is not as affected. As the commercial sector provides over 50 percent of total employment in the United States, and is relatively labor-intensive, it is not clear that the rise in efficiency wages that is the source of inflation is desirably affected by monetary policy.

The Federal Reserve clearly does not have at its disposal the capability of localizing the effects of restrictive demand management policies. The unavoidable conclusion is that inflation may not be desirably affected

over initially acceptable ranges for a rise short-term interest rates. The recognition of this possibility has emerged as one of the most important implication of a properly conceived framework for monetary policy. As Moore has concluded,

> In the short run a restriction of the growth of aggregate demand by more restrictive fiscal and monetary policy does not result primarily in a fall in inflation. Rather it generates a fall in employment, profits, investment, and real output, and a rise in real interest rates, bankruptcies, unemployment, income inequality, and the gap between actual and potential output. (Moore, 1988, p 389)

The economic analysis that lies at the foundation of monetary policy must begin to incorporate more formally a distributional dimension. If there are disproportionate effects, which this study has suggested, are they distributed efficiently, i.e. is monetary policy disproportionately affecting the sectors from which inflation emanates? This distributional implication is also instructive with regard to the convention within the Post Keynesian literature to view economic growth as divisible between capitalist and laborer. As the employment decisions of entrepreneurs or managers are dependent upon their expectation of profits, the disproportionate effects of monetary policy on particular sectors implies that over the short run the fortunes of labor and capitalists in particular employment sectors are correlated. The maintenance of this distinction in Post

Keynesian analysis may inhibit the development of a distributional understanding of the effects of modern macroeconomic policies.

Implications for the Politics of Monetary Policy

The fight against inflation is necessarily political, in that some will suffer from the containment of inflation and some will benefit. This conclusion must be juxtaposed with the equally uncomfortable fact that the monetary policy is "the only game in town."[37] This study has suggested that there is an alternative focus in the political discussion of monetary policy from the traditional separation of wealth-holders vs. non-wealth holders. Moore has suggested that inflation be viewed as affecting the ratio of wealth to income, with inflation primarily affecting wealth (Moore, 1988). Since the policies designed to contain inflation affect income levels by affecting employment, the movements in this ratio will be distributed even more capriciously through demand-management monetary policies.

The capricious nature of containing inflation through demand management monetary policies must be contrasted with the Post Keynesian arguments promoting tax-based incomes

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[37]Monetary policy is a must in a nonergodic world where orderly progressions in asset values and income streams provide the anchor for expectations that enable the economy to grow through credit (Davidson, 1988b, p. 87).

policies (TIP). While there are considerable obstacles to the successful implementation of incomes policies, they are on the level of measurement and compliance, which are obstacles being surmounted annually in the context of income tax accounting. The importance of coordinating the rise in money wages in the TIP schemes has been confirmed by economists following the seminal work of Weintraub:

> Weintraub noted as an empirical fact that the value of k, the gross profit margin, had showed no systematic movement in the United States since the Second World War. (Later other students of Weintraub showed similar stability in k in other nations.) Hence the problem of changes in the profit margin appeared to be relatively unimportant; the inflation problem since the Second World War became one of controlling wages relative to productivity. (Davidson, 1989, p. 187.)

The distributional implications of national economic policies in the context of incomes policies also remain explicit, unlike the disproportionate effects of discretionary monetary policy. This political reality indeed becomes the overwhelming feature of national incomes policies. The challenges of accounting for increases in productivity and identifying warranted movements in nominal wages are equivalent to the challenge of reaching a political consensus concerning the distribution of income. While the successful implementation of incomes policies may appear prohibitively difficult, it must certainly be entertained as a more desirable goal for governing policy research than the current scheme of success by accident

through recession. The potential for real gains in aggregate output and the standard of living must also be considered:

> But suppose that such a tax enabled us permanently to reduce unemployment by 2 percentage points, as well as avoiding the horrors of temporary unemployment required to change the inflation rate. What magnitude of costs should be set against these benefits? Some microeconomic inefficiency, without a doubt. But the whole cost of monopoly and tariffs is often estimated at less than 2 percent of GNP.... Surely the costs of an inflation tax will be trivial compared with the costs of monopoly and tariffs, and therefore far less than the benefits of lower unemployment. The more we actually experience of the real costs of unemployment, the more compelling becomes the case for fighting inflation some other way. (Layard, 1988)

The failure to explicitly recognize the distributional implications of macroeconomic policies in economic analysis is a failure to take into account the forces involved in the evolution of the economy. The repercussions of this failure are quite clear, as Foster has noted:

> Until economists can offer another conception of the common good which coincides more properly with the current evolutionary state of the macroeconomy, we can expect to observe the continuation of political pragmatism without consensus, the destructive imposition of hardship on the underprivileged in the name of efficiency and the continued decline in the status of macroeconomics within society. (Foster, 1988, p. 53)

At issue however, is not the status of a field within an academic discipline, but the successful coordination of political change. There can be no doubt that the inequities wrought by national economic policies have a

direct bearing on the stability of the political system, and however long disguised, resurface in unpredictable and unimagined forms.

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VITA

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