OUTPUT AND PRICE STABILIZATION EFFECTS OF THE AUTOMATIC FISCAL STABILIZERS DURING THE PERIOD, 1966-1975

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PREFACE

In the Name of Almighty God Who is Most Gracious and Most Merciful

This study is concerned with the output and price stabilization effects of the automatic fiscal stabilizers during periods of inflation and stagflation. The primary objective is to measure the degree of effectiveness of automatic stabilizers from the point of view of output as well as price stabilization and to see whether these stabilizers can stabilize both output and prices at the same time. A static macro model is used in the analysis which is based on actual data from 1966-75.

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LIST OF SYMBOLS

1. Y = National Income
2. X = Personal share, i.e., Y - Z
3. Z = Corporate share, i.e., corporate profits with inventory valuation and capital consumption adjustment before tax - dividends + employer's contributions for social insurance
4. OASDI = Old Age and Survivors Disability Insurance
5. R = Personal taxes
6. U = Transfer payments
7. T = Corporate taxes
8. Δ = Change from the initial to the terminal period
9. E_r = Income elasticity of personal taxes
10. E_u = Income elasticity of transfer payments
11. E_t = Income elasticity of corporate taxes
12. r_1 = Average rate of personal taxes in Period 1
13. u_1 = Average rate of transfer payments in Period 1
14. t_1 = Average rate of corporate taxes in Period 1
15. α = Effectiveness of automatic stabilizers
16. α_{pt} = Coefficient of stability for personal taxes
17. α_{tr} = Coefficient of stability for transfer payments
18. α_{ct} = Coefficient of stability for corporate taxes
19. c = Marginal propensity to consume
20. i = Marginal propensity to invest
21. E_{pt} = Price elasticity of transfer payments

22. P = Price level

23. s = With stabilizers

24. ws = Without stabilizers

CHAPTER I

INTRODUCTION

In general, taxes and transfer payments change automatically over the business cycle so as to reduce the magnitude of the fluctuations in national income. As income increases during the expansion, taxes increase and transfer payments decrease, thereby moderating the increases in consumption and as income decreases during contractions, taxes decrease and transfer payments increase; these changes act to reduce the magnitude of the decreases in consumption and investment. Taxes and transfer payments which change in response to changes in income are called automatic fiscal stabilizers because they change automatically and serve to stabilize the economy.

The effectiveness of the automatic stabilizers is usually measured in terms of the degree to which they moderate fluctuations in the level of national income. From a policy point of view it is very important to know the degree of effectiveness of existing automatic stabilizers. Any corrective action during economic expansions or contractions without the knowledge of the effectiveness of these stabilizers may prove futile.

Serious attempts to measure the effectiveness of automatic stabilizers have been made only since 1948 although their importance had long been recognized. The empirical evidence indicates in general, that the stabilizers have made a substantial contribution to the stabi-

lity of the economy. Previous empirical studies have dealt with the periods of business cycle (expansions and contractions) when, in general, output and price level were moving in the same direction. There has not been a recent study on this subject. Moreover, it is interesting to examine the role of automatic stabilizers during periods of inflation and stagflation. This study will concern itself with such periods. Moreover, the stabilizers will be examined from the point of view of both output and price stabilization.

The Nature of the Problem

Not only that there has been no recent study on this subject but the role of automatic stabilizers during periods of inflation and stagflation has not yet been explored. For example, the periods of economic expansions studied earlier were such when considerable increase in output occurred along with some increase in the price level. Therefore, the effect of automatic stabilizers on the economy during inflation when considerable amount of the increase in income is due to the rising prices, has not been known so far.

The economic expansion of the sixties had actually two phases. Phase I, from 1961 through 1965, was characterized by growth in real output and stable prices. Phase II, from 1966 through 1969, had considerable increase in income in the form of rapidly rising prices. The economy was at full employment at the beginning of 1966. Unemployment rate fell below four percent to its lowest level since 1953 (53). In other words, the later (1966 I - 1969 III) part of the expansion was more of a period of inflation. The following recession of 1969-70 was characterized by falling output and rising prices. Of the periods being

studied, it was only during the expansion of 1970 IV - 1973 IV that considerable rise in output was achieved. Then came the worst recession of the postwar period (1973 IV - 1975 I) when, once again, falling output was accompanied by a rising price level. These periods provide an opportunity to re-investigate the effectiveness of automatic fiscal stabilizers and, in particular, to examine their effectiveness when output and the price level are moving in opposite directions.

During such economic recessions when output is falling but the price level is rising to the extent that an actual fall in output will be showing a rise in nominal income, automatic fiscal policy is faced with a dilemma. Taxes should fall and transfer payments rise in the wake of declining incomes but this will serve to put additional upward pressure on the price level. Therefore, it becomes important to examine both the output and price stabilization aspects of the automatic fiscal stabilizers.

The Purpose of the Study

The main purpose of this study is to investigate the effectiveness of automatic fiscal stabilizers during periods of inflation and stagflation with special emphasis on their performance as output and price stabilizers. It is hypothesized that the automatic fiscal stabilizers are more effective during a more or less pure inflationary situation and less effective during stagflation. This hypothesis will be tested applying the actual data.

Significance of the Study

This study will examine the period starting from the first quarter

of 1966 to the first quarter of 1975 which is divided into the following four sub-periods:

i) 1966 I - 1969 III expansion

ii) 1969 III - 1970 IV recession

iii) 1970 IV - 1973 IV expansion

iv) 1973 IV - 1975 I recession[2] (52)

The significance of the present study is that it will cover the periods that have not been examined before and have special characteristics not associated with the previous expansions and recessions studied so far. Furthermore, this study would enable us to know whether the stabilizers move in the direction of stabilizing both output and prices. Previous studies were primarily concerned with income stabilization and have implicitly assumed that the price level was constant or that changes in the price level did not matter. During the period under investigation, the price level did change significantly. In fact, the increase in the price level was so great that nominal national income increased during 1969-70 and 1973-75 despite the reduction in real national income which occurred during those periods.

Organization of the Study

This study is divided into seven chapters. This chapter includes an introduction and discussion of the nature of the problem and its significance. Chapter II deals with the concept of automatic stabilizers. Some of the important definitions of automatic stabilizers and the one developed for the purpose of this study are noted. A brief discussion about the distinction between fiscal and monetary stabilizers is also included. This chapter also discusses the output and price

stabilizers. Finally, the automatic stabilizers examined in this study are specified.

Chapter III is concerned with the review of some of the previous studies of automatic stabilizers. Methodology used in the present study is given in Chapter IV. Chapter V is devoted to the derivation, adjustment and classification of the data. Analysis of the data and the results are reported in Chapter VI. The last chapter contains summary and conclusions of the study.

FOOTNOTES

[1]Because the automatic stabilizers reduce the nation's growth rate during expansions, they may or may not be desirable. The effect of the automatic stabilizers on the economy during expansions is called fiscal drag.

[2]The business cycle (reference) peaks and troughs are those designated by the National Bureau of Economic Research except in the case of 1966-69 expansion where third quarter of 1969 is used as a peak instead of fourth quarter used by the NBER. Output in the fourth quarter 1969 was actually smaller than that of the previous quarter. For the purpose of this study, a rise or fall in real national income is important because it triggers a corresponding rise or fall in tax payments. Therefore, the third quarter is used as the peak.

CHAPTER II

THE CONCEPT OF AUTOMATIC STABILIZERS

Introduction

Systematic study of the stabilizers' automatic response goes back to R. F. Bretherton (5) who wrote in 1937 "The subject of sensitivity of the yield of various types of taxes to the movement of the trade cycle is of great practical importance; but it has been almost completely overlooked in the standard English works on Public Finance." However, the concept of automatic stabilizers has drawn considerable attention only after the works of Committee for Economic Development (11), Milton Friedman (20), A. G. Hart (23) and R. A. Musgrave and M. H. Miller (35). The concept is now well established in the economic arena and various studies have revealed that the stabilizers have made substantial contribution to the stability of the economy. Nevertheless, economists differ in the matter of their definition and as to what exactly constitutes an automatic stabilizer. Distinction is also made between fiscal stabilizers and monetary stabilizers. This chapter will be devoted to the discussion of these matters. Moreover, the question of output and price stabilizers will also be examined.

Automatic Stabilizers Defined

There is no commonly agreed upon definition of automatic stabilizers. W. P. Egle (13) offers the following criteria for an automatic

stabilizer:

> (1) Permanently installed, (2) well defined in its main provisions and purposes, and (3) reliably linked to cyclically sensitive criteria (indexes) in the sense that the device starts to operate counter-cyclically as soon as these criteria indicate the need for action (p. 46).

Hart (23)(24) sets up the following requirements for automatic stabilizers in the 1st and 2nd editions of his book:

> (1) Does it push the government's budget toward deficit in case of a slump and toward surplus as business improves? (2) Does it expand the public's stock of cash in a slump and reduce it in high prosperity? (3) Does it tend to reduce the public's demand for cash in a slump and increase it in high prosperity? (4) Does it go into action without waiting for fresh policy decisions? (p. 475, 462).

However, in their third edition, A. G. Hart and P. B. Kennen (25)(26) drop the second and third requirement retaining only the first and the last one, which simply means automatic stabilizers are budget items or programs that push the budget toward a surplus or deficit during expansion or recession respectively without waiting for discretionary changes in the various tax laws.

Describing Hart's above mentioned four requirements for an automatic stabilizer as the minimum conditions, M. O. Clement (8) has suggested two additional tests.

> . . . one of the additional requisites of an efficacious automatic countercyclical program is that the devices must have enough permanence to become part of the economic milieu of decision-making units (p. 306).

> . . . the final requirement of effective built-in stabilizers is that they be closely tied to operational variables that are sensitive to and conform with economic fluctuations (p. 309).

Wilfred Lewis, Jr. (31) defines built-in fiscal stabilizers as:

> . . . those federal receipts and expenditures which, in response to contraction, operate in the direction of increasing the federal deficit, or decreasing the surplus, without the need for policy decision or action (p. 26).

Definition

Automatic fiscal stabilizers can thus be defined as those budget components that are permanently installed, that in response to a recession or expansion change direction automatically without waiting for new legislation, and reduce the change in national income relative to what it would be in the absence of such stabilizing devices.

Automatic Monetary Stabilizers

As pointed out by E. Cary Brown (6) monetary stabilizers are also present and may as well be important. In order to see how they would come into operation, let us assume money supply is held constant. Any change in money output will bring about a corresponding change in the transactions' demand for money and interest rates will tend to respond similarly. This in turn, will affect investment, government spending and consumption to the extent these variables are sensitive to changes in the interest rate, thereby bringing in some offsetting changes in real demand. Also, in a situation where money stock is constant and prices are allowed to vary, real wealth will change. In times of rising prices, real wealth will decline which will induce a decline in rates of spending. A reduction in price level will bring about the opposite results. Yet, another way monetary stabilizer could work is when change in the stock of money is equated with the budget surpluses or deficits.

In this way budget deficits will increase the stock of money while surpluses will decrease it, thereby starting an automatic operation in an offsetting way.

While the above mentioned stabilizers are potentially present and could probably be activated, they cannot be called automatic in the strictest sense. Monetary authorities will have to decide to hold the money supply constant or to equate the change in the stock of money with budget surpluses or deficits. There is no law existing at present which provides for such arrangements to become effective automatically when the need arises. In other words, a great deal of discretionary action is involved. Moreover, the contention that wealth effect would bring about changes in real demand in an offsetting manner is subject to dispute. For one thing, prices may be rigid downward. But even if prices are flexible both ways, wealth effect may not be strong enough to start off the desired movement in real demand.

Variations in the supply of moneyness or liquidity demand may also influence the level of national income. Of course, such an influence will not have as direct an impact on national income as government budget deficits and surpluses. But any change in money supply will only start showing its effect on effective demand after peoples' desire for liquidity has been fulfilled. It could very well be that a small variation in money supply is absorbed in adjusting to the desired liquidity positions (8).

While this study will be limited to the examination of fiscal stabilizers only it should not be implied that the monetary aspects of automatic countersyclical devices is not recognized.

Output and Price Stabilizers

Previous studies of the automatic stabilizers seem to have income stabilization as their only relevant goal. This motivation may partly be attributed to the fact that generally prices and output moved in the same direction during those earlier expansions and that prices were at least not rising during contractions. But the periods covered in the present study are such that we cannot afford to ignore the distinction between output and price stabilizers. These periods strengthen the need to examine the stabilizers both from the point of view of output and price stabilization. The two recessions included in the present study, 1969 III - 1970 IV and 1973 IV - 1975 I, specially the latter one, were characterized by declining output and rising prices. Moreover, as pointed out by Brown (6), income is the product of quantity and prices, the change in income may be reflecting either the change in output or prices or both. Therefore, automatic stabilizers may be examined from the point of view of both output as well as price stabilizer. It should also be noted here that the sensitivity of the tax revenue in response to business fluctuations depends more on the effective than the statutory tax rates. Effective tax rate is the one which affects the income elasticity of taxes. A change in the general price level and a process of economic growth may change effective tax rates due to the distributional change in individual income or corporate income or change in spending on those goods and services that are subject to excise taxes (48). This further signifies the role price changes may have on the over all effectiveness of automatic stabilizers.

Output Stabilizers

Since income is the product of both quantity and prices, in order to evaluate the stabilization from the point of view of any one of the two elements, the other has to be kept out of the picture. For the determination of output stabilization, we assume that prices are independent of output changes or that they are constant. Any automatic change in the demand for output would bring about changes in the output via the multiplier principle. For example, an increase in business investment, in government expenditure or in private consumption would result into a multiple increase in output depending of course, on the size of the multiplier. A decrease in one or all of the above variables would bring about the opposite results. Now, let us assume that there are two fiscal structures, one without and the other with automatic stabilizers. In other words, in the system without automatic stabilizers, taxes and transfer payments are fixed and do not change with a change in income, while in the structure with automatic stabilizers, tax revenues and transfer payments do vary with the variation in income. Following an autonomous change in one or all of the above mentioned variables, fluctuations in income would be dampened in the latter system because of the operation of automatic stabilizers. An output stabilizer would tend to expand or reduce aggregate spending on goods and services compared to what would be spent in the system with no automatic stabilizers. In other words, the operation of automatic stabilizers will reduce the size of the multiplier thereby reducing the fluctuations in output. Let us take the case of a drop in private investment. This will result into a drop in income. It will reduce the

tax liability first, by reducing the tax base in response to a drop in income, and second, by reducing the tax yield in response to a reduction in the tax base. After tax incomes will therefore, drop by less than if there was no decline in tax liability which will cushion the decline in consumption. As a net result income will not fall by as much as would have been the case had there been no automatic stabilizers operating. Following the same logic, a decline in income will increase unemployment benefit payments thus help stabilize the national income by checking the drop in disposable income and hence consumption.

Price Stabilizers

As far back as in 1955, Cary Brown (6) emphasized the need for examining a stabilizer both from the point of view of output as well as price stabilizer. Later on, D. A. L. Auld (2) also recognized this point. But so far no empirical work seems to have been done as far as price stabilizers are concerned. A particular fiscal tool may be operating so as to stabilize output but at the same time it may be working as a destabilizer with regard to price changes and vice versa.

Following the logic in the previous section, let us assume output is constant. In other words, all the change in national income is on the price side only. Now, we assume two fiscal structures, one without and the other with automatic price stabilizers. An autonomous shift in aggregate demand, either initiated by a change in business investment, government expenditure or consumption expenditure, will bring about necessary change in money income via the multiplier principle. The change in money income in the system with automatic price stabilizers will be relatively small because part of it would be offset by the in-

duced changes in these stabilizers. An autonomous rise in aggregate demand will increase money incomes. People will be moved into the higher income brackets and subject to higher marginal taxes due to the progressive rate structure. Moreover, since exemptions and deductions are fixed in nominal terms they will decline in real value which will also increase the income subject to tax. All this will increase tax liabilities and because of this accompanying rise in tax liabilities, disposable incomes of the people will not rise by as much as it would have been the case had there been no automatic stabilizers. This, in turn, will dampen further increases in money income. In a situation where there is no increase in output and all increases in income are due to pure inflation, an automatic price stabilizer must operate in such a way that the elasticity of money taxes with respect to income changes is greater than one. This condition is necessary to slow down the rate of inflation (6)(2). It follows then, that a unitary elasticity of money taxes with respect to income would neither accelerate nor decelerate the rate of inflation or to put it differently, would at least help stop the inflation from getting worse. In a sense, unitary income elasticity of taxes is also keeping down the rate of inflation which would have been greater had the taxes not risen proportionately with income.

As pointed out by Auld (2), in a more realistic case when an inflationary situation incorporates some real increase in output, automatic stabilizers have to operate in such a way that real taxes are increased, that is, elasticity of money taxes with respect to prices exceeds one. However, we feel that even if an automatic stabilizer cannot reverse the direction of a change in prices all by itself any responsiveness

of money taxes and transfer payments in the right direction may be considered a contributing factor to the overall stabilization process because prices would definitely have been higher in the absence of such devices. This could be achieved as long as the elasticity of money taxes with respect to income is positive.

Automatic Stabilizers in Existence

Included in the present study are the following major automatic stabilizers: Individual income tax, corporate income tax, excise tax, payroll taxes i.e., old-age and survivors insurance taxes, old-age and survivors insurance benefit payments, unemployment contributions and unemployment compensation benefit payments.

These stabilizers may be grouped into direct and indirect stabilizers as far as their effect on disposable income is concerned. Individual income tax, payroll taxes on employees, OASDI benefit payments, unemployment compensation payments may be called direct stabilizers while the corporate income tax, payroll taxes on employers, unemployment contributions and excise taxes as indirect stabilizers.

During a recession a drop in individual income taxes as a result of a decline in incomes would have cushioning effect directly on disposable income in that it would prevent the latter from falling as much as earned national income. But a decline in corporate taxes after a drop in corporate profits will effect disposable income only indirectly via corporations' change in dividend payments and employment policies (31). Unemployment benefit payments rise when employment drops during recessions thereby keeping disposable income from falling to the full extent of the drop in wages and salaries. Employers' contributions

to the state unemployment insurance fund are reduced during a downturn thus affecting corporations' output and employment decisions. Old-age and survivors insurance contributions are based on payrolls. They will decline during a contraction and would therefore, be a direct support to the disposable income. OASDI benefits are not dependent upon the overall business situation but are treated as stabilizers because business conditions may be influencing the retirement decisions of elderly workers who may for example, hasten their retirement in a recession (25). These benefit payments would be expected to rise during a downturn.

During an upturn, individual income tax and employees share of OASDI contributions would rise while OASDI benefit payments and unemployment compensation payments would fall checking the rise in disposable income of the individuals. Similarly, corporate income taxes, employers' share of OASDI contributions, unemployment contributions and excise taxes would rise with the rise in business activity and serve as a drag on expansion. It is also important to keep in mind that besides the cyclical volatility of the base, the existing structure of progressive income tax rates provides an added feature to the automatic stability of this tax. As the economy expands, individuals are moved up on the ladder into higher income brackets and are subject to higher marginal tax rates. On the other hand, lower tax rates are applicable as individuals' fall back to lower income brackets during a recession. Moreover, exemptions and deductions are set in nominal terms. They are reduced in real terms during expansions hence raising the taxable income of individuals which raises the tax liabilities.

One may be tempted to include Federal Farm Price Support Program, Food Stamps and Aid to Families with Dependent Children (AFDC) in the

list of automatic stabilizers because payments under these programs may vary countercyclically. For the purposes of this study however, they are not included in the current battery of automatic stabilizers for the reasons explained below. Nevertheless, it would be worth discussing these programs briefly.

Farm Price Support Program

Federal government makes subsidy payments to farmers for their products under the so called parity formula whenever the prices of non-farm products rise vis-a-vis farm products. Such payments are said to rise during recessions as prices of farm products are depressed relative to non-farm products. But this may not be the case. Prices of agricultural commodities may be falling during an expansion due to a boom in production. This will increase farm subsidies whereas we would like them to decrease from the point of view of stability. Similarly, bad crops due to unusual weather conditions etc. may cause a sharp decline in output and a rise in farm prices during recessions which will decline support payments at a time when they should rise to have a stabilizing effect. Demand considerations may not weigh heavier in the determinants of prices of farm products because the demand for food has little income elasticity in the short run. Even if support payments rise say, in a recession they may not have the influence strong enough to increase total demand. Such payments are limited only within the farm sector. Additional purchasing power made available to the farm families may be offset by the diversion of purchasing power of consumers away from non-farm goods (19)(31). A sum of $1,345 million were spent on price support and related programs during

fiscal year 1966 (60). Such payments amounted to $575 million during fiscal year 1975 (61). Moreover, price support program is not as rigid as it used to be. Administration is now allowed not only to alter the support levels within a range, but also calculate parity prices on a more flexible basis (8). This brings in a discretionary element in the farm price support program and therefore, jeopardizes its candidacy as a built-in stabilizer.

Food Stamp Program

Although a number of pilot food stamp projects were established in 1961, the food stamp program as we see it today, only came into being after the promulgation of Food Stamp Act of 1964 and its subsequent amendments. The objective is to provide assistance to eligible households in purchasing food through normal marketing channels in order to raise the level of nutrition of low income people and to strengthen agricultural economy through a beneficial distribution of abundant food supplies. The eligibility criteria is based more on the basis of need rather than categorical limitations so that the working poor could also benefit from the program. This is one of the major income maintenance programs serving over 20 million people and spending over $5 billion in benefits (51).

Some of the factors associated with participation weaken the candidacy of this program as an automatic stabilizer, at least for the period covered in this study. These include variability in subsidy levels that make the program much more beneficial at low income levels than at higher levels of eligibility, geographic availability of the program, willingness and ability to meet the purchase requirement of

the program, number of people under public assistance program that are categorically eligible for the program, difficulties and costs of becoming certified and obtaining the stamps, lack of willingness to accept government subsidies or in-kind benefits of any kind and lack of knowledge of program eligibility criteria (51).[1] The eligibility levels of the food stamp program are tied to the retail food prices hence the number of participants may be rising even during expansion if food price increases exceed average consumer incomes. The provision of allowing more and more deductions against accountable income for expenditures of other sorts makes the program biased toward relatively high income people because only families with fair amounts of income can afford to purchase much of deductible items (54, p. 14 & 18).

There is also discretionary element present in determining the eligibility of an applicant such as intensive verification of household circumstances and interview requirements. The results of such a verification or interview depend on the judgement of the person conducting these inquiries. Food stamps are a payment in kind and can be redeemed only for buying edible grocery items for human consumption in the home which normally accounts for only a small fraction of total household expenditures. For example, a consumer expenditure survey reported that the average family of four spent 13 percent of its total income for this purpose during 1972 and 1973. This may be 17 percent after allowing for the increase in the cost of food items since than (54, p. 7).

The relationship between unemployment and rates of participation in the Food Stamp Program has not been strong enough to support the argument of the program expenditures being pro-cyclical. According to a National Survey of participants conducted in November, 1973, only

30 percent of the adult participants were in the labor force and out of these 30 percent only nine percent were unemployed. About 43 percent of all participants were children of 5-18 years of age and 11.3 percent are older people age 65 and over thus less than 50 percent of all participants belong to potential workers (54, p. 11 & 30).

While looking at the total cost of the Food Stamp program we observe that the program expenditures have consistently shown an upward trend since 1969 and have not declined during expansions. Total program cost curing fiscal 1969 stood at 240.2 million dollars. It was 563.7 million dollars during fiscal 1970 and went up to 2,189.5 million dollars in fiscal 1973 even though the economy was expanding during that period (54). During fiscal year 1975, $4,599 million were spent by the government on Food Stamps. During the same year, the expenditure on general retirement, disability insurance and unemployment insurance amounted to $89.8 billion. Thus, the expenditures on Food Stamps was five percent of the other income maintenance programs (61).

In view of the above mentioned facts Food Stamp program has not been considered as an automatic stabilizer for the purpose of this study. It may however, be pointed out that Congressional mandate of P.L. 93-86 (the Agriculture and Consumer Protection Act of 1973) broadened the program by making it available nationwide by gradually switching projects from Food Distribution to Food Stamp program, completing the transition in fiscal 1975. Moreover, eligibility requirements were nationalized under 1971 amendments of the program (54). The relationship between unemployment and participation in the Food Stamp program has also been improving lately. It has been estimated that during fiscal 1974 and 1975, for every increase of 100 persons

unemployed, there was an increase of 65 persons participating in the program (54). More recently, purchase requirements have been eliminated. This has moved the program very much in the direction of a cash income maintenance program. All these recent improvements in the program could very well weaken the role of discretionary forces and make the program expenditures more or less flexible to changing economic activity.

Aid to Families with Dependent Children (AFDC)

Aid to Families with Dependent Children (AFDC), started in 1935, is another income maintenance program designed primarily to help eligible needy families with dependent children in emergency or crisis situations to avoid destitution or provide living arrangements. Needy families with dependent children deprived of parental support or care because of a parent's death, continued absence, disability or (in 23 states) father being unemployed, families with children needing emergency welfare assistance, destitute repatriates, needy aged, blind or permanently and totally disabled persons in Guam, Puerto Rico, the Northern Marianas, and the Virgin Islands are eligible to apply to their respective state or local welfare agencies. Following an amendment in 1967, states may, if they wish, make federally aided payments to families having an unemployed father (64). Individuals must meet state eligibility requirements (62).

The families receiving aid are generally headed by a female with father either have deserted the family or not married to the woman. A study done in 1971 revealed that only about 19 percent of the AFDC families had the father in the home. Out of this 19 percent only in six percent of the cases the father was unemployed. More than 45 percent

of the families had marital breakups, i.e., desertion, separation or divorced. A considerable number of cases (27.7 percent) were those where the father was not married to the mother. Moreover, unemployed father segment of the program was important only in California, Illinois, Michigan, New York, Ohio, Pennsylvania and Washington. In other states, the families aided on the basis of unemployed father were small (56). Until 1975 only 23 states and the District of Columbia have elected to provide assistance to families with unemployed father (65).

A later study in 1973 showed that 83 percent of the families on AFDC had father absent from home. The major cause of the absence of father from home was marital breakup. In about 50 percent of the families parents were either divorced, separated or father had deserted the family. Forty-five point six percent of the families had one or more illegitimate children. Only four percent of the families had fathers that were unemployed (55).

It appears that there has been a rise in the share of such families on AFDC where father was absent from home. Also the number of families having marital breakups and illegitimate children has increased among those receiving aid under this program. This indicates that the dominant factors affecting the growth of the AFDC program expenditures are social in nature like rate of marriage breakups and rate of birth of illegitimate children which are not directly related to the general business conditions. On the other hand, the unemployed father segment of the program has not increased significantly enough to make the program cyclical in nature. Though payments under this program would increase somewhat during an economic slowdown they are not likely to follow the pattern of business fluctuations much less show an auto-

matic response.

Summary

Although the concept of automatic stabilizers had been known before it became important only after the studies by the Committee for Economic Development, Friedman, Hart, Musgrave and Miller. General idea behind the definition of the automatic stabilizers is the same. That is, they are the budget components which change automatically in response to a change in the economic activity thus reducing the subsequent changes in national income. Yet, there is nothing like the definition of automatic stabilizers.

Distinction has been made between the automatic monetary and fiscal stabilizers. The former are concerned with the stock of money supply, whereas the latter refer to the budget items such as taxes and transfer payments. Distinction is also made between the output and price stabilizers. This is warranted by the fact that during both the expansions and recessions covered in the present study, the economy was experiencing inflation. During recessions, for example, an automatic decline in taxes and rise in transfer payments will stabilize real output by reducing the decline in income but, at the same time, it will add to inflation and hence automatic stabilizers will be price destabilizing.

Individual income tax, corporate income tax, excise taxes, social security taxes and benefits, and unemployment insurance contributions and benefits are considered as the major automatic stabilizers. Some of the other federal transfer programs, such as Farm Price Support Program, Food Stamp Program and Aid to Families with Dependent Children

are not included as automatic stabilizers in this study for several reasons. For example, the operation of some of these programs is influenced by the discretionary action of the authorities concerned. Moreover, some of these programs were not as important until 1975, the termination point of this study.

FOOTNOTES

[1]At the end of fiscal 1969, less than one-half of the counties in the United States were operating Food Stamp Programs. In December, 1974, 17.3 million people participated in this program out of an estimated 29.2 million eligible persons. Thus on an average Food Stamp participation rate was 59 percent.

CHAPTER III

REVIEW OF PREVIOUS STUDIES

Introduction

It was not only the theoretical aspect of the compensatory mechanism of automatic stabilizers that had drawn the attention of the economists. Authoritative empirical studies have also been done on this subject. These studies have, in general, suggested that automatic stabilizers have contributed significantly to the stability of the economy.

The empirical studies, however, have differed in several ways especially with respect to their specific purpose and the budget items included in the analysis. Some researchers have undertaken to measure the built-in flexibility of certain selected taxes and transfer payments. That is, their objective was to quantify the induced absolute change in certain tax revenues or transfer payments following a change in the economic activity. This is expressed as $\frac{\Delta T}{\Delta Y}$, where ΔT is the absolute change in a certain tax or transfer payment item and ΔY is the change in national income. Obviously, the multiple effects of an initial change in personal disposable incomes and corporate profits after taxes were not considered (67)(40)(41)(10)(30)(43)(49)(46). Studies of selected taxes and transfer payments have also been done in order to measure precisely the extent of automatic stability they have provided in the economy (50)(44)(66). This was made possible by extend-

ing the analysis further so as to incorporate the multiplier effects on national income by an initial change in consumption and investment. This way, not only the absolute change in taxes and transfer payments following a change in economic activity were included but their final effect on national income, via multiple changes in consumption and investment were also captured. A few comprehensive studies dealing with effectiveness of all the automatic stabilizers have also been done. A brief review of these studies will be presented in the following pages. These studies can be classified as those measuring (i) the built-in flexibility and (ii) the effectiveness of automatic stabilizers.

Built-in Flexibility of Automatic Stabilizers

Built-in flexibility refers to the induced absolute dollar change in a certain tax revenue or transfer payment following a change in national income. It can be expressed as $\Delta T/\Delta Y$ where ΔT is the change in tax revenue/transfer payment and ΔY is the change in income. The change in income may have been the result of a change in expenditures, like investment or government spending, etc.

A. G. Hart (23) was probably the first to analyze the built-in flexibility of various automatic stabilizers individually as well as in aggregated form. However, his earlier work was based on very rough approximations without involving the use of actual data. For example, a hypothetical decline of $10 billion in national income was assumed and the estimates of the changes it would bring in various taxes and transfer payments were arrived at on the basis of tax and transfer payment rates and their value with respect to national income in 1948,

the time this analysis was done. For example, in the case of corporate taxes, Hart concluded that if corporate profits tax rate is 40 percent and corporate profits are about 10 percent of national income, taxes will change by four percent with a change in national income.

Later on, A. G. Hart, P. B. Kennen and Alan D. Entine (26) analyzed the built-in flexibility of automatic stabilizers in a more systematic manner. They worked with the actual data for the 1954 (II) through 1963 (III) period, which included two recessions, two complete and part of the third expansion. The data were used to analyze the counter-cyclical rather than counter-recessionary behavior of automatic stabilizers, the subject of Hart's earlier work.

Changes in GNP, federal taxes, and unemployment compensation between the trough and peak quarters and vice versa were computed. The changes in taxes and unemployment compensation were then represented as percents of change in GNP. This is referred to as the swing of a particular stabilizer for a particular sub-period. Simple addition of the swings in individual stabilizers for each period gives the overall built-in flexibility of the arsenal of automatic stabilizers for that particular period.

It was estimated that all the stabilizers together provided a built-in flexibility of 35 to 40 percent of the change in national income. There was no significant difference in the built-in flexibility during expansions and contractions. Corporate taxes were the most important with a flexibility range of 14 to 20 percent followed by personal taxes, unemployment compensation and indirect taxes. The estimates of built-in flexibility include some rough approximation for the contribution of state and local taxes and social security contribu-

tions.

The estimates of built-in flexibility of automatic stabilizers give the extent to which a change in national income will be absorbed by changes in tax revenues and transfer payments. They are not directly useful in determining the full contribution of automatic stabilizers toward the stability of the economy because they do not take into consideration the multiple effects on national income of an initial change in consumption and investment, etc. Nevertheless, the importance of these budget items as automatic stabilizers is made clear.

M. O. Clement (9) has measured countercyclical contribution of the automatic stabilizers for the period 1948 (I) - 1957 (III), covering two contractions, two complete and part of the third expansion. The method used to determine the built-in flexibility of automatic stabilizers was generally the same as applied earlier by Hart, Kennen and Entine. However, the data for national income, taxes and transfer payments were adjusted for seasonal fluctuations as well as for any discretionary rate changes in taxes and transfer payments. The adjustments for rate changes were made with the help of treasury estimates. Adjustment is desirable in order to separate the effects of the automatic stabilizers from the effects of rate changes.

The results obtained by Clement further enhanced the importance of automatic stabilizers in the economy. The range of total built-in flexibility of all the stabilizers together was 23 to 36 percent during expansions and 14 to 89 percent during contractions. On the average, automatic stabilizers had a built-in flexibility of 51 percent during contractions and 28 percent during expansions. In other words, on an average, 51 percent of a decline in national income during con-

tractions was offset by the decrease in taxes and increase in transfer payments; an average of 28 percent of an increase in national income was offset by an increase in taxes and decrease in transfer payments during expansions. The order of importance of the automatic stabilizers on individual basis was the same as reported earlier by Hart, Kennen and Entine. Clement, however, showed that excise taxes were destabilizing during contractions. These results indicate extreme variability of the impact of stabilizers from one expansion or contraction to the other. Clement attributed the unusually low estimate (14%) of built-in flexibility computed for 1948-49 recession to the very small drop in national income during that period.

An additional feature of Clement's analysis is that he carried his work beyond what had been done before. He attempted a multiplier approach to ascertain the effect of automatic stabilizers on national income via their effect on consumption expenditures. Clement observed that with a given change in national income the shift in disposable income will be smaller in a system with automatic stabilizers relative to what it would be in the absence of stabilizers. Two consumption functions were derived, one based on post 1948 (I) data taken from expansions and the other one on postwar data from contractions. Estimates of the swings in automatic stabilizers were used to determine the changes in disposable incomes following a given change in national income. In a system with no automatic stabilizers, it was assumed that any change in national income will be fully reflected in the corresponding change in disposable income. Use of the consumption functions was then made to get estimates of the changes in consumption outlays in two different systems, one with and the other without automatic stabi-

lizers. A comparison of the results then led to the conclusion that the present built-in stabilizers are capable of preventing a change in consumption outlays of 33 percent and 62 percent during expansions and contractions, respectively. These results include the effect of automatic stabilizers on consumption through changes in disposable income and in federal securities held by individuals. The automatic increase in taxes during economic expansions results into government budget surplus. This, in turn, would cause government securities outstanding to fall by the amount of the budget surplus. The decline in the individually held part of the securities will bring about a decline in consumption expenditures. The opposite of what has been described will happen in the case of economic contractions. The effect of automatic stabilizers on investment is not considered in the analysis. Clement's overall conclusion is that automatic stabilizers are powerful countercyclical weapons and that they contribute significantly to economic stability.

The period covered by Wilfred Lewis, Jr. (31) in his study of the automatic stabilizers, was relatively longer than in the case of earlier studies. His analysis stretches from 1948 to 1961, covering four recessions, three complete and a part of the fourth expansion.

Lewis distinguished between the direct and indirect stabilizers. Individual income tax liabilities, employment taxes and unemployment compensation were defined as direct stabilizers because they have their primary effect on disposable personal income. On the other hand, corporate tax accruals and excise taxes are indirect stabilizers since their effects on disposable personal income are not direct and depends on the corporation's employment and dividend payment policies. Another

significant feature of this study is that fiscal effects and economic significance of built-in stabilizers are separated.

While analyzing the fiscal effects, Lewis was concerned with the measurement of the impact of built-in stabilizers on the federal deficit or surplus. This is the same as determining the built-in flexibility of the stabilizers. The basic methodology is also the same applied earlier by Hart, Kennen and Entine (26) and Clement(9), the only difference being in the adjustment of data for changes in tax laws. Whereas Hart, Kennen and Entine did not make any adjustments (no major changes were made in the tax rates during the period which they studied) and Clement used treasury estimates, Lewis adjusted the data by multiplying actual recorded tax accruals by the ratio of pre-recession to actual tax rates.

The results obtained by Lewis indicated that the built-in fiscal stabilizers have contributed substantially to the stability of the postwar economy. He estimated that the fiscal stabilizers have accounted for roughly 40 percent to over 120 percent of the decline in GNP during recessions and about 30 to 34 percent of the subsequent rise in GNP during expansions. In the case of expansions, these results were not much different than what was found earlier by Hart, Kennen and Entine and Clement. However, extreme variability in the impact of automatic stabilizers during contractions can be noticed once again plus the fact that the stabilizers are far more effective during recessions. These results also indicate that the indirect stabilizers which include corporate profit taxes as the only major item have consistently shown a rise in their built-in flexibility over the years, 25 percent during 1948-50 to 73 percent in 1960-61 recession.

The economic significance of built-in stabilizers refers to their

overall impact on the level of economic activity. Lewis pointed out that the precise measurement of such an impact is not possible since it depends on the behavior of the consumers and businesses. However, Lewis recognized that the stabilizers reduced the size of the multiplier and hence the total cumulative change in national change following an autonomous change in expenditures. Lewis estimated that during 1953-54 recession, business savings and the indirect fiscal stabilizers together offset about two-thirds of the decline in GNP. An additional one-fourth of the decline in GNP was offset by the direct fiscal stabilizers. Assuming marginal propensity to consume of 0.9 (derived by Bert G. Hickman (29) using data for 1921-29 and 1947-48) and using these ratios of the decline in GNP that was offset by the stabilizers during 1953-54 recession, Lewis computed a multiplier of 1.08. The multiplier would have been 1.42 had the direct stabilizers (individual income tax, employment taxes and unemployment compensation) not been in operation. This roughly translates to the conclusion that the operation of the direct stabilizers alone could reduce one-third of the potential change in national income. Lewis's main contribution in this part of the analysis is the detailed and highly useful discussion of the theoretical aspects of the effects of automatic stabilizers on the level of economic activity.

Lewis noted that although indirect stabilizers, especially the corporate income tax, have greater budget flexibility, their primary or first round effect on the level of economic activity is not quite significant. The argument being that changes in corporate profits tax liabilities have a very small effect on investment as well as consumption particularly in short recessions where long term profit expecta-

tions are not altered to a great extent. He observed however, that the secondary or induced effects of both the direct and indirect stabilizers on investment and hence on national income cannot be ignored.

Another study using a different approach to measure the built-in flexibility of taxes and transfer payments was done by James S. Duesenberry, Otto Eckstein and Gary Fromm (12). An econometric model was constructed to compute a set of hypothetical values for GNP and disposable income, quarterly from 4th quarter 1957 through the second quarter of 1959 both for what they called a medium recession and a more severe recession referred to as the 'disaster model.'

The approach used in the above study though different in structure is basically the same as was adopted earlier by Hart, Kennen and Entine (26) and Clement (9). Changes in taxes/transfer payments are compared to the changes in GNP. The results indicated that from 45 to 64 percent of the decline in the disposable income was offset by the built-in stabilizers. These estimates are higher than those of the Hart, Kennen and Entine and Clement studies but lower than that of Lewis (31). As before, the corporate income tax was found to be the leading built-in stabilizer. But, contrary to earlier studies, transfer payments were found to be more important than personal taxes as a stabilizer.

Effectiveness of Automatic Stabilizers

The preceding section was concerned with the review of the studies dealing primarily with the budget flexibility or simply revenue effects of the automatic stabilizers. This section will be devoted to the review of some of the major studies regarding the effectiveness of automatic stabilizers. The effectiveness of automatic stabilizers

which is synonymous with the expression 'economic significance' used by Lewis, is concerned with the contribution of automatic stabilizers to the overall stability of the economy by reducing the changes in national income. Multiple effects on national income of an initial change in consumption and investment expenditures are considered. The operation of automatic stabilizers in reducing changes in national income was discussed in the previous chapter. Since the process involves the use of multiplier models, most of the studies dealing with the effectiveness of automatic stabilizers have adopted the multiplier approach.

The studies dealing with the effectiveness of automatic stabilizers are generally of two types: static and dynamic.

Static Analysis

Static Analysis is a comparison of two equilibrium positions. It concerns itself with examining the effectiveness of automatic stabilizers over the entire expansion or contraction and does not investigate the actual time path of the adjustment process of the economy. Some of the important studies under this category will be reviewed presently.

It is to the credit of Richard A. Musgrave and Merton H. Miller (35) that the first systematic approach incorporating the multiplier effects was derived to test and measure the compensatory effectiveness of built-in flexibility. It is this formulation which has been the basis of most of the latter studies (39)(68)(1)(44)(50).[1] The approach assumes two separate tax systems, one with and the other without the built-in flexibility of taxes and transfer payments. To put it differently, in the former system, taxes and transfer payments are function

of income (i.e., they could go up or down with the changes in income) whereas in the latter system, taxes/transfer payments are fixed and do not change with the level of income. Personal and corporate income taxes, excise taxes and transfer payments are combined in the single category of personal taxes. This was made possible in the case of corporate taxes by treating corporations as unincorporated businesses. Excise taxes were treated as personal taxes assessed on an expenditure basis and finally, transfer payments were simply considered as negative taxes. Total income was then defined as personal income plus corporate profits before tax (but after dividends which are already included in personal income).

The fraction of the change in income which is prevented by the operation of these stabilizers is expressed as

$$\alpha = 1 - \frac{\Delta Y}{\Delta Y_{\alpha}}$$

where ΔY refers to the change in income in a system with built-in flexibility and ΔY_{α} is the change in income with no such built-in flexibility. An appropriate macro model is specified and solved for the values of ΔY terms. The coefficient for the effectiveness of built-in flexibility takes the form

$$\alpha = \frac{cE_{r_1}}{1-c+cE_r}$$

where c = marginal propensity to consume out of disposable income plus retained corporate profits.

r_1 = average rate of the entire tax system in the initial period, i.e., T/Y (T stands for total tax revenue minus transfer

payments and Y is the total income as defined above).

E = weighted average of the income elasticities of separate tax sources.

As mentioned earlier, the work done by Musgrave and Miller served as a foundation for many latter studies but it too was not without its limitations. The most important limitation is their handling of the corporate sector. It does not make a distinction between the effect of retained corporate earnings and personal disposable income on the economy. Both are subjected to the same marginal propensity to consume. Moreover, the induced effect on investment is ignored in this formulation.

As far as their empirical analysis is concerned, Musgrave and Miller estimated that the built-in stabilizers prevented approximately 36 percent of a change in national income. In other words, over a third of the change in national income due to an initial change in investment is offset by the automatic stabilizers. This result clearly indicates that the stabilizers have considerable influence on the stability of the economy. However, except for the personal income and corporate profits, most of the data used for taxes and transfer payments were based on estimates rather than actual data, rendering the results less reliable. Moreover, a fixed value of $c = 0.65$[2] was used implying that the results will be valid only if the value of c remained the same over the entire period of the study. Also, the analysis was not carried for the explicit purpose of finding the countercyclical effectiveness of automatic stabilizers since the period, 1946-47, used in the analysis was described as normal (36).[3]

David W. Lusher (33) analyzed the stabilizing effectiveness of

budget flexibility along the lines similar to those adopted by Musgrave and Miller. However, there were two important differences which resulted into a structurally different formula derived by Lusher. First, he included flexible expenditure programs by the government in the list of automatic stabilizers to be evaluated.

Flexible expenditure programs include (a) appropriations or major programs whose expenditures could change without fresh congressional authority or administrative discretion, e.g. interest on public debt, (b) programs requiring supplemental appropriations by congress so as to carry out expenditure commitments made under existing policies (example, public assistance grants to states and veterans' pension and readjustment benefits), (c) programs financed by public debt authorization, for example, farm price support operations and mortgage purchase programs, (d) programs under which expenditure changes could be brought about by administrative action but only to the extent that funds are available and do not need fresh congressional mandate (example, speedup in letting contracts and an increase in the rate of construction on rivers and reclamation projects, etc.), (e) programs where expenditures would change because of changes in the prices of goods and services involved. Most of these programs, however, are not independent of the discretionary action by the authorities and may, therefore, not qualify as automatic stabilizers.

Second, Lusher used a different benchmark in his study. He analyzed the effectiveness of budget flexibility under the existing, that is, variable tax system with reference to a proportional tax system. It may be recalled that Musgrave and Miller (35) measured the effectiveness of built-in stabilizers in the variable tax system with

reference to a system where taxes and transfer payments do not change in response to the changes in income. In the proportional tax/transfer payment system, the average effective tax rate does not change, that is, effective rate flexibility is zero, absolute flexibility is positive and income elasticity is equal to one. The implication of using proportional tax system as a benchmark is that only the tax changes which are greater than the proportional changes in national income will be considered stabilizing; a proportional change in taxes will be neutral and less than proportional will be destabilizing.

According to Lusher, the amount of change in income prevented by the existence of built-in flexibility is measured relative to the hypothetical change that might have occurred in the absence of such flexibility. This is expressed as

$$\frac{Y_2 - Y_{12}}{Y_1 - Y_{12}}$$

where Y_1 refers to the initial gross national expenditure or income; Y_2 refers to the gross national expenditures or income in the terminal period when changes in the average effective tax, transfer payments and flexible government expenditure rates, following autonomous changes in expenditure, are allowed; and Y_{12} is the hypothetical national income in a system of proportional taxes when their average effective rates remain unchanged.

After working with an appropriate macro model, Lusher came up with the following formulation for ϕ, the coefficient of stabilizing flexibility:

$$\phi = Y_2 \left[\frac{c(\Delta r - \Delta t) - \Delta g}{\Delta (I + G)}\right]$$

where

c = marginal propensity to consume

$\Delta r, \Delta t, \Delta g$ = changes in average effective rate of all the taxes combined, transfer payments and flexible government expenditures respectively between the initial and terminal period.

ΔI = change in investment expenditures

ΔG = change in programmed government expenditures for goods and services.

As is apparent, this formulation requires the determination of change in both investment and programmed government expenditures over the period under investigation as well as the change in effective rates of taxes, transfer payments and flexible government expenditures. Moreover, it measures the change in income prevented by the change in the average rates of taxes/expenditures, not by the absolute dollar change as was the case in Musgrave-Miller (35) analysis.

Coefficient of stabilizing flexibility estimated by Lusher for actual yearly changes for the 1929-32 and 1937-38 period ranged from a minimum of nine to a maximum of 30 percent of a change in income. This result, which is not quite significant statistically, may have been due to the particular tax structure prevailing in those years. For example, in 1940 the federal individual and corporate income tax, the most important of the automatic stabilizers, were 36 percent of the GNP while sales and excise taxes not so important as stabilizers, were 32 percent of GNP (37). However, the results found for the half-yearly

hypothetical recession model covering 1953 II - 1955 I period gave larger coefficients of stability than those of the Musgrave and Miller study. It was estimated that during this period, from 36 to 46 percent of the change in national income was prevented by changes in the average rates of taxes and expenditures.

While Musgrave and Miller (35) laid down the groundwork for testing the efficiency of automatic stabilizers through a multiplier model, it was Peter Eilbott (14) who undertook one of the most comprehensive empirical work in this area. Not only did he work with the actual data for recessionary and expansionary periods but he also had the data adjusted for any legislative rate changes, seasonal fluctuations and the lag in collections/disbursements.

Eilbott's formulation, which in effect is an extension of the one developed earlier by Musgrave and Miller, includes some very important elements of the analysis ignored in the earlier works. Unlike Musgrave-Miller and Lusher (33) who combined the various taxes, Eilbott treated personal taxes (which included individual income tax plus excise taxes plus one-half of social security contributions), transfer payments and corporate taxes separately. Moreover, he fully accounted for the effects of induced investment. Eilbott's model will be fully developed in the next chapter since it will be used for the output stabilization part of the present study.

Eilbott estimated that had 1965 rates been in force, the stabilizers, on an average, would have prevented from 36 to 52 percent of the decline in income during the three recessions between 1948-60. During

the three expansions over the same period, the stabilizers had a lesser effectiveness, 25 to 42 percent of the change in national income. Although the numerical values of these results do not seem to be greatly different than some of the earlier studies like that of Clement (9) and Lusher (33), but they may be more reliable since they are the outcome of a more comprehensive analysis.

Dynamic Analysis

Dynamic analysis specifically includes a time variable and examines the time path of the adjustment process. However, as pointed out by D. A. L. Auld (2), this kind of analysis also has its shortcomings. For example, the methods suggested and used by D. J. Smyth (45), E. T. Balopoulos (3) and J. Helliwell and F. Gorbet (28) do not include the impact of discretionary changes in the tax structure.

A common feature in this kind of study is that, in the setting of a macroeconometric model, the economy is subjected to exogenous shocks of certain amount. Then a series of simulation experiments are made both with and without the operation of automatic stabilizers and induced changes in income are found after applying a given change in policy. These studies, however, had some important differences in their methodology.

Giuseppe C. Ruggeri (42) used slightly different coefficient of stability for recessionary and expansionary situations. For recessions, the ratio of percentage peak value change [not absolute change as in the case of Musgrave-Miller (35) model] in real GNP with stabilizers to

percentage peak value change in GNP without the stabilizers is used. The coefficient of stability S is expressed as

$$S = 1 - \left(\frac{X_s^p - X_s^t}{X_s^p} \Big/ \frac{X_{ws}^p - X_{ws}^t}{X_{ws}^p} \right)$$

where X refers to real GNP and superscripts p and t stand for peak and trough values respectively. Subscript s is for the values when the stabilizers are operating, and ws when they are not. It may be noted here that the above formulation will reduce to $S = 1 - X_s/X_{ws}$ (similar to that of Musgrave-Miller model) if the peak values of GNP are the same with and without the stabilizers.

To measure the drag impact of stabilizers during expansions, Ruggeri used the ratio of percentage trough value change in real GNP without stabilizers to the percentage trough value change in real GNP with stabilizers. The drag coefficient D, which measures the percentage reduction in potential real GNP due to the operation of stabilizers is

$$D = 1 - \left(\frac{X_1^p - X_1^t}{X_1^t} \Big/ \frac{X^p - X^t}{X^t} \right)$$

where X_1 and X refer to the real GNP without and with the operation of the stabilizers respectively. The implication is that only a value of $D<0$ will indicate the existence of a fiscal drag during expansions. The use of percentage rather than absolute changes in real GNP eliminates the bias that may result if the value of GNP at cyclical peaks are different with and without the operation of stabilizers.

Ruggeri estimated that the automatic stabilizers as a whole prevented a potential fall in GNP from a minimum of 45 percent in 1960-61

recession to a maximum of 49 percent in the 1957-58 recession. A minimum of seven and a maximum of 41 percent of a potential increase in GNP was checked by the automatic stabilizers during 1961-63 and 1954-57 period respectively. These results are more or less similar to those found earlier by Clement (9), Lusher (33) and Eilbott (14). But there was significant turn around in the role of the stabilizers on individual basis. For the first time, personal taxes assumed the role of the leading stabilizer, instead of corporate taxes.

In their analysis of automatic stabilizers, James A. Chalmers and William A. Fischel (7) defined the coefficient of stability in the same manner as Musgrave and Miller (35). That is, the comparison of the multipliers of two different systems, one with and the other without automatic stabilizers, yields an estimate of their effectiveness. The expression used is $\gamma = 1 - \frac{dY_s}{dY_x}$ where dY_s is the change in income with statilizers and dY_x, the change in income without stabilizers. However, the derivation of the multipliers by Chalmers and Fischel is done in a different way. A thirteen equation macro model of the real sector is specified. These equations are written in terms of a matrix of coefficients, a column vector of endogenous variables, and a column vector of exogenous and predetermined variables. The system is solved by pre-multiplying both sides by the inverse of the matrix of coefficients. The elements of the inverse matrix are the impact multipliers for their respective exogenous variables and are used to measure the effectiveness of automatic stabilizers.

One implication of this approach is that a change in an endogenous variable that will occur in one year after a given change in any exogenous variable can be readily determined by looking at the relevant

impact multiplier in the inverse matrix.

Chalmers and Fischel (7) only considered personal income tax and corporate profit taxes in their study. The coefficient of stability is computed both for the short run (one year) and long run (four years) impacts. The results obtained are almost similar to those of some earlier studies. About 34 percent of a change in income will be prevented by the operation of only two of the stabilizers (personal income tax and corporate profit taxes) over a period of one year. The effectiveness of these stabilizers will increase to approximately 49 percent if their impact is considered over a longer (four year) period. Just like the findings of Ruggeri (42), and contrary to all the previous studies personal income tax was the most important of the two stabilizers.

Arnold H. Packer and Frank C. Ripley (38) had a different purpose in their study of the automatic stabilizers. They compared the strength of automatic stabilizers in 1952 to that of 1972 (both years were part of expansions) to see whether the economy's power to resist sudden changes has improved or not. A different approach was employed to compute the coefficient of stability. As a matter of fact, the coefficient was split into the final demand stabilizer and income stabilizer. The former related to the impact of a particular stabilizer on the final demand following a given change in expenditures. This is expressed as

$$e_i = b_i[(\Delta r_i)p_i GNP + r_i(\Delta p_i)GNP + r_i p_i \Delta GNP]/-D$$

where for each stabilizer i,

e_i = the final demand stabilizer

b_i = the appropriate marginal propensity to spend

r_i = the rate of taxes/expenditures

p_i = the share of GNP

D = the exogenous shock to the economy.

The above equation, which in effect decomposes the income change induced by each stabilizer, measures the first round response of final demand to an exogenous shock to the economy of D/GNP percent. The impact of the stabilizers on income was computed by the evaluation of the following equation:

$$I_s = -(\sum_i e_i/b_i)D/GNP$$

Packer and Ripley estimated that the impact of the stabilizers on income in 1972 virtually stayed at the same level as it was in 1955. The stabilizers prevented 29.5 percent of a change in income in 1955 and 31.4 percent in 1972. Therefore, they concluded that the automatic stabilizers are too weak to keep the economy on track once it reaches full employment.

It should be pointed out that the evaluation of automatic stabilizers on calendar year basis may not be very useful. The impact of the stabilizers can best be investigated with reference to cyclical changes in income. Furthermore, the simple comparison of the strength of automatic stabilizers in 1955 to that of 1972 may not be helpful because of the changes that have occurred in the tax structure and other relationships in the economy.

Summary

Most of the earlier studies of automatic stabilizers were concerned only with their built-in flexibility thus computing only the absolute changes in revenues/expenditures following a change in income. These

studies proved that a significant amount of built-in flexibility exists in the economy due to the operation of automatic stabilizers. But it was soon realized that this measure alone was not sufficient to guage the over all impact of these stabilizers. A particular tax may have greater revenue flexibility in absolute terms but may have a limited impact on the economy as far as the stability is concerned.

It was with this consideration that the studies of the effectiveness of automatic stabilizers were undertaken in the context of multiplier models. Some of these relatively more comprehensive analyses were of static nature, comparing two equilibrium situations and involving the use of actual data while others used econometric forecasting models and had some dynamic elements in them to track the course of the time path of GNP.

The general findings were that the automatic stabilizers contributed significantly to the stability of the postwar economy. They were responsible, on the average, for offsetting about one-third of the changes in income during expansions and as much as one-half of the change in income during recessions. According to the findings of some earlier studies, corporate income tax was relatively more important as a stabilizer. The latter studies, however, showed that personal income tax and transfer payments are becoming more and more important in this respect.

FOOTNOTES

[1]This point will become clear after reading the review of the studies immediately following this one.

[2]The value of c was obtained by correlating total net private saving with disposable income plus corporate saving for the period 1929-41.

[3]See (36) for Musgrave's later work.

CHAPTER IV

METHODOLOGY

Introduction

As mentioned earlier, the effectiveness of automatic fiscal stabilizers in the present study will be discussed in terms of output and price stability. For measuring output stability, the model first developed by Musgrave and Miller (35) and later extended by Eilbott (14) is more appropriate and will be used here. However, some modifications are made to measure the effectiveness of individual stabilizers. A procedure suggested by Brown (6) will be used to test the effectiveness of the stabilizers so far as price stability is concerned (2). Presently, the specification of the model to be used in this study will be undertaken. The data must be adjusted for seasonal variations, collection lags and legislative changes in the tax laws, if any. This process will be fully elaborated in the next chapter.

The Model for Measuring Output Stabilization

Following Musgrave and Miller, let us assume that (a) government expenditures are for goods and services and are constant, (b) all taxes are from the personal income tax, (c) no corporate saving occurs, (d) investment is not affected by taxes, and (e) there are no imports and exports. It should be pointed out, however, that allowing

imports and exports will not change anything in our analysis since they will not be affected by the automatic stabilizers. Any change in income between the two periods may be expressed as:[1]

$$\Delta Y = \Delta I + c\Delta Y - c(r_2Y_2 - r_1Y_1) \qquad (1)$$

where

ΔY = the change in national income between the initial and the terminal period $(Y_2 - Y_1)$.

ΔI = the change in investment between the two periods $(I_2 - I_1)$.

c = marginal propensity to consume out of disposable income.

r_1, r_2 = average rate of tax (T/Y) in the initial and the terminal period respectively.

Y_1, Y_2 = national income in the initial and terminal period respectively.

The income elasticity (E) of the tax yield (T) is defined as the percentage change in the tax yield in the initial period divided by the percentage change in income in the same period. Thus

$$E = \Delta T/T \div \Delta Y/Y$$

which is the same as

$$E = (\Delta T/\Delta Y)(Y/T) \qquad (2)$$

Solving for ΔT, we get

$$\Delta T = (E\Delta Y)(T/Y) \qquad (3)$$

Since ΔT also equals $r_2Y_2 - r_1Y_1$, we can substitute equation (3) in equation (1), therefore

$$\Delta Y = \Delta I + c\Delta Y - c(E\Delta Y)(T/Y) \tag{4}$$

which can be simplified as

$$\Delta Y = \Delta I\left[\frac{1}{1 - c + cE(T/Y)}\right] \tag{5}$$

If r_1 is substituted for T/Y, we have

$$\Delta Y = \Delta I\left[\frac{1}{1 - c + cEr_1}\right] \tag{6}$$

In the above expression, $\frac{1}{1 - c + cEr_1}$ is, in effect, the multiplier of the system where automatic stabilizers are operating. Let us call this change in income as ΔY_s. In a system where there are no automatic stabilizers or where taxes are fixed instead of being the function of income, the income elasticity of taxes will be zero. Therefore, the change in income following an autonomous change in investment in such a system, which we will refer to as ΔY_{ws}, will be

$$\Delta Y_{ws} = \Delta I \frac{1}{1 - c} \tag{7}$$

The degree of effectiveness of built-in flexibility, α, can be expressed as

$$\alpha = 1 - \frac{\Delta Y_s}{\Delta Y_{ws}} \tag{8}$$

The $\Delta Y_s/\Delta Y_{ws}$ term is the ratio of the change in income in the particular tax system with built-in flexibility to the change in income in a

system with no such built-in flexibility. If this ratio were equal to one it would mean that the change in income is the same in both the systems, with or without the built-in flexibility. This will make $\alpha = 0$, meaning no impact whatsoever of automatic stabilizers on income. But in the case where the value of this ratio, $\Delta Y_s/\Delta Y_{ws}$ is less than one, it would indicate that the change in income when automatic stabilizers are operating is smaller than the change in income if there are no automatic stabilizers. By whatever amount this ratio is less than one is the extent of the effectiveness of automatic stabilizers. Therefore, $\alpha = 1 - \frac{\Delta Y_s}{\Delta Y_{ws}}$ gives the fraction of the change in income prevented by the operation of automatic stabilizers.

Substituting equations (6) and (7) into equation (8) gives

$$\alpha = \frac{cEr_1}{1 - c(1-Er_1)} \tag{9}$$

According to Eilbott's (14) formulation, which explicitly includes the effect of transfer payments and allows separation between the corporate and personal sector, any change in income following a change in, say, investment, can be expressed as[2]

$$\Delta Y = \Delta I + c(\Delta Y - \Delta Z) - c(r_2Y_2 - r_1Y_1) + c(u_2Y_2 - u_1Y_1)$$
$$+ i\Delta Z - i(t_2Y_2 - t_1Y_1) \tag{10}$$

where

ΔZ = change in the sume of corporate profits with inventory valuation and capital consumption adjustments, before taxes minus dividends plus corporate social insurance contributions.

u_1, u_2 = average rate of transfer payments (U/Y) in the initial and terminal period respectively.

i = marginal propensity to invest.

t_1, t_2 = average rate of corporate taxes (T/Y) in the initial and terminal period respectively.

The rest of the variables are defined as before.

If we define Y - Z = X = personal income - government transfer payments - business transfer payments - net interest + personal social security contributions + excess of wage accruals; $r_2Y_2 - r_1Y_1 = \Delta R$ = change in personal taxes between the initial and the terminal period; $u_2Y_2 - u_1Y_1 = \Delta U$ = change in transfer payments between the initial and the terminal period; and finally $t_2Y_2 - t_1Y_1 = \Delta T$ = change in the amount of corporate taxes between these two periods, then equation (10) can be written as:

$$\Delta Y = \Delta I + c\,\Delta X - c\,\Delta R + c\,\Delta U + i\,\Delta Z - i\,\Delta T \qquad (11)$$

Income elasticity of personal taxes, E_r is expressed as

$$E_r = (\Delta R/\Delta Y)(Y_1/R_1) \qquad (12)$$

where R_1 refers to the amount of personal taxes in the initial period. Solving for ΔR, gives

$$\Delta R = E_r\,\Delta Y(R_1/Y_1) \qquad (13)$$

Income elasticity of transfer payments, E_u is

$$E_u = (\Delta U/\Delta Y)(Y_1/U_1) \qquad (14)$$

where U_1 is the level of transfer payments in the initial period. Solving for ΔU gives

$$\Delta U = E_u \Delta Y(U_1/Y_1) \tag{15}$$

Similarly, the income elasticity for corporate taxes, E_t is

$$E_t = (\Delta T/\Delta Y)(Y_1/T_1) \tag{16}$$

where T_1 is the level of corporate taxes in period one. Solving for ΔT, we get

$$\Delta T = E_t \Delta Y(T_1/Y_1) \tag{17}$$

Substituting for the terms ΔR, ΔU, and ΔT in equation 11, we get

$$\Delta Y = \Delta I + c\Delta X - cE_r \Delta Y(R_1/Y_1) + cE_u \Delta Y(U_1/Y_1) + i\Delta Z - iE_t \Delta Y(T_1/Y_1) \tag{18}$$

which can be rearranged such that

$$\Delta Y - c\Delta X + cE_r \Delta Y(R_1/Y_1) - cE_u \Delta Y(U_1/Y_1) - i\Delta Z + iE_t \Delta Y(T_1/Y_1) = \Delta I \tag{19}$$

Dividing through by ΔY and substituting r_1, u_1 and t_1 for R_1/Y_1, U_1/Y_1 and T_1/Y_1 respectively, we get

$$1 - c\Delta X/\Delta Y + cE_r r_1 - cE_u u_1 - i\Delta Z/\Delta Y + iE_t t_1 = \Delta I/\Delta Y \tag{20}$$

Rearranging terms yields

$$\Delta Y = \frac{\Delta I}{1 - c\Delta X/\Delta Y - i\Delta Z/\Delta Y + cE_r r_1 - cE_u u_1 + iE_t t_1} \tag{21}$$

In fact, this is the expression for ΔY_s, the change in income in a system having automatic stabilizers. The corresponding expression for

ΔY_{ws}, the change in income with no such stabilizers, which will have zero income elasticities of personal taxes, transfer payments and corporate taxes, i.e., $E_r = E_u = E_t = 0$, will be

$$\Delta Y = \frac{\Delta I}{1 - c\,\Delta X/\Delta Y - i\,\Delta Z/\Delta Y} \tag{22}$$

After substituting (21) and (22) into equation (8) and simplifying, we get

$$\alpha = \frac{c(E_r r_1 - E_u u_1) + iE_t t_1}{1 - c\,\Delta X/\Delta Y - i\,\Delta Z/\Delta Y + c(E_r r_1 - E_u u_1) + iE_t t_1} \tag{23}$$

The above formulation, which measures the effectiveness of automatic fiscal stabilizers as a whole, will be used to estimate the output stabilization strength of these stabilizers. That is, to what extent the automatic stabilizers were effective in preventing changes in output over the business cycle. Since our concern here will be with the real output, the relevant data are in terms of constant dollars.

In order to determine the relative effectiveness of individual automatic stabilizers, equation 23 must be disaggregated. For example, to determine the effectiveness of personal taxes as a stabilizer, we assume that transfer payments and corporate taxes are fixed and that only personal taxes change with the changes in income. In other words, the income elasticities of transfer payments and corporate taxes are assumed to be zero. The coefficient of stability for personal taxes will take the form:

$$\alpha_{pt} = \frac{cE_r r_1}{1 - c\,\Delta X/\Delta Y - i\,\Delta Z/\Delta Y + cE_r r_1} \tag{24}$$

Assuming transfer payments flexible and personal taxes and corporate taxes constant we get the following coefficient of stability for transfer payments:

$$\alpha_{tr} = \frac{-cE_u u_1}{1 - c\Delta X/\Delta Y - i\Delta Z/\Delta Y - cE_u u_1} \qquad (25)$$

Similarly, the coefficient of stability for corporate taxes will be

$$\alpha_{ct} = \frac{iE_t t_1}{1 - c\Delta X/\Delta Y - i\Delta Z/\Delta Y + iE_t t_1} \qquad (26)$$

Limitations of the Model

Although the model described in the previous section is fairly comprehensive and covers most of the aspects of automatic stabilizers, it does have its limitations. Some important limitations are:

1) The model is static in nature. It compares two equilibrium situations and does not trace the actual time path of adjustment process. Yet, it suits the purpose of this study, which is to determine the extent to which the automatic stabilizers were responsible for reducing changes in income from, say, peak to trough and vice versa in a particular cycle. It is sometimes argued that the static measures take into account two equilibrium situations which may not exist. But the measures suggested by this model do not necessarily imply that two equilibrium situations are compared. So long as changes in income between the two periods are derived on the basis of actual rather than hypothetical data, the purpose of the study is served.

2) It may be argued that instead of using actual peak and trough values of national income, the trend values found through interpolation

should be used. The use of actual values may have an upward bias in the effectiveness of automatic stabilizers. However, it should be remembered that the automatic stabilizers, by their very nature, are always operating and change direction with the movements in incomes. Therefore, the hypothetical trend values may not be reached so long as the automatic stabilizers are active.

3) The elasticity measures used in this model are those of arc elasticities. Thus, the results obtained with the help of such elasticities will be relevant only for the average effectiveness of automatic stabilizers over the entire downturn or upturn. On the basis of such results, it cannot necessarily be said that the automatic stabilizers were offsetting a particular percentage of a change in income at each point in a contraction or expansion.

4) The values for the marginal propensity to consume and invest (c and i) are assumed to remain constant over the cycle, which may not be the case. To minimize any potential error, a set of values of these parameters will be used.

5) It should be admitted that this model ignores the influence the manipulation of money stocks and interest rates may have on the level of aggregate demand and hence on output. In fact, the movements in interest payments will affect the level of consumption and investments and in turn, the national income.

6) The effect on income of the induced changes in government spending on goods and services as a result of the automatic changes in tax revenues or benefit payments is also ignored. For this reason, the results obtained may not indicate the actual effectiveness of automatic stabilizers, which can only be true if the government spending

on goods and services remained unchanged.

These qualifications must be borne in mind while deriving any conclusions from the results obtained with the application of the above mentioned model.

A Measure of Price Stabilization

According to Brown (6) nominal taxes can only act as price stabilizers if they increase in a greater proportion than the increase in the price level. Transfer payments have to do the opposite to become price stabilizers. For a particular tax, i, the following measure is used to gauge its price stabilization performance:

$$(1)\quad E_{pi} = (\Delta T_i / \Delta P)(P_1/T_{i1}) \quad > \quad 1 \quad \text{stabilizing}$$

$$(2)\quad E_{pi} = (\Delta T_i / \Delta P)(P_1/T_{i1}) \quad = \quad 1 \quad \text{neutral}$$

$$(3)\quad E_{pi} = (\Delta T_i / \Delta P)(P_1/T_{i1}) \quad < \quad 1 \quad \text{destabilizing}^3$$

where E_{pi} refers to the price elasticity of tax i, T is the tax, P is price level, and subscript 1 stands for the initial period.

The price stability of transfer payments will be evaluated in the following manner:

$$(1)\quad E_{pt} = \Delta U / \Delta P(P_1/U_1) \quad > \quad 1 \quad \text{destabilizing}$$

$$(2)\quad E_{pt} = \Delta U / \Delta P(P_1/U_1) \quad = \quad 1 \quad \text{neutral}$$

$$(3)\quad E_{pt} = \Delta U / \Delta P(P_1/U_1) \quad < \quad 1 \quad \text{stabilizing}^4$$

where E_{pt} refers to the price elasticity of transfer payments and U is the transfer payments. The rest of the variables are as defined above.

FOOTNOTES

[1]The expression within the parenthesis is incorrectly written as $(r_1Y_1 - r_2Y_2)$ in Musgrave and Miller's article.

[2]Here again the expressions for the change in personal taxes, transfer payments and corporate taxes are incorrectly written as $(r_1Y_1 - r_2Y_2)$, $(u_1Y_1 - u_2Y_2)$ and $(t_1Y_1 - t_2Y_2)$, respectively, in Eilbott's article.

[3]From a hypothetical point of view, however, any positive price elasticity of taxes will be stabilizing in the sense that inflation would have gotten worse had there been no increase in taxes at all due to an increase in prices.

[4]This type of stabilization may not be desirable, however. Transfer payments must at least rise proportionately to the rise in prices to maintain purchasing power of the recipients.

CHAPTER V

DERIVATION, ADJUSTMENT AND CLASSIFICATION OF THE DATA

Introduction

Prior to using the data, much of it must be adjusted. The following sections are devoted to a step by step explanation of the adjustment process. First, the data for taxes and transfer payments are discussed. Then, adjustment of the data for seasonal fluctuations, collection lags- the lag between the period a particular tax is collected and when it is actually reported to the Treasury - and legislative rate changes, if any, is considered. Finally, the different classifications of taxes and transfer payments are explained,

Derivation of the Data

The basic data for individual income taxes, corporate income taxes, federal excise taxes, social security taxes (Old-age and Survivors Disability Insurance Contributions) and benefits, and unemployment insurance contributions and benefits are derived in the following manner.

Individual Income Tax

The data consists of tax revenue collected through withholding. They represent the amount reported on quarterly tax returns received

each quarter. It would have been better to use total tax collections, withheld at source as well as non-withheld. But because most of it is paid in the first quarter of every year, the non-withheld portion cannot accurately be associated with particular quarters. The exclusion of non-withheld payments, which accounted for 24 percent of the total gross individual income tax payments in fiscal 1971 and 22 percent in fiscal year 1974, causes effectiveness of individual income tax as an automatic stabilizer to be underestimated. Withholdings collections represented as much as 89 percent of total net (after refunds) individual income tax payments during fiscal year 1971 and 94 percent during fiscal year 1974 (17).

Corporate Income Tax

The data employed are that of the corporate profit tax liabilities and not the actual cash payments. Basically, the same argument as in the case of non-withheld part of the individual income tax payments, is valid here namely, the actual tax payments cannot be accurately attributed to the quarter during which these payments fell due. Furthermore, it is assumed that the current tax liabilities weigh heavily in the decision making process of the corporations for investment plans and dividend payment policies.

Federal Excise Taxes

All federal excise tax collections are included in the data.

Social Security Taxes

The data include taxes for old-age and survivors insurance, disa-

bility insurance, railroad retirement, minus social security taxes paid by the self-employed. In other words, OASDI contributions + railroad retirement contributions - social security taxes by the self-employed make up the data for social security taxes for this study. Social security taxes by the selfemployed were subtracted from the total OASDI contributions for the same reason as that of the exclusion of non-withheld individual income tax payments. That is, they are not attributable to the appropriate quarter because most payments are made in the beginning of the following year. The omission is not serious since self-employment taxes accounted for only 5 percent of the total social security taxes during fiscal years 1971 and 1974 (17). To obtain data for social security taxes by self-employed people, income tax not withheld which did not include self-employment tax was subtracted from income tax not withheld which did include tax on the self-employed.

OASDI Benefit Payments

The data consist of old-age and survivors insurance cash benefit payments plus payments from disability insurance trust funds plus railroad retirement benefits. Lump sum OASDHI payments are subtracted from the total because they are one time payments to the heirs of the insured person at the time of his/her death. Although disability insurance payments are not directly related to the business conditions they are included in the data because these payments cannot be separated from the lump sum OASDHI payments which are deducted from the total and are also included on the contribution side of the OASDI account. These payments accounted for only 10 percent of the total OASDI benefits in the first quarter of 1966 and 14 percent in the first quarter of

1975 (57).

Unemployment Insurance Contributions

Contributions by the employers in the State Unemployment Insurance program are included in this category. Taxes paid by employers under the Federal Unemployment Tax Act and Railroad unemployment insurance contributions are not included. Payments under the federal unemployment taxes accounted for 15 percent of the total employers' contributions during fiscal year 1966 and 20 percent during fiscal year 1975 (58). For the most part, the payments are concentrated in the first quarter of the following year (at least until 1971); therefore, they cannot be attributed to the relevant quarter of the year. Payments under the railroad unemployment insurance have been consistently declining over the last decade. They were four percent of the total unemployment contributions during fiscal year 1966 but dropped to less than two percent during fiscal year 1975 (58).

Unemployment Benefit Payments

The data consist of the payments made to the unemployed under state laws plus unemployment benefits to the railroad employees. Payments under the state laws include unemployment insurance for federal employees and for ex-servicemen; they also include payments under the Servicemens' Readjustment Act of 1944 and the Veterans' Readjustment Act of 1952 and those under federal temporary extended unemployment insurance programs of 1958 and 1961.

Adjustment of the Data

The data, as discussed in the preceding section, are adjusted for seasonal fluctuations, collections lags and legislative rate changes, in that order.

Adjustments for Seasonal Variations

Taxes and transfer payments for a particular quarter may be influenced by seasonal factors. Consequently, the data must be adjusted so as to eliminate the influence of these factors. Except for corporate tax liabilities, published on a seasonally adjusted basis, the data for all other taxes and transfer payments noted above are adjusted for seasonal fluctuations.

An OLS (ordinary least squares) regression of the original series using dummy variables for each quarter, was run for each of the taxes and transfer payments. Specifically, the following equation was fitted to the data:

$$Y_{ij} = B_o + B_1D_1 + B_2D_2 + B_3D_3 + E_{ij}$$

where Y stands for the observed value of a particular tax or transfer payment; i is the number of the observation, and j refers to the particular tax or transfer payment item. D_1, D_2 and D_3 are dummy variables for first, second and third quarter respectively, so that

D_1 = 1, if the data refers to the first quarter,
0, otherwise.

D_2 = 1, if the data refers to the second quarter,
0, otherwise.

D_3 = 1, if the data refers to the third quarter,

0, otherwise.

The coefficient for the fourth quarter is given by the values of the intercept, B_o. E stands for the residuals.

Following G. S. Maddala (34), the mean of the original series is added to the residuals corresponding to each observation in order to obtain the seasonally adjusted values for the particular tax/transfer payment item. This can be expressed as follows:

$\overline{Y}_j + E_{ij}$ = seasonally adjusted value for the ith observation of the tax item, j.

where $\overline{Y}_j$ is the mean of the series of tax or transfer item j and E_{ij} is residual corresponding to ith observation from the regression equation of tax or transfer item j.

Adjustments for Lags in Collection

The data published in a particular quarter of the year actually indicates the time a certain tax revenue was received by the government. All the taxes are not reported immediately to the Treasury after they have been collected from the taxpayers. Therefore, there is a time lag involved in case of certain taxes between the period to which a tax belonged and the period it is reported in the relevant Treasury documents. Unless proper adjustments are made, the data as reported on the basis of its' receipt by the treasury, may lead to erroneous conclusions due to the collection lag. These lags in collection, however, differ from one tax to another depending upon the mode of payment in each case.

Data for individual income tax withholdings and unemployment contributions are adjusted for the lags in collection as is explained later. In the case of corporate income tax, there is no need for adjustment for collection lag because the data used are that of liabilities and not the actual payments. There is no significant collection lag in the case of excise taxes because most of them are paid at the end of every month. Although social security taxes (OASDI contributions) are withheld at source by the employers and deposited with the treasury along with the individual income tax withholdings, their transfer to the trust funds from which the data have been derived may fluctuate depending on the position of the fund at various points in time. Therefore, data for this category of taxes are not adjusted for collection lag. As far as OASDI benefits and unemployment compensation payments are concerned, no adjustment for collection lag is involved.

Following procedure was adopted to adjust the data for collection lags in individual income tax withholdings and unemployment insurance contributions.

Individual Income Tax Withholdings. The employers have to abide by the following schedule in depositing with the treasury federal income tax and social security taxes withheld at source:

1) When the liability for payroll taxes (federal income tax and social security taxes) for an employer is less than $200 for a quarter, total liability for the quarter has to be deposited by the last day of the following month or paid with quarterly returns.
2) In case of the cumulative liability for payroll taxes being less than $200 at the end of the first month of

the quarter but $200 or above at the end of the second month, it is to be deposited by the 15th of the third month. Third month's collections are deposited with the quarterly returns.

3) If the total liability is $200 or above but less than $2,000 per month, deposits must be made for each of the first two months of the quarter on or before 15th of the next month. Third month's payments are to be made on or before the last day of the month following the quarter (63).

The above schedule of payments results into a minimum of 15 days and a maximum of four months lag between the collection of taxes and their actual deposit with the treasury.

Lewis (32) estimated that approximately 90 percent of the withholdings in the first two months of each quarter, and 30 percent of the withholdings in the third month of the quarter are deposited in the treasury account by the end of the month following. This means that 60 percent of the total withholdings of a particular quarter are deposited and show up in treasury data in the same quarter while the remaining 40 percent will show in the following quarter's figures of tax collections.

The individual income tax withholdings as reported in the treasury data are adjusted for collection lag on the basis of the above estimates. Accordingly, 60 percent of the seasonally adjusted withholdings of a given quarter are added to the 40 percent of the seasonally adjusted collections of the following quarter to come up with the figure for the first of the two given quarters. For example, to

arrive at the values for the first quarter, 60 percent of the collections of the first quarter are added to the 40 percent of the collections of the second quarter.

Unemployment Insurance Contributions. As stated in an earlier section of this chapter, the data include only the payments made by the employers to the state unemployment insurance program. The time of the actual payments would therefore, be regulated by state laws. However, it is reasonable to assume that generally a one quarter lag is involved between the time these payments fall due and presumably have their impact on the employers' decision making process, and the time they are actually paid and published in the relevant series. Therefore, for any given two quarters, seasonally adjusted values for the second quarter were related to the first quarter and so forth.

Adjustment for Legislative Rate Changes

Legislative changes in the rates of various taxes and transfer payments are made as and when needed to keep up with the changed circumstances. For the purposes of measuring the impact on the economy of automatic changes in taxes and transfer payment items, it is important that the data employed should be free from the effects of any discretionary changes and show only the automatic changes due to the general economic activity. If the data used are not adjusted for rate changes the effectiveness of automatic stabilizers may be overestimated. For example, if tax rates are reduced during a recession, the decline in tax revenues will be greater than what it would have been only as a result of a decline in incomes. But the unadjusted data

will inaccurately indicate a greater automatic flexibility.

Government estimates of the effect on revenue and transfer payment expenditures of discretionary changes are used to adjust the relevant data for cyclical peak and trough quarters only. Such estimates are published in the Budget of the United States and the Economic Reports of the President. As pointed out by Auld such estimates have the advantage of including the adjustments for all factors affecting the tax revenue (2).

Notable legislative changes during 1966-75 period were: (1) Expenditure Control Act of 1968, enacted June 28, 1968, (2) Tax Reform Act of 1969, enacted December 1969, (3) Revenue Act of 1971, enacted December, 1971, and (4) Tax Reduction Act of 1975, enacted March 29, 1975. In addition, social security tax rates and earnings base were increased. The scope of unemployment insurance benefits was extended in December, 1974 (a later amendment came in March, 1975). Social security benefit rates were increased in March, 1968, October, 1972, April, 14 and July, 1974. Excise tax on telephones was gradually reduced during this period.

The estimates of the revenue effects of changes in the tax rates published in the relevant issues of the Budget are on a fiscal year basis. In order to come up with an approximate value of the revenue effects for a particular quarter, the following procedure was adopted:

(1) Actual quarterly figures were added on a fiscal year basis. For example, to get actual tax collections during fiscal year 1970, tax collections reported for third quarter 1969 through second quarter 1970 are added.[1]

(2) Actual tax collections of a given quarter are divided by

the total collections of the fiscal year as obtained at step 1 above. This gives the share of that quarter's collections in the total. For example, actual total collections of individual income tax withholdings during fiscal year 1970 were $77,410 million. Collections for the third quarter which was the peak quarter, were $18,967 million. Dividing $18,967 through $77,410 gives 0.245, which means that the actual tax collections during third quarter 1969 were 24.5 percent of the total collections for fiscal year 1970.

(3) Fiscal year estimates of revenue effects of a rate change are multiplied by the share of the given quarter in the total. The resultant figure is the approximate effect of the rate change during that particular quarter. Continuing with our previous example, it was estimated by the government that individual income tax will increase by $7,200 million during fiscal year 1970 due to the 10 percent surcharge levied under the Expenditure Control Act of 1968. $7,200 million was multiplied by 0.245, the share of the third quarter found at step 2 above, giving a value of $1,764 million for the effect of a rate change during that quarter.

(4) Finally, the values of the effect of a rate change during a given quarter, found at step 3 are added or subtracted, as the case may be, to the corresponding values for that quarter after they have been adjusted for seasonal fluctuations and collection lag, if any. In the cases where a legislative change resulted in an increase in tax revenue, the values for the effect of that increase for a given quarter will be subtracted from the values of that quarter to eliminate the effects of legislative changes. The opposite is done when legislative actions resulted in a decline in taxes.

Where the estimates of the legislative changes are given on calendar year basis, which is particularly true in the case of estimates of transfer payment changes reported in the Economic Report of the President, actual quarterly values in a calendar year are added. The observed values of a peak or trough quarter are then divided by the total for that year to determine the share of that quarter in the year's total. The rest of the procedure is identical to that of step 3 and 4 above.

The details of the adjustment of the data for legislative rate changes is given for each cyclical peak and trough quarter in Table I.

Classification of the Data

After making necessary adjustments for seasonal fluctuations, collection lag and legislative rate changes, the data for taxes and transfer payments are classified into three main categories: personal taxes, corporate taxes, and transfer payments.

Personal Taxes

Individual income tax withholdings, federal excise taxes (treating them as personal taxes assessed on an expenditure basis) and employee share of the old-age and survivors' disability insurance (OASDI) contributions excluding contributions by the self-employed but including railroad retirement contributions, were combined together and are referred to as personal taxes. Data for the employee share of the OASDI contributions were estimated by dividing the total OASDI contributions into two, the other half going to the employer contribution for OASDI.

TABLE I

ADJUSTMENTS FOR LEGISLATIVE RATE CHANGES IN VARIOUS TAXES AND TRANSFER PAYMENTS DURING 1966-75 (In Million Dollars)

Period	Budget Item	Amount (after making adjustments for seasonal fluctuations and collection lags, where applicable)	Fiscal/Calendar Year Total	Share of the particular quarter in the yearly total	Type of Change	Govt. estimates of revenue/expenditure effects for the fiscal/calendar year	Estimates of the change associated with the particular quarter	Amount of revenue/expenditure after adjustments for rate changes
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
					Expenditure Control Act of 1968 (June 28, 1968)			
1969 III	Individual Income Tax	$19,772	$ 77,410	24.5%	(i) 10% tax surcharge	+ $7,200 (fiscal)	+ $1,764	$18,008
	Corporate Income Tax	$38,900 (annual rate)	$147,800	26.3%	(ii) -do-	+ $1,800 (fiscal)	+ $ 473.7	$36,360 (Annual rate)
					Repeal of investment tax credit (effective April 21, 1969)	+ $ 500 (calendar)	+ $ 163.8	
	Excise Tax	$ 3,828	$ 15,706	25.3%	(iii) Deferring of a scheduled reduction in automobile (7% to 5%) telephone (10% to 5%) excise taxes until Jan. 1, 1970.	+ $2,100 (fiscal)	+ $ 531.7	$ 3,296
	Social Security Taxes	$ 7,943	$ 33,070	25.6%	(iv) Increase in social security tax rates from 8.8% to 9.6% on Jan. 1, 1969	+ $3,000 (fiscal)	+ $ 767	$ 7,176
	Social Security Benefits	$ 7,226	$ 30,323	23.0%	Liberalization of social security benefits (effective March, 1968)	+ $3,000 (for calendar 1968) (major part of $5 billion increase in transfer payments during 1969)	+ $ 750	$ 6,476

TABLE I (CONTINUED)

Period	Budget Item	Amount (after making adjustments for seasonal fluctuations and collection lags, where a applicable)	Fiscal/Calendar Year Total	Share of the particular quarter in the yearly total	Type of Change	Govt. estimates of revenue/expenditure effects for the fiscal/calendar year	Estimates of the change associated with the particular quarter	Amount of revenue/expenditure after adjustments for rate changes
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
					Tax Reform Act of 1969 (Dec., 1969)			
1970 IV	Individual Income Tax	$19,340	$ 76,484	24%	(i) Extension of income tax surcharge at 5% rate from Jan. 1 to June 30, 1970	+ $ 400 (fiscal)	+ $ 242	$19,098
					(ii) Repeal of investment tax credit	+ $ 600 (fiscal)		
	Corporate Income Tax	$33,000 (annual rate)	$143,700	23%	(iii) Extension of income tax surcharge at 5% rate from Jan. 1 to June 30, 1970	+ $ 700 (fiscal)	+ $ 803.75	$29,800
					(iv) Repeal of investment tax credit	+ $1,900 (fiscal)		
					(v) Tax reform and relief provisions	+ $ 900 (fiscal)		
	Excise Tax	$ 3,961	$ 16,615	24.8%	(vi) Extension of excise tax rates to Dec. 31, 1970	+ $1,200 (fiscal)	+ $ 298	$ 3,663
	Social Security Benefits	$ 8,929	$ 33,322	26%	(vii) Social security benefit increase	+ $3,900 (calendar 1970)	+ $1,014	$ 7,915

TABLE I (CONTINUED)

Period	Budget Item	Amount (after making adjustments for seasonal fluctuations and collection lags, where applicable)	Fiscal/Calendar Year Total	Share of the particular quarter in the yearly total	Type of Change		Govt. estimates of revenue/expenditure effects for the fiscal/calendar year	Estimates of the change associated with the particular quarter	Amount of revenue/expenditure after adjustments for rate changes
(1)	(2)	(3)	(4)	(5)	(6)		(7)	(8)	(9)
					Revenue Act of 1971 (Dec., 1971)				
1973 IV	Individual Income Tax	$28,013	$112,064	24.5%	(i) Increased exemptions	-1,200			
					(ii) Increased deductions	-1,400			
					(iii) Job development credit	- 700			
					(iv) Revision of accelerated depreciation	+ 300	} -$2,900 (fiscal)	-$ 710	$28,723
					(v) Correction of withholding schedules	+ 100			
	Corporate Income Tax	$48,600 (Annual Rate)	$198,000	24.5%	(vi) Job development credit	-2,900			
					(vii) Revision of accelerated depreciation	+1,300			
					(viii) Tax deferral for certain corporations engaged in foreign trade	- 100	} -$1,700 (fiscal)	-$ 417	$50,200
	Excise Tax	$ 4,387	$ 16,844	27%	Reduction in telephone excise (10% to 9% on January 1, 1973)	- 300			
					Repeal of auto and small truck excises (Revenue Act of 1971)	-2,200	} -$2,500 (fiscal)	-$ 675	$ 5,062

TABLE I (CONTINUED)

Period	Budget Item	Amount (after making adjustments for seasonal fluctuations and collection lags, where applicable)	Fiscal/Calendar Year Total	Share of the particular quarter in the yearly total	Type of Change	Govt. estimates of revenue/expenditure effects for the fiscal/calendar year	Estimates of the change associated with the particular quarter	Amount of revenue/expenditure after adjustments for rate changes
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1973 IV	Social Security Tax	$13,235	$ 53,094	21%	Rate increase from 9.6% to 10.5% effective January 1, 1971 +3,800 (fiscal 1973) Taxable earnings base increase from $7,800 to $9,000 effective Jan. 1, 1972 +3,600 Rate increase from 10.4% to 11.7% effective Jan. 1, 1973 +6,800 Taxable earnings base increase $9,000 to $10,800 effective Jan. 1, 1973 +4,700	+$18,900 (fiscal)	+ $3,969	$ 9,266
	Social Security Benefits	$14,001	$ 53,696	25.6%	Increase in benefits	+$ 8,000 (Calendar)	+ $2,046	$11,955
	Unemployment Contributions	$ 1,073	$ 5,213	16.4%	Tax increase	+$ 200	+ $ 32	$ 1,041

TABLE I (CONTINUED)

Period	Budget Item	Amount (after making adjustments for seasonal fluctuations and collection lags, where applicable)	Fiscal/Calendar Year Total	Share of the particular quarter in the yearly total	Type of Change	Govt. estimates of revenue/expenditure effects for the fiscal/calendar year	Estimates of the change associated with the particular quarter	Amount of revenue/ expenditure after adjustments for rate changes
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
					Tax Reduction Act of 1975 (March 29, 1975)			
1975 I	Corporate Income Tax	$ 4,060 (Annual Rate)	$194,100	21.0%	(i) Decrease in tax	-$ 800 (fiscal)	-$ 200	$41,600
	Excise Tax	$ 4,079	$ 16,552	22.8%	Reduction in telephone excise tax 9% to 8% from Jan. 1, 1974 / 8% to 7% from Jan. 1, 1975	-$ 300 (fiscal)	-$ 69	$ 4,148
	Social Security Tax	$15,889	$ 61,449	26%	Earnings base increase $10,800 to $13,200 effective Jan. 1, 1974; +$4,800			
					From $13,200 to $14,100 effective Jan. 1, 1975 +$ 100	+ $4,900 (fiscal)	+$1,298	$14,591
	Social Security Benefits	$16,611	$ 68,639	24.0%	Increase in benefit rates. 7% in April and additional 4% in July, 1974 (Total 11%)	-	+$1,815.77 (11% of total benefits of the quarter)	$14,795
	Unemployment Benefits	$ 3,246	$ 12,448	28.9%	Unemployment benefit increase	+ $2,000 (calendar)	+$ 500	$ 2,746

Sources: U. S. Budgets 1970, p. 61-62; 1971, p. 67; 1973, p. 66-67; 1974, p. 62, 76; 1975, p. 46; 1976, p. 59; 1977, p. 51; General Explanation of Tax Reform Act of 1969, p. 27; Economic Reports of the President, 1968, p. 54; 1969, p. 39; Feb, 1970, p. 32-33; Feb, 1974, p. 76, Feb, 1975, p. 61; Feb, 1976, p. 53.

Corporate Taxes

Corporate income tax liabilities, one-half of total OASDI contributions and unemployment contributions are included in this group of taxes.

Transfer Payments

OASDI benefit payments and unemployment benefits are summed and called transfer payments.

FOOTNOTES

[1]Prior to 1976, the fiscal year ended on June 30th. It now ends on September 30th.

CHAPTER VI

MEASUREMENT AND FINDINGS OF OUTPUT AND PRICE STABILITY

Introduction

In this chapter the data, after having been adjusted for seasonal variations, collection lags and legislative rate changes are subjected to the detailed analysis of the type suggested by the model in Chapter IV. The results for each of the two cyclical upturns and downturns are noted.

It may be recalled that the measure of the effectiveness of automatic fiscal stabilizers is split into output and price stabilization effects. Analysis with respect to output stabilization will be taken up first followed by the evaluation of the price stabilization aspect of the automatic stabilizers.

Measurement of Output Stability

While evaluating the output stabilization performance of the automatic stabilizers, the effects of movements in the price level, have to be eliminated from the data. Therefore, as a first step, all the relevant data belonging to cyclical peak and trough quarters are converted into constant (1958) dollars. This includes data for national income, individual income tax withholding collections, excise taxes, social

security taxes, corporate income tax liabilities, unemployment insurance contributions, social security benefits and unemployment compensation payments. The data for taxes and transfer payments are then arranged under the three main categories of personal taxes, corporate taxes, and transfer payments as explained at the end of the preceding chapter. Current dollar values for corporate profits with inventory and capital consumption adjustment, dividends, and employer contribution for social insurance are also converted into constant dollars because they are later used for deriving the corporate share of national income. GNP implicit price deflator (1958 = 100) is used for this purpose.

As a second step, personal and corporate shares of national income are derived for each of the peak and trough quarter falling within the period of the study. It may be recalled that the corporate share, Z, has been defined in Chapter IV as:

Z = corporate profits with inventory valuation and capital consumption adjustment minus dividends plus employer contributions for social insurance.

Personal share, X, would therefore be equal to Y - Z.

Third, absolute changes in the real values of national income, personal and corporate shares of national income, personal taxes, corporate taxes and transfer payments from peak to trough and vice versa falling within the period (1966 I - 1975 I) covered by the study, were computed. While computing changes in taxes and transfer payments during cyclical expansions and contractions, the data used for the ending quarter are adjusted for discretionary rate changes, if any, during that cycle to make it comparable with the initial quarter figures. But when the same quarter is representing the initial quarter

of the following cycle, the data used are not adjusted for discretionary rate changes since such a comparison is not affected by the rate changes in the preceding cycle. This is so because we are interested in the changes that occurred during a particular expansion or contraction under a constant rate structure. Therefore, to make the data for the initial and the terminal quarter comparable, the only values that need to be adjusted for rate changes are those of the ending quarter so that they represent the rate structure prevailing at the beginning of the cycle.

Fourth, the ratios $\Delta X/\Delta Y$, $\Delta Z/\Delta Y$ and average rates of personal taxes R/Y, corporate taxes, T/Y and transfer payments U/Y are derived for each cycle.

Fifth, output elasticities of personal taxes, corporate taxes and transfer payments are computed for each of the two upturns and downturns. This is done by evaluating the ratio of percentage changes in real taxes/tranfers to the percentage changes in real national income for each period.

Thus far, all the ingredients of the formula (equation 23 in Chapter IV) for measuring the degree of effectiveness of output stabilizers have been determined except for the values of marginal propensity to consume, c and marginal propensity to invest, i. A set of the values for c and i are employed in order to allow the results a broader applicability.

The final step is to combine the derived values of average rates of taxes/transfer payments, output elasticities and the ratios $\Delta X/\Delta Y$ and $\Delta Z/\Delta Y$ with each pair of the assumed values for c and i in the man-

ner indicated by equation 23 in Chapter IV. This is done for each of the two expansionary (one complete and part of the other expansion) and contractionary periods covered in the study. The resultant figures indicated that the automatic fiscal stabilizers as a group, were capable of preventing that much of a percentage of change in national income over the relevant period.

In order to ascertain the effectiveness of any single stabilizer while other stabilizers are assumed constant, the derived values of its' average rates, output elasticity and the ratios $\Delta X/\Delta Y$ and $\Delta Z/\Delta Y$ were combined with different sets of the assumed values for c and i as indicated by equations 24 through 26. Again, this was done separately for each of the four periods covered in the study. The results obtained gave the degree of potential effectiveness of a single stabilizer in preventing the changes in national income. The words 'potential effectiveness' are used because this will be achievable only if rest of the stabilizers are inactive, which means that a part of the would be influence of other stabilizers on income will be captured by the particular stabilizer being evaluated. Therefore, potential effectiveness will tend to be greater than the actual. This point has also been stressed by Ruggeri (42).

Measurement of Price Stability

As mentioned earlier, this aspect of automatic stabilizers is concerned with looking into the contribution of automatic stabilizers toward the stability of general price level. By the very nature of the problem involved here, all the relevant data for national income, taxes and transfer payments, etc. is in current dollars indicating

that the price level is allowed to change.

Percentage changes in the general price level (using GNP implicit price deflator as an index) and in the current dollar values of personal taxes, corporate taxes and transfer payments from peak to trough quarters and vice versa of each sub-period are derived. These percentage changes are then used to compute price elasticities of all the three major categories of automatic stabilizers. As noted in Chapter II, a particular tax item with a price elasticity of greater than unity works to stabilize prices. A unitary price elasticity indicates its neutrality so far as price stabilization is concerned and an elasticity of less than one means that the stabilizer in question was acting as a price destabilizer. In the case of transfer payments, a price elasticity of less than one is consistant with price stabilization whereas an elasticity of greater than one will indicate that these payments were price destabilizing. A price elasticity equal to one will show neutral effects.

Results

As mentioned in Chapter I, the present study covered the period from 1st quarter 1966 through 1st quarter 1975 which was further split into four sub-periods according to the peaks and troughs of economic activity. The results obtained for each of these four periods are presented in a chronological order.

1966 (I) - 1969 (III) Expansion

It should be mentioned here once again that this period is part of a long expansion that started in early 1961 and continued until the

third quarter of 1969. An inflationary situation prevailed during this period as there was considerable increase in the general price level. Price level rose by as much as 15 percent. While national income in current dollars showed an increase of 171.4 billion, it was only $63.1 billion when converted into constant (1958) dollars (Table II).

Assuming values for the marginal propensity to consume and invest of 0.9 (21)(22)(18) and 0.5 (15)(16)(14) respectively, it is estimated that as much as 78 percent of the potential increase in real output was prevented by the automatic stabilizers. The effectiveness of output stabilizers is reduced to 55 percent if the values for MPC and MPI are assumed to be 0.8 and 0.3 respectively. Thus the output stabilizers, as a whole, prevented from 55 to 78 percent of the potential increase in output (Table III).

As far as the effectiveness of a single category of stabilizers is concerned, only personal taxes were contributing significantly to the output stability. Real personal taxes increased by $18.5 billion during this period, which amounted to a 2.69 percent increase in taxes for every one percent increase in output. It is estimated that from 61 to 81 percent of the potential increase in output was prevented automatically by personal taxes. Very little contribution to the output stability was made by the corporate taxes because they did not increase much during this period. The output elasticity of corporate taxes was only 0.35. On the other hand, transfer payments were adding to the expansionary forces rather than checking them. These payments registered an increase of $4.4 billion in constant (1958) dollars during 1966 (I) - 1969 (III) period (Table II). It should be mentioned here once again that the effectiveness of individual stabilizers refers to their potential

TABLE II

ABSOLUTE AND PERCENT CHANGES IN NATIONAL INCOME AND THE AUTOMATIC STABILIZERS[1]

	1966I-1969III		1969III-1970IV		1970IV-1973IV		1973IV-1975I	
	Absolute Change	Percent Change	Absolute Change	Percent Change	Absolute Change	Percent Change	Absolute Change	Percent Change
1. National Income:								
i) current dollars	171.40	0.28	31.70	0.04	296.40	0.36	47.0	0.04
ii) constant dollars	63.10	0.117	-15.02	-0.025	109.00	0.18	-60.8	-0.08
2. Personal Taxes:[2]								
i) current dollars	33.71	0.51	5.61	0.05	42.64	0.39	9.68	0.06
ii) constant dollars	18.51	0.31	- 1.00	-0.013	16.17	0.20	- 6.93	-0.07
3. Corporate Taxes:[3]								
i) current dollars	8.81	0.19	- 5.19	-0.09	19.00	0.37	- 1.83	-0.025
ii) constant dollars	1.64	0.04	- 6.49	-0.15	6.84	0.18	- 7.25	-0.158
4. Transfer Payments:[4]								
i) current dollars	8.69	0.43	5.46	0.19	11.24	0.30	9.28	0.17
ii) constant dollars	4.40	0.24	2.40	0.107	3.10	0.11	0.33	0.01
5. Price Level	16.75	0.15	8.74	0.06	21.05	0.15	22.69	0.14

[1]Changes in automatic stabilizers are those occurred automatically, i.e., after adjusting for legislative rate changes. The data are seasonally adjusted at annual rates in billions of current and constant (1958) dollars.

[2]Personal taxes included individual income tax withholding collections, excise taxes, and one-half of old age survivors and disability insurance contributions.

[3]Corporate taxes included corporate income tax liabilities, one-half of OASDI contributions and unemployment contributions.

[4]Transfer payments include unemployment compensation payments and OASDI benefits payments.

SOURCE: Federal Reserve Bulletins, Survey of Current Business, Social Security Bulletins and Annual Reports of the Treasury.

TABLE III

OUTPUT AND PRICE ELASTICITY AND THE EFFECTIVENESS
OF THE AUTOMATIC STABILIZERS, 1966-1975

	1966I-1969III Expansion	1969III-1970IV Contraction	1970IV-1973IV Expansion	1973IV-1975I Contraction
1. Output Elasticity:				
i) personal taxes	2.69	0.52	1.10	0.82
ii) corporate taxes	0.35	6.24	0.90	1.80
iii) transfer payments	2.08	-4.28	0.61	-0.11
2. Price Elasticity:				
i) personal taxes	3.43	0.83	2.56	0.44
ii) corporate taxes	1.32	-1.43	2.46	-0.18
iii) transfer payments	2.88	2.79	1.97	1.23
3. Effectiveness (α) with different sets of MPC and MPI:				
MPC MPI				
0.9 0.5	0.78	0.48	0.42	0.39
0.9 0.3	0.84	0.35	0.35	0.30
0.8 0.5	0.53	0.46	0.32	0.25
0.8 0.3	0.55	0.33	0.27	0.33

SOURCE: Federal Reserve Bulletins, Survey of Current Business, Social Security Bulletins and Annual Reports of the Treasury.

and not the actual effectiveness. This means that by whatever percentage of the change in national income they were capable of preventing would be possible only if rest of the stabilizers were not there. But since rest of the stabilizers do affect consumption and income, some of these influences will show up in the performance of the active stabilizer. In short, the actual effectiveness of a stabilizer will be smaller than its potential one.

Personal taxes were also the major contributors with respect to price stability. The price elasticity of personal taxes was 3.43 during this period which indicates that these taxes increased at a much faster rate than the rate of increase in the price level. Corporate taxes also increased in a greater proportion than prices and were therefore, checking the inflationary forces. The price elasticity of corporate taxes was 1.32. Transfer payments were destabilizing with respect to price stability as they were in the case of output stability. Price elasticity of transfer payments was 2.88 during this period (Table III).

1969 (III) - 1970 (IV) Contraction

The expansion that had started in 1961 peaked out in the third quarter 1969. This was followed by a mild recession which lasted until fourth quarter 1970. This period, however, did not register a consistent decline in real national income. Real national income started declining in the last quarter 1969 and continued this trend through the second quarter 1970. It picked up a little in third quarter 1970 but dropped again in the last quarter of 1970. While real output declined by as much as $15 billion during this period, the price level increased by six percent (Table II). Thus, the economy

experienced declining output and rising prices during this recession.

The automatic stabilizers, as a group, contributed significantly to stabilize output. The combination of the values for the marginal propensity to consume and invest of 0.9 and 0.5, respectively, yielded an estimate of 48 percent for the effectiveness of output stabilizers. When the values of 0.8 for MPC and 0.3 for MPI were assigned to these parameters, the effectiveness of automatic output stabilizers was reduced to 33 percent (Table III).

Individually, corporate taxes and transfer payments were the leading output stabilizers. Their range of potential effectiveness was from 17 to 32 percent and 17 to 24 percent respectively during the period under discussion. Personal taxes could only prevent from 8 to 12 percent of a change in national income (Table IV). During recessions profits fall off more relative to the decline in individual incomes. Therefore, a greater change in corporate taxes results in their being more effective.

All the three major categories of automatic stabilizers were behaving in a destabilizing manner with regard to the price stability. Although personal taxes, in money terms, increased five percent it was less than the six percent increase in the price level. Corporate taxes, in current dollars, moved in the opposite direction to prices and hence contributed to inflation. Nominal transfer payments increased 19 percent which was three times as much of the increase in price level and therefore, also added to the inflationary forces (Table II).

1970 (IV) - 1973 (IV) Expansion

During this period of economic expansion, from the fourth quarter

TABLE IV

POTENTIAL EFFECTIVENESS OF INDIVIDUAL AUTOMATIC OUTPUT STABILIZERS DURING EXPANSIONS AND CONTRACTIONS, 1966-1975

Period	Marginal Propensity To Consume	Marginal Propensity To Invest	Effectiveness (α)
1966I-1969III Expansion			
Personal Taxes	0.9	0.5	0.81
	0.8	0.3	0.61
Corporate Taxes	0.9	0.5	0.18
	0.8	0.3	0.05
Transfer Payments	0.9	0.5	----[1]
	0.8	0.3	-0.59
1969III-1970IV Contraction			
Personal Taxes	0.9	0.5	0.12
	0.8	0.3	0.08
Corporate Taxes	0.9	0.5	0.32
	0.8	0.3	0.17
Transfer Payments	0.9	0.5	0.24
	0.8	0.3	0.17
1970IV-1973IV Expansion			
Personal Taxes	0.9	0.5	0.41
	0.8	0.3	0.27
Corporate Taxes	0.9	0.5	0.14
	0.8	0.3	0.06
Transfer Payments	0.9	0.5	-0.16
	0.8	0.3	-0.08
1973IV-1975I Contraction			
Personal Taxes	0.9	0.5	0.29
	0.8	0.3	0.19
Corporate Taxes	0.9	0.5	0.19
	0.8	0.3	0.08
Transfer Payments	0.9	0.5	0.02
	0.8	0.3	0.01

[1]The effectiveness of transfer payments is not reported here because an unbelievable coefficient of stability for transfer payments was calculated. This was primarily the result of a decline in the corporate share in national income during the expansion which in turn produced the anomaly.

SOURCE: Federal Reserve Bulletins, Survey of Current Business, Social Security Bulletins and Annual Reports of the Treasury.

1970 through fourth quarter 1973, national income in constant (1958) dollars registered an absolute increase of $109 billion. This translates into an increase of 18 percent over the entire expansion. The increase in the price level was 15 percent, which is the same increase that occurred during 1966-69 part of an earlier expansion. But because of the greater percentage increase in nominal national income, 36 percent as against 28 percent during 1966-69, substantial gains in real output were recorded during 1970-73 expansion (Table II).

During this period, all the output stabilizers together are estimated to have prevented from 27 to 42 percent of the change in national income (Table III). As far as their individual performance is concerned, personal taxes were the major stabilizers with a potential effectiveness ranging from 27 to 41 percent. Although their potential effectiveness was much less, 6 to 14 percent, than that of the personal taxes, corporate taxes also moved in the direction of stabilizing output. As was the case in 1966-69 expansion, transfer payments again were destabilizing (Table IV).

Evidently, output stabilizers were not as effective as was the case in the 1966-69 period. Real national income during 1970-73 period increased at a higher rate, 18 percent as compared to that of 11.7 percent increase during 1966-69. The impact of the increase in taxes during the latter period was greater than that of the former because considerable amount of the rise in incomes during 1966-69 was due to inflation. This may partly explain the rather mild contribution of automatic stabilizers during 1970-73 expansion. This may not be undesirable during expansions if achieving full employment is the primary consideration.

Both personal taxes and corporate taxes rose in greater proportion than the rise in price level. Thus, real taxes increased and contributed to the price stability during 1970-73 period. It should be pointed out that part of the price stability can be attributed to the wage and price controls which were in effect during this period. Personal taxes automatically rose by as much as 39 percent. Corporate taxes registered an increase of 37 percent during the period. Since the increase in price level was 15 percent, less than 50 percent of the increase in taxes, both the personal and corporate taxes were acting as price stabilizers. Transfer payments moved in the direction of destabilizing prices as they did in the case of output stabilization. These payments increased as much as 30 percent, in current dollars, between the peak to trough quarters of this expansion (Table II). This, being double the increase in price level, added to the inflationary forces. The price elasticity of transfer payments was 1.97 (Table III). It should be mentioned however, that unemployment compensation payments decreased during this period. It was the increase in OASDI benefits which more than offset the decrease in unemployment compensation.

1973 (IV) - 1975 (I) Contraction

This was the period which, more than anything else, prompted the evaluation of automatic fiscal stabilizers in terms of both price and output changes. As was the case in 1969-70 recession, the economy experienced rising prices and falling output during 1973-75. Real output declined by $60.8 billion or eight percent while the price level increased by 14 percent during this period (Table II). Stabilizers were subjected to opposing effects by rising prices and falling output.

The automatic stabilizers as a group, were operating to stabilize output. In other words, they were behaving in such a manner that slowed down the decline in real output. It is estimated that from 33 to 39 percent of the decline in potential output was prevented due to the operation of the stabilizers (Table III). Considering a single category of automatic stabilizers at a time, it is estimated that personal taxes alone were capable of preventing from 19 to 29 percent of the potential decline in output. Corporate taxes could have been effective in offsetting from 8 to 19 percent of the decline in output during the same period (Table IV). Because of the higher rate of inflation, the decline in corporate taxes was much less than that of 1969-70 period. This may explain the relatively lesser effectiveness of corporate taxes as automatic stabilizers. There was a slight automatic increase in transfer payments ($0.33 billion) and hence they were largely neutral so far as output stabilization is concerned.

As was the case in 1969-70 recession, the automatic stabilizers were destabilizing in respect to price changes during 1973-75 recession. Although personal taxes, in current dollars, increased by $9.68 billion or six percent between the peak and trough quarters of the recession, they did not keep pace with the 14 percent rise in the price level. Price elasticity of personal taxes was 0.44. Corporate taxes decreased by 2.5 percent while transfer payments increased 17.6 percent and hence, both these budget items were price destabilizing (Table II).

CHAPTER VII

SUMMARY AND CONCLUSIONS

Summary

The automatic fiscal stabilizers consist of those taxes and transfer payments which change automatically in response to changes in the national income. For example, taxes increase with the rise in incomes while transfer payments decrease during an economic expansion. During recession, however, as incomes decline so do the taxes, while transfer payments rise. The effectiveness of automatic fiscal stabilizers is, in a simpler language, the contribution of these stabilizers in reducing the percentage changes in national income.

The budget items considered as such in this study are the individual income tax, corporate income tax, social security taxes, unemployment insurance contributions, federal excise taxes and transfer payments. Transfer payments include social security and unemployment benefit payments. These were later classified into three major categories of personal taxes, corporate taxes, and transfer payments. Personal taxes included individual income tax withholdings, excise taxes (assuming they were assessed on an expenditure basis) and one-half of social security taxes. Corporate taxes comprised of corporate profit tax liabilities, one-half of the social security taxes, and unemployment insurance contributions. Transfer payments included social secur-

ity benefits and unemployment compensation payments.

Since the period studied , 1966 (I) - 1975 (I), is that of generally rising prices, even when output was falling, the contribution of stabilizers has been tested both from the point of view of output and price stability.

The data for taxes and transfer payments were adjusted for seasonal variations, lags involved in collection and reporting to the treasury, and legislative changes enacted in the various tax and transfer payment rates. The last type of adjustment was necessitated by the purpose of this study which was to consider only the automatic, and not discretionary, changes in taxes and transfer payments. Treasury estimates were used in making such adjustments.

A static multiplier approach was used to measure the output stability of the automatic stabilizers.While doing this, all the relevant data were converted in constant 1958 dollars. This was essential to ascertain the movements in real values of these variables. Price elasticity of taxes and transfer payments were computed to determine whether a particular budget item was price stabilizer or destabilizer.

The effectiveness of all the automatic fiscal stabilizers together was evaluated followed by the testing of the individual performance of each of the three major categories. The results indicated that the stabilizers as a group, were moving in the direction of stabilizing output both during expansions as well as contractions. They were highly effective during 1966-69 part of the expansion in that from 55 to 78 percent of the increase in income was prevented due to the operation of the stabilizers. During the inflationary expansions people move into higher income brackets subjecting themselves to higher tax rates.

Not only that, taxes rise because of gains in real incomes but inflationary gains in incomes also result in higher taxes. This explains the stabilizers being more effective during 1966-69 part of the expansion. In the following recession of 1969-70, 33 to 48 percent of the decline in output was offset by the automatic stabilizers. During 1970-73 expansion, the effectiveness of automatic stabilizers was in a range of 27 to 42 percent of the rise in output. The smallest contribution of automatic stabilizers was estimated for 1973-75 contraction. During the recessions accompanied with rising price level, nominal incomes do not fall as much as they would in the case of constant or declining price level, the decline in taxes and the rise in transfer payments is smaller. For this reason, the role of automatic stabilizers is restricted. From 33 to 39 percent of the potential decline in national income was prevented by the stabilizers during 1973-75 contraction. On the average, then, the automatic fiscal stabilizers were responsible for preventing from 37 to 52 percent of the potential change in national income during 1966 (I) - 1975 (I) period.

Except for the 1969-70 recession, personal taxes were the single major contributing factor to the output stability during 1966-75 period, followed by the corporate taxes. During 1969-70 contraction, corporate taxes and transfer payments provided most of the output stability. As explained in the previous chapter, the decline in corporate profits during economic recessions is greater than the decline in the incomes of individuals. Therefore, a greater change in corporate taxes makes this item more effective as an automatic stabilizer. During 1973-75 recession, however, the decline in corporate taxes was less compared to that of 1969-70 recession because of higher rate of inflation.

This explains the smaller contribution of corporate taxes toward economic stability during 1973-75 period. Transfer payments were output destabilizing during both the 1966-69 and 1970-73 expansionary periods. These payments were more or less neutral with regard to output stability during 1973-75 recession. High rate of inflation (14 percent) kept the transfer payments from rising significantly in real terms during this period and hence their effectiveness as a stabilizer was neutralized.

Regarding the performance of the automatic stabilizers in respect to price stability, the results indicated that both personal taxes and corporate taxes were behaving in a manner so as to stabilize prices during expansionary periods of 1966-69 and 1970-73. On the other hand, transfer payments were moving in a direction that was price destabilizing. During two recessionary periods of rising prices and falling output (1969-70 and 1973-75), however, all three categories, personal taxes, corporate taxes and transfer payments were price destabilizing.

Conclusions

During the periods of stagflation - a situation of falling output and rising prices - it becomes important to look at the effects of the automatic fiscal stabilizers on output and prices. When output is falling we would expect taxes to fall and transfer payments to rise in order to contain further downward trends in the economy by means of maintaining consumption expenditures. But when prices are rising simultaneously, any decline in taxes and rise in transfer payments will add to the inflationary forces. In a situation like this, automatic fiscal stabilizers cannot stabilize both output and prices. Therefore, automatic fiscal policy faces a dilemma. Letting stabili-

zers free to operate so as to check the decline in output strengthens the inflationary forces. That is exactly what happened furing the recessions of 1969-70 and 1973-75, when price level was rising. As noted in the preceding section, the automatic stabilizers in general, behaved to stabilize output but they were acting as price destabilizers during these periods.

On the other hand, during periods of economic expansion automatic fiscal stabilizers stabilize both output and prices. They are much more effective on both fronts, especially during periods of near full employment and inflation when a considerable part of the increase in national income is due to rising prices. During one such period covered in this study, 1966-69, 55 to 78 percent of the potential increase in national income was offset by the automatic fiscal stabilizers.

There were variations in the stabilizing impact of individual fiscal stabilizers. Personal taxes were the most effective output as well as price stabilizers during both expansions and the most effective output stabilizers during one of the two recessions which experienced the rising price level. As a matter of fact, a major share of the output stability during the inflationary period (1966-69) is provided by the personal taxes. It may be concluded then that personal taxes, in general, are the most important automatic fiscal stabilizers today. Corporate taxes are second in importance as a tool for automatic output and price stabilization policy during economic expansions. Transfer payments having increased during both of the expansionary periods were destabilizing both prices and output. During the mild recession of 1969-70, however, these payments were stabilizing output but were almost neutral during the more severe recession of 1973-75. Transfer payments

have understandably been on the rise even during economic expansions perhaps because of the greater coverage and more and more people becoming eligible. The role of these payments is considerably depressed by rising prices during such recessions when the general price level is rising. Personal taxes were also the leading output stabilizers during the more severe recession of 1973-75. It should be pointed out that social security benefits have been indexed starting June, 1975. Benefit payments will automatically go up as the cost of living increases (47) (59). Therefore, a rise in the price level during any future recession may not dampen the real increase in benefits. But since social security benefits are not very powerful automatic stabilizers, the degree of effectiveness of all the stabilizers may increase only slightly during such recessions.

The overall conclusion that can be drawn from this study is that the automatic fiscal stabilizers are relatively more effective as output and price stabilizers during the economic expansions when considerable amount of the increase in income is due to the rising prices. On the other hand, they are less effective as output stabilizers and move in the direction of destabilizing prices during the recessions which are characterized by rising prices and falling output. Personal taxes are the most important as stabilizers followed by the corporate taxes and transfer payments in that order.

Automatic fiscal stabilizers are expected to check a good part of the expansionary forces during inflationary periods. However, they will not solve the problem of inflation completely. It is also argued that the automatic stabilizers have the disadvantage of slowing down the rate of growth in the economy. A policy of holding tax rates and

expenditure programs unchanged will result in a rising surplus at a full employment level of income because of an automatic increase in revenues. This will lead to a drag on the economy (27) (37). Therefore, automatic stabilizers may or may not be desirable. This depends, however, on whether or not slowing down of growth in a certain year is crucial for the overall economic stability. It may be desirable to check extreme booms in order to keep the economy on the track. Automatic stabilizers do help achieve that objective. During such economic recessions when output is falling and prices rising, the stabilizers will provide some stability by moving in the direction of reducing the decline in output but will also aggravate the inflationary situation at the same time.

Comparison with the Results of Some of the Earlier Studies

Since the present study treated the output and price stabilization aspects of automatic fiscal stabilizers separately, no direct comparison can be made with the previous work on the effectiveness of automatic stabilizers. It may be recalled that the previous studies did not consider in their analyses the effect of the changes in the price level. However, it may be worthwhile making some general remarks about the results of this study and those of the previous ones. For the purposes of this sub-section, the results of only those studies are discussed which were comprehensive and analyzed the final effect of automatic stabilizers on the changes in national income. Thus, the studies dealing with the built-in flexibility - the absolute change in taxes with respect to a change in national income - of automatic

stabilizers are excluded because their results are not comparable.

The results of Musgrave and Miller (35) study for 1946-1947 period showed the effectiveness of automatic stabilizers to be 36 percent. Lusher (33) estimated the effectiveness of automatic stabilizers during 1953-55 hypothetical recession to be from 36 to 46 percent of a change in income. Eilbott (14) concluded that on an average, automatic stabilizers were preventing from 36 to 52 percent of a decline in income during recessions and from 25 to 42 percent of a rise in income during expansions between 1948 and 1960. Rugger's (42) estimate for 1953-63 run from 45 to 49 percent during recessions and 7 to 41 percent during expansions. The present study revealed that the automatic fiscal stabilizers were capable of preventing on an average, from 41 to 60 percent of a change in income during expansions and from 33 to 44 percent during recessions.

It can be seen that while almost all the previous studies showed that the stabilizers were relatively more effective during recessions and less so during expansions, the results of this study led to the opposite conclusions. As was expected, this study revealed that the stabilizers are relatively more effective during highly inflationary expansions and less effective during recessions accompanied with inflation. This is so because during the expansions accompanied by rapidly rising price level people are moved into the higher income brackets and tax collections are greater than what they would be had the price level risen normally. Similarly, during recessions when output is falling but the price level is still on the rise, the decline in the tax revenues and the increase in transfer payments is smaller relative to what it would be had the price level not been

going upward. The difference in the results of this study from those of the previous ones is, therefore, attributed to the kind of expansions and recessions studied here, which were inflationary. The only exception was the case of 1970-73 expansion where the results of this study were almost identical to those earlier works. Again, this was expected because this expansion had the characteristics of those earlier expansions which were not highly inflationary.

With regard to the individual contribution of the automatic fiscal stabilizers, the results of the present study are identical to those of Eilbott and Ruggeri who discussed such effects. Personal taxes are more effective during expansions while corporate taxes are more important stabilizers during recessions, except for 1973-75 period. In spite of the fact that the 1973-75 recession was far greater in intensity than that of 1969-70, even greater rise in the price level during the former checked the decline in corporate taxes. Whereas these taxes declined by $5.19 billion during 1969-70, the decline in corporate taxes during 1973-75 period was much less, $1.83 billion.

Recommendations for Further Research

As mentioned in Chapter II, some of the transfer payment programs, like food stamps, farm price support and aid to families with dependent children, were not considered as automatic fiscal stabilizers in this study. Such programs have traditionally been excluded from the studies of automatic stabilizers. The reason being that their mode of operation has been such that a great deal of discretion is exercised by the authorities concerned in making payments. Therefore, changes in the payments made under these programs are not as automatic as is the

case with social security and unemployment benefits. However, it may as well be worthwhile examining these programs especially the food stamp and AFDC, in any further study of automatic fiscal stabilizer because there seems to be a trend of standardizing eligibility requirements for participation in these programs. This may eventually bring them close to the other transfer payment programs which change direction automatically following a change in economic activity.

The eligibility requirements for food stamps have been simplified lately. For example, the applicant is not required to meet the purchase requirement by putting a minimum amount of cash to buy food stamps. Moreover, the food stamp program has become very important in recent years, perhaps because more and more people are becoming aware and are willing to participate in it. The rise in the general price level and especially in the prices of food items may also be causing more and more people becoming eligible for food stamps.

Similarly, Aid to Families with Dependent Children Program is moving in the direction where payments may become more automatic in nature with the changes in economic activity. Eligibility requirements for participation in the AFDC Program have been liberalized. It is estimated that by 1971 most of the AFDC families were eligible for other in-kind benefits like medicaid and food stamps, etc. The attitudes have changed and the poor are becoming more and more aware of their legal rights. For these and other reasons, the composition of the families in this program has shifted toward those with living fathers. Since 1961, states can provide aid to families with an unemployed father. If the unemployed parents segment of the program becomes important then the payments made under this program may also

change with a change in economic activity. The AFDC Program may thus become a genuine candidate in the array of automatic stabilizers.

In view of the above, an in depth study of these programs to determine their built-in response may reveal that the economy has more built-in stability than has been discovered thus far.

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