

/IMPACTS OF FEDERAL DEFICITS ON INCOME DISTRIBUTION/

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"Many a citizen will never be able to understand fully the problem of the public debt, for it is too complicated for the average layman."

James M. Buchanan,  
Public Principles of Public Debts (1958)

#### A. INTRODUCTION

In recent years federal deficits have garnered increased public interest. Decades ago, Orthodox theory inreighed against the development of public deficits over time. When the fiscal year ended, expenditures were to equal receipts; regardless of the phase of the economic cycle, budgets were to be balanced at the end of each fiscal year [25,p.18]. Deficits had not been used as a source or a tool for governmental interference in the market nor to secure the financial ability to provide public and merit goods.

Later, under President Eisenhower, budget balancing was still an economic goal, but the so-called "Modern Fiscal Policy" derived mainly from the Depression when deficits were appropriate. Therefore, a balanced budget was still desired but depended on various economic conditions [43,p.283]. With the full employment budget surplus concept, a tool was created to measure how the budget surplus or deficit affects the economy<sup>1</sup>. This concept was developed at the end of the Eisenhower administration and seemed to be helpful for John F. Kennedy's tax cut policy in 1961/62. Due to the President's tax cut plans, along

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1. The CED defined the full employment surplus as the amount of surplus that would have been realized in any year if there had been full employment.

with a large package of government expenditures aiming towards full employment, and forced by the Berlin crisis in 1962 to increase defense spending, Kennedy raised the deficit again [43,p.391]. Hence, contrary to the Orthodox theory, budgets have not been balanced at the end of each fiscal year.

After the first oil price shock in 1973, and together with the use of a more Keynesian type of policy, budget deficits were used to finance countercyclical governmental expenditures during recessions. The aim was to pay off these debts as the economy rebounds. Contrary to the initial paradigm, budget deficits have continuously increased since 1970, both in years of prosperity as well as recession. The appearance of deficits during the peaks of the business cycle point out that deficit financing has changed from a countercyclical tool to a source of financing expenditures throughout the business cycle.

With a \$ 170 billion deficit for the fiscal year 1984, which is about 4 - 5% of the GNP, the American deficit has become an important part of the economic environment. The deficit has grown over time and with it interest and retirement payments for its debts have also grown. For the 1984 fiscal year, the interest payments totaled \$ 111 billion which is 65% of the deficit. In other words, 65% of the total deficit must be allocated for payment of interest on the debt; therefore, only 35% of the deficit free is to spend on activities designed to stimulate economic growth. [2,p.30]

Robert J. Barro points out in his article "A Deficit Nearly

on Target" that he would be concerned if the deficit were either much larger or much smaller than it is. Barro argues: "Recent deficits -- currently about 4% - 5% of Gross National Product, or about \$ 170 billion for fiscal year 1984 -- are in line with what we would expect from experience, given the state of the economy. And they're in line with what we ought to be running." [2,p.30] He argues further that past U.S. deficits have three main causes:

A. First, there have been temporary federal expenditures during periods of war. In these periods, deficits, instead of increasing taxes, have been utilized to finance the expansions necessitated by the emergency. He argues: "Since high taxes blunt the incentives that help the economy deal with the war or other emergency, these kinds of deficits are a good idea." [2,p.30] This, Barro's first element, has not been a consideration in recent years.

B. Second, the federal deficit has risen during recessions to avoid:

1. a major tax increase to finance stimulative anticyclical interventions and
2. major cuts in governmental expenditures.

These elements were an important source of the budget deficits during the 1975 - 76 and 1980 - 83 recessions.

C. Third, net federal interest payments have risen. The significance of this element has risen over time because of the

increasing inflation rate and with it the rising nominal interest rate.

Even assuming the deficit is right on target, one does not know if this target is good for the nation. Such economists as Richard Rose and Guy Peters [38,p.8], Herbert Stein [42,p.12], and Heinz Ludwig [14,p.313] do not agree with Barro. They think the deficit is too large and that a national bankruptcy could loom in the near future [4,p.22] [45,p.117] [38,pp.8]. They argue that the deficit and the resultant interest payments grew faster than the GNP which is necessary to cover those payments. Previously, the GNP grew faster or at an equal rate with the interest payments, so that the interest payments could easily be covered by increasing national wealth. But in situations with high and steadily growing interest rates, where interest payments grow faster than GNP, one would have the problem of financing these payments without doing damage to future economic growth.

In the face of the problems caused by a public deficit, one should ask why another financing source, such as taxation or user fees to name but two, is not employed. A public deficit, as a financial source of expenditures, is highly sophisticated and a more oblique tool than a tax increase.

There are some problems caused by the public debt, such as a crowding out of private investment by public investment (real crowding out), high interest rates, and overvalued currency to name but three [42,p.80] [28,p.75-80]. In addition, intergene-

rational and intragenerational burdens and income distribution, all products of public deficit spending, surface. The burden, caused by public debts is typified by a withdrawal of resources inevitably leading to an uneven distribution of wealth<sup>1</sup>. Each of the approaches subsequently introduced will develop its own concept of burden, which usually serves as cornerstone of the idea. All the different and slightly varying burden concepts depend on the following definitions:

An intergenerational burden, a burden between generations, is defined as a withdrawal of current resources paid for initially with bonds that finance the public debt, and the serviced by increasing the tax payments of later generations.

A burden generated within a single generation, or intragenerational burden, may be defined as the shift of resources from one part of the same generation to another.

These different burdens can affect the income distribution of a country over a certain period of time [21,p.64]. In this paper the phrase "income distribution" will be used as follows: Income distribution represents the shift of resources from one individual or group to another individual or group within a society. This shift may be the product of direct

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1. The proponents of the later introduced New Orthodoxy such as Lerner, Wagner, and Wicksel do not believe in an uneven distribution of wealth, caused by a public deficit, but the proponents of the three other approaches in the paper do believe in intergenerational and intragenerational uneven distribution of wealth. Some representatives of these thoughts are Modigliani, Vickrey, Gandenberger, and Buchanan.

forces, whose effects may be immediate or long term. Each approach develops its own set of slightly differing definitions which will be examined as necessary.

On the following pages I will introduce four different approaches to the topic of public deficits, outlining their impact on income distribution as represented by different schools and authors, in different times and countries. All approaches depend basically on a neoclassical full employment model, which will also be introduced later.

Further, it is not the aim of this paper to specify whether burdens presently exist or shall emerge in the future, but rather the report should be considered as a survey of differing opinions and thoughts.



### The Basic Neoclassical Model

In this part of the paper the basic neoclassical model shall be introduced as the basic framework of all following approaches. The following part is copied and translated from Otto Gandenberger [18,p.38], a German economist.

The model examines two different financing alternatives of an additional public expenditure.

1. Tax financing (with superscript T). The expenditure is financed by an extraordinary tax in the present.
2. Deficit spending (with superscript D). The expenditure is financed by issuing of bonds in the present.

Beginning with the production equation for the governmental and private sector:

$$C_{pr} + C_{gov} + I_{pr} + I_{gov} = Y$$

And the income equation of households:

$$Y - T = C_{pr} + S_{pr} \quad \text{or} \quad Y = C_{pr} + S_{pr} + T$$

After connecting the production equation with the income equation of private households, we get the equilibrium condition:

$$(1) \quad C_{pr} + C_{gov} + I_{gov} + I_{pr} = C_{pr} + S_{pr} + T$$

This condition can be solved either in a case of tax financed or debt financed governmental expenditures.

In a debt financed case we have following equation: (superscript D = Debt) representing the Debt case, i.e.:  $S_{pr}^D$  = private savings in the situation, where an additional public expenditure is financed by public debts.

$$(1a) \quad C_{gov}^D + I_{gov}^D + I_{pr}^D = S_{pr}^D + T$$

and compared to the tax financed case: (superscript T = Taxes) representing the Tax case, i.e.:  $T^T$  = Tax receipts in the situation where an additional public expenditure is financed by an extraordinary tax.

$$(1b) \quad C_{gov}^T + I_{gov}^T + I_{pr}^T = S_{pr}^T + T$$

After subtracting (1b) from (1a) we get:

$$(2) \quad \{ [C_{gov}^D + I_{gov}^D] - [C_{gov}^T + I_{gov}^T] \} + [I_{pr}^D - I_{pr}^T] = [S_{pr}^D - S_{pr}^T] + (T - T)$$

Per definition, because of the rigid expenditure side of the budget, where all budgets are planned in advance and cannot vary, we get:

$$(2a) \quad [C_{gov}^D + I_{gov}^D] - [C_{gov}^T + I_{gov}^T] = 0 \quad \text{and}$$

comparing the tax receipts of the two financing

alternatives we can deduce that;

$$T^D > T^T$$

and the difference between  $T^T$  and  $T^D$  has to be the debt.

$$(2b) \quad T^D - T^T = -D$$

The planned tax receipts will be reduced in the amount the debt increases. Therefore, equation (2) simplifies to:

$$(3) \quad I_{pr}^D - I_{pr}^T = S_{pr}^D - S_{pr}^T - D$$

The savings function is now:

$$(4) \quad S_{pr} = S_d(Y_d) \quad \text{where: } Y_d \text{ is disposable income in the beginning period}$$

The savings function also can be divided in two cases:

With the superscript D for the Debt case and the superscript T for the Tax case.

$$(4a) \quad S_{pr}^D = S_d^D(Y_d^D) \quad \text{and} \quad S_{pr}^T = S_d^T(Y_d^T)$$

The disposable income  $Y_d$  in a tax financed case is smaller than the disposable income in a debt financed case because the individuals have to pay the extraordinary tax. The difference

between  $Y_d^D$  and  $Y_d^T$  is again the deficit.

And because of  $Y_d^T = Y_d^D - D$  we can write:

$$(4b) \quad S_{pr}^T = S(Y_d^D - D)$$

Therefore, we can write instead of (3):

$$(5) \quad [I_{pr}^D - I_{pr}^T] = \{S(Y_d^D) - S(Y_d^D - D)\} - D$$

If we use  $s$  for the average propensity of savings APS and  $c$  for the average propensity of consumption APC in the interval between

$(Y_d^D)$  and  $(Y_d^D - D)$  we get:

$$(6) \quad I_{pr}^D - I_{pr}^T = s D - D = -c D \quad \text{and}$$

$$(7) \quad I_{pr}^D = I_{pr}^T - c D$$

where:

- $C_{pr}$  = private consumption
- $C_{gov}$  = governmental consumption
- $I_{pr}$  = private investment
- $S$  = savings
- $T$  = direct Taxes

We can now deduce that, to stay in equilibrium in a case of debt financed governmental expenditures, private investment must be crowded out in the amount of  $c D$ . In a fully employed economy and

under the assumption of capitalistic market activity this crowding out of private investment is only possible with increasing interest rates. That means interest rates have to increase until equation (7) is fulfilled [18,p.45].

## CHAPTER ONE

### THE NEW ORTHODOXY

#### 1. THE BASIC IDEA OF THE NEW ORTHODOXY

The idea that a federal deficit could not cause a burden-shift into the future is called the "New Orthodoxy". The term New Orthodoxy was coined by J.M. Buchanan [12,p.4], the most virulent critic of this approach.

Basically the economists Lerner [25] [26,pp.139], Meade [29], and Hansen [22,p.334], support this idea, whose origins may be traced back to Adolph Wagner [48] and Knut Wicksel [18,p.334].

The basic philosophy of the New Orthodoxy is that in a closed and full-employment economy (see basic classical model on page 9 to 12) the private sector can utilize only those goods and services which are present in the country at a given time period. An additional governmental expenditure must cause an expansion of the public share of GNP to the burden of the private sector. For proponents of the New Orthodoxy, the withdrawal of resources, created by additional governmental spending, is the only burden for society. Any debt created by government expenditure cannot shift a burden onto future generations. If such a shift were to occur, future goods and services have to be used in the present to realize present projects, and this interchange is in reality not feasible. Because interest and bond retirement payments (if and when the debt is extinguished) represent an internal transfer of payments, there would be no withdrawal of resources from the private to the public sector in the future.

The famous phrase "we owe it to ourselves" has emerged from this argument [25,p.117]. That the "we" and the "ourselves" do not belong to the same social group is implicit in this point of view. Public borrowing impacts upon the interpersonal but not the intertemporal distribution [31,p.539].

The argument against the realization of an intertemporal burden is that the taxpayers pay their taxes to the federal government, but the interest and bond retirement recipients will receive their payments immediately. Furthermore, if there is no intertemporal shift of a burden in times of a fully employed economy, there will be no argument for a burden in a trough of a business cycle. During a recession, when production factors are unemployed, an additional expenditure could be totally satisfied with unemployed resources. Therefore, there would be no resources withdrawn from the private sector at all. In this view the public sector would not crowd out private activities; and since no opportunity costs would have been created, these would not project a burden in the future or even in the present.

After expanding the basic model from a closed to an open economy, the supporters of the New Orthodoxy admit a shift of a burden because goods and services can be imported and the connection between production of goods and services and their consumption is interrupted. Using an open economy model, the public debt is more likely to be comparable with a private debt than it is in a closed economy model. The argument "we owe it to ourselves" does not hold true anymore, because creditors might be

citizens of another country. Therefore, a shift of a burden is possible because of the debtor/creditor relationship. Similarly, in a private debt situation, interest payments and bond retirements will be transferred to another country and the domestic citizenry will experience a net loss of resources. Hence, even proponents of the New Orthodoxy admit a shift of a burden, since the closed cycle of borrowing and bond service and retirement payments in the society is interrupted by the influence of participants of another economy [29,p.163] [26,p.140] [22,p.529].

In the available macroeconomic literature one can find different approaches for expounding the ideas of the New Orthodoxy. Lerner presents one view of the New Orthodoxy.

## 2. Lerner's Defense

As a proponent of the New Orthodoxy, Abba P. Lerner [25,p.16] points out that it is common to think about a national debt as a private debt, where one individual owes to others, and where every dollar of indebtedness must be subtracted from his assets and, therefore, from his wealth. Lerner writes also that private indebtedness creates an uneasy relationship between the debtor and the creditor. The creditor may threaten the debtor with hardship and ruin. To avoid this uncomfortable situation the well-established rule of private prudence was created [25,p.16].

Authors of the New Orthodoxy school deny that the concepts



associated with private debt are valid for the public debt. Lerner uses an analogy for the treatment of private debt as compared to public debt. Debt is created when the nation borrows from its citizens; this is the so-called internal debt. Lerner's analogy for private debt does not hold for national debt under a closed economy assumption, since the debt is owed by the nation to its own citizenry. A debt can only be burdensome if one individual, group, or nation owes financial resources to another individual, group, or nation. From a strictly macroeconomic view, in a closed economy there is no group or individual to whom the debt is owed because the nation itself is the group or the individual. Lerner sees no shift of a burden created by the debt; society owes the debt to itself.

Debt also results from a nation borrowing financial resources from another nation, the so-called external debt. Lerner states that in the case of an external debt, the borrower is tempted to consume more than is produced, and during the repaying period he is forced to consume less than is produced. This burden, however, only exists for external borrowing.<sup>1</sup>

Meade [29,p.20], another proponent of the New Orthodoxy, argues that interest and extinction payments could have little effect on the economy except as the interest payments could lead

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1. According to the basic neoclassical model of a closed economy it is not possible to make a whole nation consume more than is produced, because there exists only a finite number of resources for production. For Lerner, it is not surprising that task of a nation repaying its own debt internally does not in itself constitute burden.

to a redistribution of income between taxpayers and owners of financial securities [29,p.20].

Conclusively Meade points out that interest payments could cause a small burden of redistribution, Lerner conversely argues that "interest payments are no more subtraction from the national income than the national debt itself is a subtraction from the national wealth." [25,p.18] Lerner's thesis assumes that interest payments, as an addition to the debt but not paid out of the debt, would not, in and of themselves, create a burden. Lerner argues that even "if our children or grandchildren repay some of the national debt, these payments will be made to our children and grandchildren and to nobody else." [25,p.17]

Lerner agrees with the creators of the redistribution argument, that "we" and "ourselves" do not belong to the same social class. But from a macroeconomic viewpoint, such as is represented by the concept of the New Orthodoxy, no burden will be created because the microeconomic environment of the single individual is not observed. Even if the benefits from a national debt do not accrue to every individual equally, Lerner argues: "Such a redistribution of wealth is involved in every significant happening in our closely interrelated economy, in every invention or discovery or act of enterprise" [25,p.19]. In sum, society gains more from having a debt and ignoring redistribution of wealth, than it does from having no debt at all.

Though Lerner admitted the existence of a burden of redistribution, he did not admit the extensive burden implied by those who argued from the analogy to the private debt. "When economists are sufficiently irritated by the illegitimate analogy," Lerner concludes, "they are liable to say that the national debt does not matter at all. But this must be understood in the same sense as when a man who finds that rumor has converted a twisted ankle into a broken neck tells his friend that he is perfectly all right." [25,p.17]

### 3. Modifications of the New Orthodoxy

Section three of Chapter one explores several criticisms of the New Orthodoxy. The Thesis proposed by Bowen-Davis-Kopf, and Musgrave do not completely disagree with the doctrine of the New Orthodoxy; rather they each modify the concept. In the third part of this section, though Buchanan attacks the New Orthodoxy as being completely invalid.

#### 3.1 The Bowen - Davis - Kopf Thesis

William G. Bowen, Richard G. Davis and David H. Kopf, critics of the New Orthodoxy [6,p.98] [7,p.141] [5,p.701], expanded the macroeconomic view of the New Orthodoxy to a microeconomic

perspective. Taking into account the difference in burden between different generations, they used a quotation of President Eisenhower as a point of departure for their concept of burden of debt. President Eisenhower said on January 7, 1960: "Personally, I do not feel that any amount can be properly called a surplus as long as the nation is in Debt. I prefer to think of such item as a reduction on our children's inherited mortgage." [5,p.701] Bowen, Davis, and Kopf assumed that the President implied that costs of public expenditures can be shifted to future generations. The basic question for Bowen, Davis, and Kopf in that case was: Did Eisenhower assume a closed economy? The answer of the New Orthodoxy, assuming a closed economy in their model, would have been, "that the burden cannot be shifted to future generations because government spending must drain resources from the community at the time the government project is undertaken ... regardless of whether the project is financed by borrowing, taxes, or money creation" [5,p.701].

Bowen, Davis, and Kopf argue, that the above statement made by the New Orthodoxy is correct, but only when the real burden of debt financing is defined as the total amount of private consumption sacrificed for the public project at the moment of time when the borrowed financial resources are spent [46,p.132] [40,p.137]. Bowen, Davis, and Kopf define the real burden of a public debt as "the total consumption of private goods foregone during the lifetime of that generation as a consequence of government borrowing and attendant public spending." [5,p.702].

To illustrate this idea Bowen, Davis and Kopf have developed a generational model with the following assumptions:

1. The subscriptions to the bonds are entirely paid out of total consumption
2. Full employment
3. One generation takes 44 years
4. Within a society there is an identifiable generation of people who are approximately 21 years old and purchase voluntarily government bonds to finance public project X.

This group of 21-year-old individuals who purchased the bond voluntarily can be considered as generation 1. The next step is to consider the allocation of a burden between generations. When original purchasers of the bonds reach 65 years of age and the society creates a new generation of possible bondholders. Suppose the bondholders sell their securities to the 21 year old members of generation 2 in order to finance their retirement. Suppose further that the price they receive has been deflated and there has been no lifetime change in purchasing power of generation 1 [5,p.702]. Even though the total production decrease of private goods caused by carrying out the public project X took place in generation 1's lifetime, no burden was shifted. Bowen, Davis and Kopf point out the reason for this [5,p.702]: The Saving represented <sup>1</sup> by generation 1's purchase of bonds is equal to the dissaving due to the later sale of the bonds to generation 2 and

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1. At this part of the model Bowen, Davis and Kopf ignore interest charges on the debt.

the later purchase of consumer goods.

In this situation, Bowen, Davis and Kopf do not see any burdenshift caused by bond financing of public project X. Therefore, no burdenshift was caused by the bond itself. But the model does not consider the actual causes of the burden: interest payments and retirements of the debt.

After generation 2 sells its bonds to generation 3 it also "sells" its responsibility to pay for the public project. If, during the remaining lifetime of generation 2, the government decides to retire the debt by levying taxes, the lifetime consumption of generation 2 would decrease. Hence, the burden of public project X rests on generation 2 to the extent that generation 2 pays taxes but holds no bonds that are redeemed [5,p.702].

The basic argument now centers on whether the resources needed for public project X have been expended during the period where generation 1 was the bondholder. After selling the bonds to generation 2, the burden rests on generation 2's shoulders in the form of a reduced lifetime consumption. "Generation 1 merely makes a loan of its reduced consumption and the real reduction of consumption is born by the generation (s) alive at the time this loan is extinguished." [5,p.703]

In analyzing the Bowen, Davis and Kopf thesis Shoup [40,p.890] uses a timber example, that the whole burden story depends on the level of expanding consumption.

Here is a description of Shoups example:

In year 100 let the government cut  $j$  units of timber. Assume generation 1 quickly responds by consuming (cutting) less timber for themselves. Also assume that in year 144 the capital stock would again be equal to the capital stock one generation earlier, where government did not make the expenditure. Generation 2 inherits  $j$  units of timber less than it would have bequeathed without government expenditure. If generation 1 would not have decreased consumption with respect to the expenditure in year 100, then a smaller capital stock would have been inherited because fewer trees would have been growing between 101 and 143. [40,p.890]

On the other hand, if the expenditure would have been financed by taxation, generation 1 may have possibly reacted in the same way by cutting their consumption down in the equal amount of the public expenditure in year 144 because they decided to make up for their earlier depreciation in year 100. Generation 1 then passes fewer  $j$  units of timber to generation 2 along with a tax receipt. The tax receipt has the equal value to generation 2 as a bond of the same face amount. Yet the bond would have yielded interest which would have had to have been paid to generation 2 by taxing itself.

Therefore, Bowen, Davis and Kopf conclude: "No matter what happens to  $C$  and  $I$ , generation 1 (the present generation) is going to enjoy a higher level of lifetime consumption relative to the consumption of future generations if government expenditures are financed by issuance of debt instruments than if taxes are

employed." [5,p.703] [41,p.137] [17,p.139] It should be noted that this argument depends on the artificial assumptions that bonds are held only by one generation at the time of repayment, assuming no debt is retired during the lifetime of generation 1 but that debt is retired during the lifetimes of later generations.

### 3.2.The Musgrave Intergeneration Equity Example

Musgrave basically accepts the theory of the New Orthodoxy and expands on it with his intergenerational equity example and bases his argument on the pay as you use principle [34,p.136]. In a first examination Musgrave considers only the situation of an internal Debt.<sup>1</sup> Taxpayers should pay for the use of goods provided by the government each time they use these facilities [33,p.563]. Different groups of taxpayers will use these facilities as well as different generations, assuming a long-lived government facility [40,p.892].

Musgrave's pay-as-you-use principle has its roots in municipal finance, where it is observed that the composition of residents changes frequently, and therefore, groups could gain an uneven share of the public good with respect to their payments

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1. In a further analysis Musgrave expands his argument to an external debt [33,p.556], but his argument would be not on an equal level with the closed neoclassical model, used by the proponents of the New Orthodoxy. Therefore Musgrave's extended model shall find no consideration here.



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[33,p.563]. Musgrave argues: "Here the principle of pay-as-you-use finance follows directly from that of benefit taxation, and loan finance is required to distribute costs among the various generations." [33,p.563]

To illustrate the burden shift between generations, Musgrave uses the following example: Consider a project which serves in equal amounts, over three periods (one generation covers three periods within a stable population). Assume an observation period of five generations. Also assume that debts have to be repaid within one generation. Every period of the project benefits 3 generations. For example, period 1 benefits generation 1 in its 3rd, generation 2 in its 2nd and generation 3 in its 1st period. Furthermore period 2 of the project serves generation 2 in its 3rd, generation 3 in its 2nd, and generation 4 in its 1st period and so on. To distribute the costs equally we have to calculate 3 periods of the project and 3 periods in each possible generation. The highest amount of cost to pay is  $1/3$  of the project's costs. Generation 1 and 5 have to pay  $1/9$  because they gain only in their very first (generation 1) and in their last (generation 5) periods from the project. After analyzing how much each generation has to pay, regarding the pay-as-you-use principle, it is necessary to consider different financing methods.

By referring to table 1.1 we can suppose the total cost of

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1. In his article "Internal debt in the classical system", Musgrave considers the pay-as-you-use principle only in relation with an internal debt [34,p.139].

the project to be \$100<sup>1</sup>. The entire cost of the project has to be spent in the first period. The burden of \$100 divided by 3 generations, results in a taxation of \$33.33 to each generation. Generation 1 is only able to pay \$33.33 in its period, but the entire amount is due in the same period. Therefore, it has to obtain loans from generation 2 and 3. According to our assumption, there cannot exist a loan from generation 1 because each loan has to be repaid during the generation's life span. In the second period of the project cycle, generations 2, 3 and 4 are concerned. The tax revenue is again \$33.33. The debt held by generation 2 is totally retired. Loans, within the amount of \$16.6, have to be taken out by generation 4 in order to retire part of the debt in generation 3. One can observe the same procedure in period 3, relative to generations 3, 4 and 5. The total cost has thus been divided between 5 generations according to their benefits.

Coming back to the New Orthodoxy and its view of a burden shift from the public to the private sector, Musgrave assumes that 75% of the tax receipts come from consumption and 25% belong to investment. Compared to the Bowen, Davis, and Kopf thesis, which had a 100% consumption burden, the share of consumption participation in Musgrave's argument dropped to 75%.

As shown in the last column of table 1.1, one can observe

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1. Because of simplicity Musgraves ignored the interest cost but argued in a footnote: "The interest will be divided between generations in proportion to their share in the postponement of payment, so that 1/4 is contributed by generations 2 and 4 each while 3 pays 1/2." [34,p.563]

that private consumption is reduced by \$25 each period, representing the pay-as-you-use principle. Private capital formation decreased \$75 in period 1 but increased in the following 2 periods to a total of -\$25. The total cost of the project is divided between private consumption and investment with respect to the marginal propensity of consumption, and in accordance with the assumption that private saving is not interest elastic.

Table 1.1

Period	Source of funds	Payments for each generation					Total pay- ments in period
		1	2	3	4	5	
1	Taxes	11.1	11.1	11.1	@	@	33.3
	Loans	----	33.3	33.3	@	@	66.7
	Repayments	----	----	----	@	@	
	dC	-8.3	-8.3	-8.3	@	@	-25.0
	dI	-2.8	-36.1	-36.1	@	@	-75.0
2	Taxes	@	11.1	11.1	11.1	@	33.3
	Loans	@	----	----	16.6	@	16.6
	Repayments	@	33.3	16.6	----	@	49.9
	dC	@	-8.3	-8.3	-8.3	@	-25.0
	dI	@	30.5	13.8	-19.4	@	25.0
3	Taxes	@	@	11.1	11.1	11.1	33.3
	Loans	@	@				
	Repayments	@	@	16.6	16.6	----	33.3
	dC	@	@	-8.3	-8.3	-8.3	-25.0
	dI	@	@	13.8	13.8	-2.8	25.0
1-3	Taxes	11.1	22.2	33.3	22.2	11.1	100.0
	Loans	----	33.3	33.3	16.6	----	83.2
	Repayments	----	33.3	33.3	16.6	----	83.2
	dC	-8.3	-16.7	-25.0	-16.7	-8.3	-75.0
	dI	-2.5	-5.5	-8.4	-5.5	-2.8	-25.0

@ unborn or deceased  
dC change in consumption  
dI change in investment

[33,p.564]

### 3.3.The Buchanan Thesis

While the authors of the other thesis modify the New Orthodoxy, Buchanan, the major critic of this idea does not admit any validity to the New Orthodoxy. He argues in his Utility Approach that debt financing of public projects does shift a burden from a present generation to a future generation. [12,pp.32]

Buchanan's argument runs as follows: In the year when the project has to be financed, meaning at the same time as resources are withdrawn from the private sector in favor of public use in a full-employment economy, "no individual can be found who feels that he is undergoing a sacrifice<sup>1</sup>, while no one can be found who is thereby experiencing gain." [40,p.895]

However, when bonds are repaid in later generation a consumption cut will be created due to increased taxes in the future. He argues further that the burden of less consumption of one generation can only exist through the burden on individuals in this generation and that the funds needed to purchase bonds are withdrawn entirely from private capital formation. He concludes finally that a sacrifice of wealth is inflicted upon a future generation.

The point Buchanan made, contrary to the theories of Bowen, Davis and Kopf, and of Musgrave is that public borrowing will withdraw 100% from capital formation instead of being financed by

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1. with "sacrificing" Buchanan means to enjoy less consumption [40,p.896]

taxes in the present. He does not explicitly state that tax financing would withdraw resources only from consumption, but that can be assumed [40,p.895] as will be further examined in chapter two of this paper <sup>1</sup>.

In conclusion, we can state that in the view of the New Orthodoxy, debt does not constitute a burden because future payments of interest from taxpayers to bondholders will not draw upon resources. The advocates of the New Orthodoxy admit a "deadweight loss", or in other words a loss of wealth may be created or an uneven personal income distribution may result, but the traditional view does not allow a transfer of a burden to the future. [44]

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1. Buchanan's critique of the New Orthodoxy is the foundation for his utility approach. Therefore his critique of the New Orthodoxy shall be very brief at this point in the paper.

## CHAPTER TWO

### THE UTILITY APPROACH

#### 1. An Introduction

The name Buchanan and the development of the Utility Approach are synonymous. While his argument has changed slightly over time, Buchanan's views and his concept of burden stand in opposition to the fundamental tenets of the New Orthodoxy.

Buchanan's model assumes that in a democratic society, the individual is called upon to make important economic decisions. By focusing on this individual, a microeconomic approach can analyze which individual, as a member of the total society, has to carry the burden of the debt at a particular point in time. The specific nature of the burden is defined as the individual utility loss for one member of society [27,p.316]. The analytical tool employed to identify this burden will be the Pareto criterion<sup>1</sup>, the task of which is to examine the wealth each individual, as a member of a society, both before and after public activity. Using the Pareto Criterion, we can compare one individual to another to discern if one enjoyed an increase in

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1. The Pareto Criterion is a phrase used in welfare economics to describe a situation after a public expenditure (or any other kind of public activity i.e. tax cuts or tax rises). The Pareto Criterion compares the situation before the governmental act to the situation after it. Satisfying the Pareto Criterion means that the total society has a gain in welfare while no one individual has a loss in utility. One or more individuals gain wealth while others stay on the same utility level as before.

wealth while another suffered a decrease <sup>1</sup> [13,p.106]. From individual comparisons, societal comparisons can be made to determine if one social group may be compensated by the gain of another social group without any loss in total wealth; thereby satisfying the Pareto criterion.

Buchanan's major argument is based on a utility analysis, where the bond purchasers have no change in utility, but the taxpayers have to carry the whole burden in the form of increased taxes in the future. Therefore, taxpayer's consumption possibilities are decreased along with their utility. A burden, in Buchanan's view can be explained as a utility loss of one group without a utility gain by another social class.

## 2. The Burden Controversy

The results of Buchanan's analysis of the burden of public debt bear certain similarities to an analysis of private debt for one individual. The central question rotates around whether a debt can be shifted over time. For Buchanan, the controversy of burden shiftability rests upon the confusion that arises from the

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1. Buchanan also referred to the concepts of potential compensation, in which is argued that it is satisfactory according to the Pareto Criterion if some individuals gain wealth and others lose wealth and if the losers of wealth will be compensated by the individuals among society who gain wealth. Furthermore, in these concepts is argued that it is satisfactory according to the Pareto Criterion that individuals who gain wealth only have to be able to compensate the loss of wealth of the individuals who lost wealth, but must not necessarily compensate them in reality.

see also Buchanan's explanation of the Pareto and Kaldor-Hicks approach concerning the theory of compensation. [12,p.106]



"false analogies" [12,p.48] of the New Orthodoxy theory. In Buchanan's opinion, it is entirely illegitimate to talk in terms of a group burden. The nation's balance sheet is nothing but the sum of all private balance sheets. Social decisions, which serve as the basis for public investments, are determined by the balance sheets of individuals and families [9,p.58].

Buchanan's idealized model, appears to be very much like those envisioned by nineteenth-century British Utilitarians like John Stuart Mill and Jeremy Bentham. According to Buchanan in a society based upon liberal values, democratic institutions, and utilitarian traditions, it is fundamentally incorrect to think in terms of corporate groups [12,p.36]. Individuals, not corporate society or communal groups, make decisions based upon enlightened self-interest. It follows that these acting individuals possess the ability to influence decisions made concerning public expenditures, and as resources are shifted from the private to the public domain, there can be no discussion of group burden, but only of individual utility [12,pp.36,37].

In Buchanan's view, a creditor is a voluntary actor, able to choose between investing money in government bonds or in an alternative private investment [27,pp317]. Because of their freedom of choice, creditors, assuming they make rational decisions, do not lose wealth and strive to increase their level of wealth. Creditors may consider the small risks involved with government bonds, and when combined with a profitable interest yield, they may rate bonds as high as or even superior to private

investment. Creditors decide to take part in the financing of a project as a riskless investment, since the probability of national bankruptcy is not very great.

Taxpayers, however, are required to pay taxes, and yet have little or no influence on the decision making process itself [27,p.318]. The free market decision [13,p.90], the free choice of every individual to sacrifice part of his consumption possibilities for investment, is restricted by compulsory taxation [27,p.319]. Sacrifices, in the form of future tax payments and the resultant diminution of consumption possibilities, are imposed upon taxpayers by decision makers. If rationally made, the public expenditure will be productive in the sense that everyone will experience a utility gain as taxpayers share in the real income generated by the public project. This "mutuality of advantage" [9,p.57] guarantees that debt<sup>1</sup>, in and of itself, does not constitute a burden.

Buchanan analyzes the different motives of individuals in order to isolate the burden-carrying party. The purchasers of bonds give up utility in the present to buy securities. The utility, in this case, is defined as the possibility of consumption. In other words, creditors cut consumption in order to

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1. Buchanan argues, that if an individual has the right to freely choose the option of purchasing a government bond then he is moving toward a preferred position on his utility surface. Therefore if a shift of resources takes place caused by voluntary action of private individuals it is meaningless to speak of a burden. Buchanan calls this the "mutuality of advantage".

receive higher income in the future. They carry a burden in the present in order to receive a higher future return on investment; their motivation is not to secure present public projects [10,p.65].

The motives of taxpayers are quite different. Their role, observing the right to choose between the cost liability according to the public good and the right of individuals to be able to use the public good, is comparable to purchasers of private goods. Buchanan compares the price of a public good to the price of a private good which an individual might otherwise have purchased. Taxpayers have to pay for their benefits in the form of taxes. Buchanan sees a direct relationship between the necessity of carrying the burden by taxpayers and benefits which accrue from public projects [27,p.318].

During the decade of the 1960s, Buchanan's views increasingly came under fire [31,p.530 p.534]. Buchanan ridiculed those debt theorists who wrote in a vacuum unfamiliar with political and social realities. Ironically, Buchanan was also ignoring the political and social realities [27,p.318] of escalating public expenditures which were caused by the Vietnam war and by Johnson's policies pursuing the "Great Society". Buchanan was forced to revise his idealized model of a burden free society in favor of a view which took into account objective forces that

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1. One of his phrases concerning the scientific work Adolph Wagner's and his view about democracy will be shown as follows: "The explanation arises, of course out of the almost complete absence of political sophistication on the part of those scholars, who have been concerned with fiscal problems." [9,p.58]

dictate investment decision making on the part of private individuals .  
1

Buchanan developed this view of choice in decision making in his "Theory of Choice" [10,p.62]. As a major component of his revised approach to burden theory, the difference between choice influencing and choice influenced costs was stressed.

Choice influencing costs<sup>2</sup> are defined as anticipated future utility losses [10,pp.62]. A burden derived from these costs can only be carried by individuals who have an alternative financing choice.

Choice influenced costs<sup>3</sup> are those burdens incurred by individuals who do not have a chance to anticipate and are without a choice in influencing finance decisions of government spending. Therefore, the consequences, induced by the differences of each financing alternative, will appear in the future. Buchanan states that, "in the cost influencing sense these costs are concentrated in the moment of choice and not in the later period during which

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1. Buchanan's idealized model rests upon the idea of the individual's choice with regard to the financing of public projects. According to Buchanan, as long as taxpayers and creditors have the right to choose between levying extraordinary taxes and issuing bonds, the debt would be burden free.

2. For example if an individual decides to buy a car he will cut his present consumption and he will change his life style in order to be able to purchase the car. Buchanan calls these choice influencing costs.

3. The costs involved in the real transfer of money needed to purchase the car, where the individual already made his choice and cannot influence the procedure, are the so called choice influenced costs.

the actual outlays must be made. But the choice influencing, subjective costs exist only because of the decisionmakers recognition that it will be necessary to make future period outlays." [10,p.62] And Buchanan argues further that "the choice influenced costs of debt financed projects, the losses in utility as a result of choice, are borne exclusively in periods subsequent to decision." [10,p.62] The evaluation of Buchanan's theory of choice is subjective [27,p.318] because of the impossibility of utility measurement [39].

### 3. The Framework of the Utility Approach

Buchanan outlines the following four assumptions as cornerstones of the Utility approach. First it shall be assumed [5,p.31] that the public debt under discussion is consistent with the neoclassical model as previously introduced. Secondly, the debt has been created for real purposes and is not owing to inflationary causes. The third assumption points out that public expenditures shall be at moderate size, where the total income, community investment, and the effects of the sale of bonds on interest rates and price structure are marginal. Finally, the resources to purchase government securities are withdrawn from

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1. see pp. 9-12

2. The former chancellor of West Germany disusses Reagan's "Economical Revolution" and how the U.S. President financed his costly expenditures along with tax cuts.

private capital formation. The market structure shall be competitive and no assumption will be made concerning the purpose of the additional public expenditure [8,p.32]

Following these assumptions, Buchanan "shall try to prove that, in the most general case:

1. The primary real burden of a public debt is shifted to future generations
2. The analogy between public debt and private debt is fundamentally correct <sup>1</sup> [30,p.417]
3. The external debt and the internal debt are fundamentally equivalent <sup>2</sup> ." [12,p.31]

Of special interest will be Buchanan's argument concerning a shift of a burden into the future. He defines a future generation as "any set of individuals living in any time period following that in which the debt is created" [5,p.33], where the length of the periods is not relevant as long as each period is equal to every other period.

The analysis begins with Buchanan's critique of the New Orthodoxy. According to New Orthodoxy theory, in a closed economy where public projects are concurrently financed and construc-

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1. Buchanan argues with the equality of private and public debt because for him and his microeconomic, utilitarian view, a public debt is owed to individuals and the debtor has to face a debtor/creditor relationship similar to that of a private debt.

2. Considering the analogy between public and private debt as true, Buchanan also assumes that from a microeconomic view there is almost no difference between domestic debt and debt owed to foreign bondholders.

ted, resources can be withdrawn only from the contemporary generation<sup>1</sup> [8,p.126]. Buchanan stated that the purchase of a government bond is a voluntary act and the individual moves to a preferred position on his utility surface. This has to be true for each creditor because the motive of purchasing government securities must be a higher return on investment in the future by giving up consumption possibilities in the present.

The burden of debt can be interpreted as the opportunity cost of public spending financed through debt. Opportunity costs have the same value as do private goods given up to purchase bonds [14,p.29].

Buchanan explains the phrase opportunity cost, warning that one should keep in mind that there are two separate opportunity costs [14,p.29]. In one sense, costs are concentrated in the moment of decision making and have to be planned for the future even if payments are not yet due. Buchanan calls this a "subjective opportunity cost." In a second sense, costs are created by the movement of payments, when money is exchanged between individuals and he refers to this as an "objective cost" [14,p.29].

For example if an individual decides to purchase a car, he will plan to cut future consumption of other goods at the time he makes the purchase decision, and this reduction in consumption represents the subjective part of the opportunity cost. The

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1. Buchanan used the Allan Brownlee argument of the New Orthodoxy see also [8,p.126].

individual then is obliged to plan his future income and consumption in accordance with the demands of financing the car. If, at the moment the car is delivered, he has to pay the whole cash amount, he has surrendered the possibility of buying something else with his money, and thereby objective costs are created. The subjective costs are only postponed from the time of decision-making to the time of real money transfer, when they become objective costs. For the amount of the burden, it does not matter whether the public expenditure is financed by taxes or by bonds<sup>1</sup>. Decision-makers must predict what will happen to the economy in the future if they follow a debt policy rather than a tax increase. They need to know the differences in the intergenerational and intragenerational distribution of the costs of public projects<sup>2</sup>.

As Buchanan argues further, decision makers should question whether a \$1 increase in national income is desirable when a Texas cattle rancher gains \$2 and a West Virginia miner loses \$1, a situation created by the public debt<sup>3</sup> [14.p.30] [28]. One has also to consider that the debt must somehow be retired in the future and that the cattle rancher might be hit harder by a tax

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1. At this point interest rates are not considered.

2. The estimation of future economic incidents, like inflation extraordinary taxes, and so on, by society as decisionmakers can be considered as one of the major problems in Buchanan's idealized model.

3. This example created by Buchanan, implies that the gains of an additional public expenditure financed by a public deficit are not equally distributed among society in the present.



increase than would be the miner. The decision-maker, or in Buchanan's terms, the creator of choice influencing costs, must consider that future generations inherit a burden from the past while gaining from the public good in the present [10,p.64].

#### 4. Critique of Buchanan's Concept and his Response

Modigliani and Vickrey [46.p.74] [32,p.107] come to basically the same conclusions concerning the shift of the public debt into the future, but by different means. Buchanan's argument is predicated upon a consumption cut, whereas Modigliani and Vickery<sup>1</sup> argue for a lower increase in capital formation .

Buchanan's answer to their argument rests upon his contention that any future burden is based on an increase in taxation which can only result in lower consumption possibilities as compared to consumption possibilities in the initial period without an extraordinary tax caused by a deficit. The resources for financing the debt in the present are withdrawn from private investment, since these resources would have been invested otherwise. Even if all resources are withdrawn from private consumption, the subjective costs of debt creation still depend on the decision maker's evaluation of opportunity costs [10,p.65]. He argues further: "The decision of a prospective bond purchaser is, of course, relevant to the rate of private capital formation, but this is not the same decision as that of the prospective

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1. See aggregate investment approach

bondseller<sup>1</sup> ." [10,p.65] In other words, if the bond purchaser withdraws resources from his private capital formation, he passes on less capital to his heirs. This could be explained as a burden in accordance with Modigliani's and Vickrey's argument [47,p.133]. But if the bond purchaser draws only from private consumption, in Buchanan's view, no such burden would be imposed. Buchanan concludes that the formation discussion is based on the confused results of two separate emphases of the capital decisions, namely those undertaken by bond purchasers and those undertaken by bond sellers, each representing different sets of decision-makers.[13,p.91] [10,p.42]

## 5. Buchanan's Critique of Ricardo's Equivalence Theorem<sup>2</sup>

David Ricardo's [37,pp.244] concept of public debt has been widely discussed over the years. [14,p.31] He suggests that a rational individual should be indifferent between an increase in extraordinary taxation and the issuance of bonds of equal value. Ricardo assumed a perfect capital market in the sense that an individual could borrow at the same interest rate as could the government [10,p.66]. "Under such conditions, the individual could without cost transform one of these fiscal alternatives into the

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1. For Buchanan the bondseller is the same as the one who is issuing the debt [10,p.65]

2. mentioned by Buchanan [10], [14], [12]. Buchanan mentioned the original source [37] only in [12].

other via transactions in the capital market. That means that the individual could transform, at any time, the direction of his payments either toward tax payments or toward debt financing without costs to himself [14,p.31]. These assumptions allow the individual to convert one of the two fiscal alternatives, taxation or bond issues, into the other without any costs. Since the individual can choose between financial alternatives without liability, to his activity, Ricardo maintained that social members would remain indifferent.

Buchanan, in advancing his utility approach, raises serious questions concerning Ricardo's theorem. As a model the analysis seems to him elementary and obvious. "But a similar analysis could be extended to any act of individual choice. If, for example, the individual is informed that he may always exchange an orange for an apple through the market, he will be indifferent between a gift of an orange and an apple because of the possibility of costless transformation" [10,p.66]. Buchanan points out that an orange would have the same utility as an apple for the individual, which means the subjective evaluation of the individual is redundant. He argues further, in the loan-taxes discussion, that the individual seems to be indifferent not because of his subjective evaluation, which represents an individual's utility, but because of the costlessness of the transformation. This argument suggests that the transformation of a tax versus loan alternative, in equal values, does not measure choice influencing costs. If an individual chooses the loan alternative, he will

indicate that his costs are below the costs created by the tax alternative, where future debt services and retirement payments are equal to present tax charges. Hence, to make a rational choice, each individual can make his subjective evaluation between two alternatives [10,p.66].

But, as Buchanan criticizes further, if for some reason the burden of the debt and the burden of tax payments fall in the same period of time, no evaluation would be required. In typical Buchanan fashion, he concludes that the Ricardo approach is relevant only insofar as it mirrors Buchanan's elementary principle that opportunity costs of debt are shifted to the future [14,p.32]

#### 6. Ricardo's Equivalence Theorem and Rational Expectations

Ricardo's Equivalence Theorem was also considered by authors of the rational expectation theory. Mainly Robert Barro analyzed impacts of debt issued in the present and its impact on future generations under the considerations of Ricardo's idea. Considering the Ricardo Equivalence Theorem, Barro argued that the possibility rises to escape from taxation through a perpetual deficit finance. The stream of future interest payments has to be paid out of increasing taxation or by issuing new debts. This argument resembles on a "chain-letter" mechanism where the last member of this chain has to carry the whole burden of a tax increase [3,p.230]. Barro developed an example where he assumes that an additional \$1 million of current government spending is

financed either by current taxes or debt. The first case would imply that individuals experience a one time tax liability of \$1 Million. In the latter case, assuming the interest rates for bonds as 5% per Year, individuals have to pay an additional \$50,000 tax in the time beyond the debt issuance. Tax collections are increased by \$50,000 a year forever.

Considering the Ricardo Equivalence Theorem the two options of financing a government expenditure would be viewed as equivalent. Barro argues that the Ricardian idea holds true under following conditions:

"(a) there is no possibility of escaping part of the perpetual tax liability, either by dying (which introduces an effect on finite lives) or by leaving the jurisdiction of the government;  
(b) everyone can borrow and lend funds at the same interest rate as the government;  
(c) there is no certainty about future tax shares, which might be induced by uncertainty about individual income or other characteristics that determine tax shares;  
(d) the future tax liabilities implied by a public debt are accurately perceived;  
(e) the volume of government expenditures is independent of the method of finance; and,  
(f) no other channels exist for effects of the choice of finance method on the prices, rates of return, and so on, faced by individuals"[3,p.231].

Considering the length of the list of conditions it seems to be pretty difficult to satisfy all these factors. Barro distinguished between first-order and second order effects of these factors, which means Barro considers first the various issues how the debt affects individual's evaluation on personal wealth; and secondly, Barro analyzed "the connection of these wealth perceptions to the burden of the public debt argument to crowding out of private investment, and fiscal policy" [3,p.232].

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In conclusion Barro<sup>1</sup> argues mainly about individual's uncertainty and misperception of future taxes and the imperfections of private capital markets.

## 7. Conclusion

It has been shown in this chapter that Buchanan's utility approach has basically developed out of his critique of the New Orthodoxy. Buchanan's major argument is the shift of the observers view to a microeconomic, utilitarian level. Buchanan argues that the future taxes, caused by issuing a debt create a consumption cut in the future and therefore represent a burden in the future. That means, that taxpayers will decrease their utility in the future, while bondholders, when the bonds are repaid, have no change in utility [10,p.65]

With the creation of the "Theory of Choice", Buchanan defended his idea of future burden while isolating some of the false paradigms of the New Orthodoxy.

Compared to the following aggregate investment approach, where Modigliani argues that the resources from which the debts are financed come from private capital formation. Buchanan conversely argues that future burdens will take the form of lower

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1. see also:

BUCHANAN, JAMES. M Barro and the Ricardian Equivalence Theorem  
Journal of political Economy April 1976 p.337-342

2.FELDSTEIN, MARTIN Perceived Wealth in Bonds and Social Security: A Comment Journal of Political Economy April 1976 p.331-336

3.Barro, Robert Reply to Feldstein and Buchanan Journal of Political Economy April 1976 p. 342-348

consumption caused by an increase in taxation [30,p.413].

## CHAPTER THREE

### THE AGGREGATE INVESTMENT APPROACH

#### 1. AN INTRODUCTION

The aggregate investment approach and the utility approach both attack the New Orthodoxy by proposing a shift of a burden in the future caused by a public debt. The previously introduced utility approach concentrates on representing the future burden as a consumption abstinence. The aggregate Investment Approach, however, finds the burden mainly in toward the investment side of the income equation.

The Aggregate Investment approach was developed and named by Modigliani, who is along with Vickrey, one of the main proponents of this idea [32,p.108].

The Aggregate Investment Approach analyzes the impact of the public debt on current investment and subsequent economic growth [32,p.108]. The proponents of this approach define burden as a decrease in future real income caused by a public deficit. This burden is created because a public deficit induces a cut in private capital formation [32,p.108].

Moreover, in the aggregate investment approach, a tax financed expenditure may also create a burden in the future due to a reduction in disposable income and a consequent reduction in current consumption and investment. In other words, both parts of the income usage, investment and consumption, will suffer from an increase in taxation utilized to finance additional government



spending. Therefore, future private capital formation is smaller. However, if taxes are paid totally out of income which would have been used for consumption, investment is not reduced and the burden is not shifted to the future [27,p.320].

Moreover, Modigliani admits that the public expenditure financed either by debt or taxation may not create a burden on future economic growth if government increases expenditures on public investment goods --for example transportation-- that may have as large a return as investment in the private sector. This paper assumes government expenditure is all channeled to consumption items, and thus a burden exists in Modigliani's analysis.

## 2. THE ANALYTICAL FRAMEWORK

Modigliani and Vickrey follow a Keynesian type of view concerning the public debt. Modigliani defines debt as:

"(1) all claims against the government held by the private sector of the economy, or by foreigners, whether interest bearing or not (and including therefore bank-held debt and government currency, if any; less (2) any claims held by the government against the private sector and foreigners" [32,p.108].

Therefore, Modigliani uses the definition of a net deficit within<sup>1</sup> an open economy to define the debt .

The principal conclusions of Modigliani can be shown in the following summary:

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1. Modigliani explains in footnote 5 [32,p.108] that the definition of debt implies that the national debt also theoretically could be negative.

1. With given government expenditures, an increase of national debt, no matter if external or internal, is generally in favor of the individuals living in this period of debt creation, since these individuals gain from the public project in the present but do not suffer from a reduction of current consumption.

2. Such an increase of national debt will generally create a burden to those individuals living in later periods. It will create a reduction of private capital formation. The relative size of this loss, compared to the gain of the individuals living in the period of debt creation may generally be different considering how effectively the proceeds of the deficit have been used [32,p.109]. This means that if the additional expenditure was used quite effectively in a sense of creating additional wealth or shifting the economy towards a full employment situation, the burden might not be as high as predicted.

3. If the rate of interest at which the government issued the bonds can be used as an approximation of the marginal productivity of private capital, the burden under (2) can be measured by the amount of interest the government has to pay to the bondholders [32,p.109].

To measure the burden it is necessary to examine the difference in effect between taxation and borrowing. Under the given assumption of full-employment in a closed economy we can use a model of Gandenberger<sup>1</sup> which will examine the effect on capital formation and consumption caused by either taxation or deficit spending:

$$(1) \quad dE_{T,D}^K = - dE_{T,D}^C$$

where  $dE_{T,D}^K$  = Effect on Capital formation caused by Taxation or Debt.

and  $dE_{T,D}^C$  = Effect on Consumption caused by Taxation or Debt.

As was mentioned before, real income is used for either consumption or investment and both are negatively related, i.e. the individual either uses income for consumption or for investment. Assuming a Consumption Function with real income as the usual endogenous variable and Taxation and net debt as additional endogenous variables we can write:

$$(2) \quad C = C(Y, T, D)$$

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1. Gandenberger's model contradicts the model of Modigliani that will be introduced later in this paper. Gandenberger's model is very poor concerning future periods, but does imply the effect of taxation or deficit spending on consumption and capital formation.

with the use of (2) and holding Y constant we can write (1) as following derivative:

$$(3) \frac{dE^K}{dT, D} = -(dC/dT \cdot dT - DC/dD \cdot dD)$$

As previously assumed, the relation between taxation and consumption is negative and an increase in public borrowing leads people to a higher (or no change) in consumption, compared to a tax financed situation; therefore, we can deduce a non-negative relationship between debt and consumption in the equation and we can write:

$$(4) \quad dC/dT < 0 \quad \text{and} \quad dC/dD > 0$$

after setting  $dC/dT = a$  and  $dC/dD = b$

we can write:

$$(5) \frac{dE^K}{dT, D} = -(a \cdot dT - b \cdot dD)$$

We can see that the amount of the effect depends only on the assumed consumption function where, as assumed, the influence of D on consumption in the present is marginal. In other words a deficit spending does not affect present consumption much, if at all. After setting  $b=0$  we can conclude<sup>1</sup> that the taxation-borrowing effect on capital formation is:

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1. because D has no influence on consumption in the present.

$$(6) \quad \frac{dE^K}{dT, D} = -(a \, dT)$$

If "a" is a number between 0 and -1 ( $0 > a > -1$ ) and since "a" represents the power of influence of taxes on consumption the effect on capital formation will always be positive in the present<sup>1</sup> if  $G = 0$ .

To utilize Gandenberger's model for our topic concerning capital formation in a deficit case, we have to set  $a=0$  and to assume that b is a number between 0 and -1. This assumption conforms to Modigliani who assumes a constant consumption in the case of deficit spending. After reforming equation (5) with the values of  $a=0$  and  $0 > b > -1$  we can deduce that the effect of deficit spending on capital formation is negative.

Concerning future periods, Ganderberger's [18,p.336] model is very poor, and therefore Modigliani's original model shall be considered now.

Modigliani begins his model with the demand function of the private sector and named it P.

$$P = P(X, T, r)$$

where: X = Output

T = Taxes

r = interest rate

and it shall be assumed that:  $dP/dT < 0$

The interest value r in the equation represents the effects of monetary policy, including deficit spending, as a financing

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1. Gandenberger assumes in his article that  $0 > a > -1$

source. Therefore, assuming full employment where  $X = X$ , the equation will be satisfied by many possible values of  $T$ , accompanied by the current value of  $r$  [32,p.115]. Furthermore, Modigliani assumes that the level of government expenditure is given, as well as the level of taxes, and that the budget deficit "does effect future generations through the stock of capital inherited by them" [32,p.116].

Along with the assumptions and the preliminary equations shown, above Modigliani begins with a given government expenditure  $G$ , and a given combination of  $T$  and  $r$ , which both match with the assumption of full employment. Lastly, as "is generally assumed in Keynesian analysis" [32,p.116], consumption responds first to taxes and not to interest rates.

The first step in the analysis will be an increase in  $G$  by  $dG$ , taxes will be held constant, and deficit  $D$  shall be equal to the amount of the increase in  $G$ .

$$dG = dD$$

Therefore, in a full employment economy without inflation and because consumption only responds to a change in taxation in the short run, we have  $dC = 0$  since taxes are constant. We can write now:

$$dG + dC + dI = 0$$

since  $dC = 0$  we have

$$dG = dD = -dI$$

Therefore, we can deduce, that the deficit financed expenditure goes hand in hand with a reduction of capital formation in equal amount. Modigliani shows in table 3.1 the total effects in form of a numerical example of a debt financed government expenditure versus a tax financed government expenditure. This table shall be used as the basis of the following analysis [32,p.117].

Column 1 shows the initial situation with a balanced budget and no additional government expenditure.

Column 2 shows an increased government expenditure by 100 units with unchanged taxes but increased deficit spending in equal amount to the change in G.

Column 3 illustrates an increased government expenditure by 100 units financed by taxes.

Row 1 shows Gross National Income = full employment Output X which is constant in a full employment situation as assumed.

Row 2 shows government expenditures, where G increases from the initial situation from 300 units by  $dG = 100$  units to the amount of 400 units in the deficit situation as well as in the totally tax financed economy.

Row 3 shows the taxation, where in the tax case, tax receipts increase by  $dT=100$  to 400.

Row 4 clarifies disposable Income. A decrease can only be observed in the tax financed situation.

Row 5 shows, according to the consumption function with disposable income as the only endogenous variable, total Consumption C. The marginal propensity of consumption is assumed

as 0.6.

Table 3.1

Alternative Situations

	Initial situation	Increased G financed by deficit	Increased G financed by taxes
<hr/>			
<u>Variables</u>			
1. Income	2,000	2,000	2,000
2. Government Expenditure G	300	400	400
3. Taxes T	300	300	400
4. Disposable Income $Y=X-T$	1,700	1,700	1,600
5. Consumption $C=C+cY$	1,500	1,500	1,440
6. Saving $S=Y-C$	200	200	160
7. Deficit $D=G-T$	0	100	0
8. Private Capital Formation $I=S-D$	200	100	160

Table out of [32,p.117]

Row 6 shows total savings as the difference between disposable income and Consumption.

Row 7 shows the budget balance. In the initial case, as well as in the tax financed case, the budget was balanced, meaning



that government expenditures and tax receipts were equal. In the deficit case, the deficit, or the negative balance of the budget, is equal to the government expenditure with  $dD=dG=100$  units.

Row 8 shows private capital formation. In the initial situation an investment of 200 units can be observed which is equal to the amount of private savings since the deficit is 0. In the situation where the additional government expenditure is financed by deficits. we can observe a private investment of only 100 units, since the residual 100 units have been used to finance the deficit. Compared to a tax financed situation where capital formation is smaller than in the initial situation, we can see that the loss in investment depends on a smaller savings ratio due to the extraordinary tax needed to finance the additional expenditure.

Row 8 also illustrates Modigliani's argument that in a case of a deficit financed additional government expenditure, the generation beyond the one which is responsible for the debt inherits a smaller share of capital formation than in a situation without an additional government expenditure or in a situation which is financed by extraordinary taxes.

The previously introduced analysis can be seen as being in agreement with the classical doctrine that deficits shift a burden to the generation living beyond the time of the additional government expenditure. Based on the illustration of table 3.1, Modigliani claims that the burden of the following generation is based "in the loss of income from capital and not in the taxes

levied on later members to pay the interest charges, as the classical argument contends" [32,p.118].

Modigliani, in search of a reasonable measurement unit for the shifted burden, considers the long run interest rate  $r$  as a term comparable to the theoretical approximation of  $r$ , which represents the marginal productivity of capital. Hence, considering the annual interest charges  $r(dD)$ , Modigliani argues that one has a good approximation of the yearly loss of a society, which is also called the opportunity cost of the debt. These costs are created by the initial reduction in the stock of capital and will not be recouped as long as the debt is not retired.

Modigliani also found that long-term interest rates, as a good measure for the true loss the society has to suffer due to a debt financed government expenditure, might host some problems. The first problem, so Modigliani argues, is caused by the increase in interest rates by government operations, brought about by an increase in the marginal productivity of capital due to a reduction in private capital. In this case Modigliani argues that the interest rate, as an indicator for a burden, will overestimate the true burden of the debt, which will lie somewhere between  $r_0(dD)$ , the initial situation, and  $r_1(dD)$ , the

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1.  $r(dD)$  represents the longrun interest rate times the net change in debt.

2. In this viewpoint, Musgrave has exactly the same opinion [33,p.577].

situation after government expenditures have increased interest rates.

The second problem may arise due to an imperfection in the capital market, particularly when government encourages banks and other financial institutions to acquire bonds by setting their price below market value. Therefore, facing the differences between  $r$  and  $r^*$  one can doubt the accuracy of long term interest rates and the theoretical measure is still the marginal productivity  $r^*$  (dD) [32,p.119]. Because of the above explained problems of the accuracy of measurement of long term interest rates, the empirical measurement of the true burden by using long term interest rates is not very great. We can conclude that no burden would be shifted to future generations as long as the sum of current savings is left untouched. In other words, due to the assumption that consumption does not change, resources to finance the deficit have to be withdrawn from investment. Therefore, the maximum burden which could possibly be shifted to the future would be the same as the total amount of possible private investment used to purchase government bonds [35,p.14].

Neissner, another proponent of the aggregate investment approach argues that future capital stock may be affected by a change in present depreciation allowances and therefore he added the sum of current depreciation allowances to the argument of a lower capital formation in the future in his slightly different statement concerning future burdens created by debts. Neissner argues that a change of depreciation allowances in the present

will affect future capital formation. For example if the depreciation becomes more difficult for private firms their investment will grow slower because private investment will become more expensive. Neissner argues further that an increase in taxation reduces not only savings but also consumption; a financing by deficit spending will only affect capital formation. So far Neissner comes to the same conclusion as does Modigliani, which is that "the stock of capital available to the 'future generation' --those who live after the period of extra government expenditures-- would be smaller under borrowing than under taxation." [35,p.146] Neissner added to this statement the idea that a future capital stock might be influenced by different current depreciation allowances. He argued: "The operational lifetime of a piece of equipment or a building is usually longer than the depreciation lifetime used by accountants, and therefore replacement can be postponed without reducing the capital stock in operation." [35,p.147] The above argument caused Neissner to add the sum of current depreciation allowances to the argument of lower capital formation, which add up to the real burden transfer to future generations.

### 3. The Pigou Thesis

In his article, "Debt Finance and Future Generations" Shoup [40,p.888] explains the Pigou thesis, which had its origins in the classical thoughts of David Ricardo, as follows:

"If government expense is financed by taxation, the first generation hands on to the second nothing but tax receipts; if by

bond issue, the first generation bequeaths the bonds to the second, but, along with them, a tax liability represented by the annual charge on the debt for interest....The members of the second generation like those of the first pay the interest to themselves, and hence, cannot gain by holding bonds rather than their forebearers' tax receipts." [40,p.888]

The central argument in this thesis revolves around whether the subsequent generation loses wealth, inherits tax receipts, or inherits bonds. This is important in terms of real capital stock. The inheritance of the third generation from the second depends mainly on the creation of capital stock which the second generation inherited and developed from the first, due to a investment multiplier process.

Ricardo and Pigou posit that the first generation cuts its consumption less and its investment more if government expenditure is financed with bonds instead of taxes because individuals living in the first generation tend to underestimate the future service charges of debt, such as interest payments and bond retirement [40.p.888]. Each individual thinks he might be richer with bonds and an undefined tax obligation than without bonds and with no future obligation. Moreover, with a consumption function, that is dependant on disposable income, we can assume, in the short run, that consumption will be cut less in a bond financed economy [40,p.888]. In a bond financed situation, individuals will use part of their income to buy bonds, which are usually withdrawn from the investment budget.

In the case of a tax financed government expenditure, resources are withdrawn in the present, meaning the individual

must cut some of his expenditures. But in a bond financed case, the additional expenditure is made out of resources which do not withdraw part of an individual's income in the present. Therefore, assuming an individual's consumption characteristics are constant, the individual will cut consumption less in a situation financed by bonds than in a situation of a government expenditure financed by taxes. If all the above explained holds true, total investment in a tax financed situation will be greater than in a situation where a public project is financed by deficit spending.<sup>1</sup> If government opts for bond financing rather than tax financing to pay for public expenditures, then the capital stock passed to the next generation is fairly small. Because the method of financing can distort and reduce investment expenditure, according to the classic Pigou doctrine, it is possible to shift a burden in the future because the following generation has less capital stock available; thereby diminishing both consumption and future economic growth [40,p.889].

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1. According to the definition of income spending in which an individual has either to consume or to save his income we can follow that if the individual consumes as much as before the expenditure, or cuts consumption less than investment, then in a bond financed situation future investment would be smaller than it would be in a taxation case.

### 3. CONCLUSION

Under the realistic assumption of a positive marginal productivity of private Capital, the real future income decrease is positively related to the crowding out of private capital formation [32,p.109]. In other words if we observe a strong crowding out of investment caused by a public deficit, we can expect a strong decrease in real future income. Furthermore, it can be assumed that the financial resources for paying taxes are a high percentage of the consumption budget. The financial resources used to purchase government bonds belong to the part of income which is usually used for private investment. This can be explained as follows: The individual wishes to acquire a personal investment portfolio and in this portfolio government bonds will be substituted for private investment assets. One cannot assume a consumption cut such as Buchanan did, but instead a decrease in capital formation.

Though individuals view government bonds as an alternative to placing funds in the private sector, they do not anticipate taxes that are due in the future for retirement and interest payments. The individuals overestimate their economic situation in the debt case [27,p.320] and since total consumption is constant, as assumed, this will cause, compared to the taxation case, a higher consumption-investment ratio in the present because the individuals benefit from relatively lower taxes. Com-

pared to a case where an additional government expenditure is financed by taxation, the consumption is relatively higher in a deficit case, because, as assumed, an additional taxation will withdraw resources from consumption and investment, where an additional debt will withdraw financial resources only from investment. A higher consumption-investment ratio with consumption assumed as fixed causes ceteris paribus a lower ratio of savings which causes lower investment, as a part of savings, in the future [27,p.320].

This phenomenon can be explained with the classical analysis: In a full employment situation, resources can only be invested that have been saved before. In other words if total savings in one period is \$100, total investment can also be only \$100. Therefore, with constant output, constant consumption, and increasing government expenditures, investment must decrease. Under this condition tax financing of an additional public expenditure will allow more private investment when consumption is reduced will debt financing for which consumption is constant [27,p.319].



## CHAPTER FOUR

### THE TRANSFER APPROACH

#### 1. THE PROBLEM

One argument in the political discussion of governmental debts is that a deficit creates more wealth among the rich and more poverty among the poor. Politicians call this "distribution from the bottom to the top." The transfer or conventional approach deals with this phenomenon and has its roots in the ideas of Lerner and Meade<sup>1</sup>. Richard A. Musgrave's [33,p.613] argument is similar to that of the German "Sachverstaendigenrat", an institution similar to the U.S. Council of Economic Advisers. The Transfer Approach was named by Gandenberger and Andel, two German Public Finance professors.

The three previously introduced approaches focused basically on the problem of an intergenerational shift of a debt burden, whereas the German advisers analyzed the existence of a transfer of a burden in the present, namely from the bottom to the top of the income scale. Therefore, the transfer approach was the basis of deficit discussions in the 1960's. The transfer, or conventional, approach had this position for a certain time but more experts criticized than supported it. One of the few proponents of the transfer approach was K.D. Henke [23,p.440], a German

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1. See the Controversy between Meade and Lerner about redistribution of interest income in chapter one of this paper.

public finance professor, whose main argument dealt with the validity of the transfer approach during recessions. Basically N. Andel [1,p.69] and O. Gandenberger [19,pp.1] criticized the conventional approach and successfully deleted the bottom to the top distribution argument from the academic discussion. Then at the end of the 1970's, Henke [23,pp.440] wrote an article about the validity of the transfer approach in recessions and one could see that the transfer approach was still alive.

This chapter explains the basic idea of the transfer approach and its theoretical foundation, followed by the empirical work of Andel and Gandenberger, who analyzed the validity of the transfer approach.

## 2. THE IDEA OF THE TRANSFER APPROACH

The basic argument of the transfer approach involves a distribution from the bottom to the top of the income scale. Individuals with high income have financial resources which are not needed as a necessity for living, but which will be instead used as an investment. In the case of a public deficit situation the government creates bonds, sells those bonds and pays interest on them. Being a creditor of a government is usually less risky than being a creditor of a private corporation. Therefore, an investor would (equal interest rates assumed) prefer governmental bonds. Hence, people with high income gain profits with the help

of the governmental debt. Individuals who belong to the lower income scale have no, or less, excess money to invest, but they also must pay taxes. The government pays the interest to the bondowners out of these tax receipts [24,p.217].

With the tax payments of all taxpayers, including lower income taxpayers, the interest income of the higher income taxpayers will be financed because of an increasing debt. After all, interest rates will rise, as explained in the basic neo-classical model, and cause an even higher gap between the poor and the rich.

The validity of this idea depends on a variety of distribution criteria [24.p.218]:

- a. What share of the total tax payments do low and middle income classes pay?
- b. What share of interest income do high income classes earn?

These two arguments are part of Andel's and Gandenberger's analysis in the later part of this chapter. Another important element of this discussion is the increase in interest rates caused by public debts.

### 3.INTEREST AND LOAN VOLUME EFFECT

The interest claims of loanable funds are, per definition interest rates times loan volume. Therefore, the total effect is

usually distributed in interest<sup>1</sup> and loan volume<sup>2</sup> effect [20,p.384].

In the case of an increase in the loan amount, we have an additional demand for capital (see dd in picture 1) causing a shift in the capital demand function. The capital supply function shifts as well (see s dd in picture 1), since compared to a tax financed governmental expenditure, consumers have a higher disposable income. A part of this additional disposable income will be saved, and therefore, more financial resources are available to satisfy capital demands, thus decreasing the interest rate.

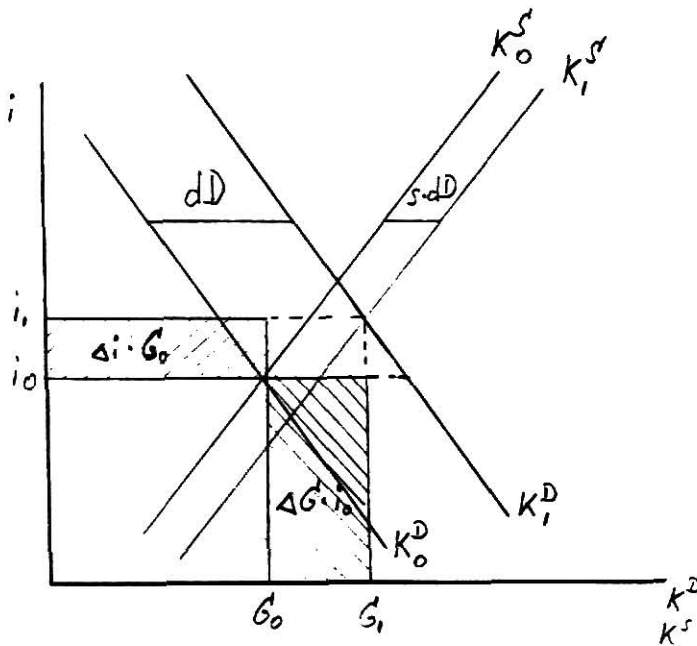


Fig. 4.1.

1. The interest effect is the change in the interest rate in the initial situation  $i_0$  compared to  $i_1$ . See also figure 4.1 where

$$\Delta i \cdot G_0 = \text{interest effect.}$$

2. The loan volume effect is the change in the interest rate in the initial situation  $G_0$  compared to  $G_1$ . See also figure 4.1 where

$$\Delta G \cdot \Delta i = \text{loan volume effect. Therefore, the total effect} = \Delta G \cdot \Delta i + \Delta i \cdot G_0$$

The amount of the interest increase depends on the elasticity of capital demand and supply. The demand elasticity is usually fairly small<sup>1</sup>; only some long-run, capital intensive and relatively sure projects seem to be interest elastic<sup>2</sup> [20,pp.385]. The capital supply in a closed economy seems to be fairly rigid. Therefore, we can predict a relatively strong interest effect [20,p.385]. These results change after observing an open economy with international money market activities. The additional domestic demand for capital causes a higher capital import because of the increasing interest rates, due to the public debt, and therefore, a part of the additional interest income flows abroad. Borrowing activity creates a positive interest effect and a positive loan volume effect.

The increase in interest rates caused by deficit spending not only has impacts on income distribution in future periods, but also on the valuation of current wealth. If interest increases, the present values of bonds or other investment papers will fall [20,p.386].

The analytical basis for these predictions can be observed in the previously introduced basic neoclassical model of a closed economy. The analysis could be developed with the use of secon

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1. In the short run the demand elasticity of capital seems to be fairly small because short run investment depends mostly on future sales estimations and usually on short term loans.

2. Long run capital investment seems to be more interest elastic because of the necessity of those investments to be financed by long term loans.

dary effects, such as real crowding out<sup>1</sup> and the use of different tax systems. Musgrave [33,p.613] questions whether the tax which is to be used as an alternative to bond financing already has a distributional effect on society, such as a progressive income tax<sup>2</sup>.

When considering the Transfer Approach, it is more of interest to analyze the uneven distribution of current income caused by a public debt. If the major share of interest income belongs to higher income classes, we will face a situation of a distribution between taxpayers and recipients of interest income. In the case of an open economy, the uneven distribution impact should be fairly small compared to what it would be in a closed economy, because part of the additional income flows abroad.

Andel and Gandenberger criticized this approach heavily [1] [19] [20] [18].

#### 4. THEORETICAL CRITICS OF THE TRANSFER APPROACH

The basic idea which Andel followed was to observe the whole life-cycle of a debt financing. This life-cycle can be divided into two phases:

1. The time  $t_0$  when the debt was made.

2. The whole period of the existing debt  $t_0 - t_n$  [24,p.220].

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1. Real crowding out represents a situation where governmental investment directly crowds out private investment.

2. Musgrave also divides his argument between the distributional effects of average taxation and marginal taxation [33,p.613]

Andel describes further that the technique of the transfer approach is to pick a certain part  $i$  out of the time period  $(1 < i < n)$  and to analyze this time as to period whether there are distribution effects or not.

If we start analyzing at  $t_0$  of the cycle we have to face the problem of financing additional government spending with higher taxes or with higher debts. Creating debts is a method of avoiding tax increases in the present. Hence, Andel did not use the term "burden", to indicate what would have been created in a debt financed case. He instead referred to "avoiding costs," which are defined as costs created by avoiding tax increases.

Therefore, the hypothetical avoiding distribution effects in period  $t_0$  have to be compared with the distribution effects in following periods  $t_1 \dots t_n$  [24,p.220].

The main consequence of the increased debt is the interest payment which has to be paid out of the future tax receipts. Therefore, taxes have to be increased in the future, but the net distribution effect could be calculated after comparing the incidence of the "alternative tax" with the incidence of the "interest tax". The alternative tax is the tax which has been avoided because of the debt financing, and the interest tax is the tax which must be created in the future to pay the interest of period  $t_{i-1}$ . For Andel the result of comparing interest taxes with alternative taxes is ambiguous and has to be analyzed empirically. He argues further that an analysis of these impacts would cause problems in accountability and the use of a partial

analysis would be useless [1,p.72].

Gandenberger saw in the transfer approach an implicit false conclusion [20,p.386]. He derived that interest income is not created because of a public debt. The creditors have a certain amount of excess financial resources which should be profitably invested. If there would have been no governmental bond or any other fund which could be used as a public debt source, created, the creditors would use other profitable investment for their money.

Gandenberger argued: If the government chooses debt financing instead of financing an additional public expenditure by taxes one can estimate as explained before, a higher level of interest rates. This will cause a gain of additional interest income for bondowners. But, so Gandenberger argues further, only when it is proven that those bondowners belong to high income classes can one speak of an income distribution from the bottom to the top [24,p.221]. As long as the assumptions of price level stability and full-employment hold true Gandenberger argues with the proponents of the transfer approach that only interest effects can have an impact on income distribution. Therefore the economically interesting cases would be unemployment or inflationary situations. In the following section, Henke's analysis of the validity of the transfer approach in a recession is presented.



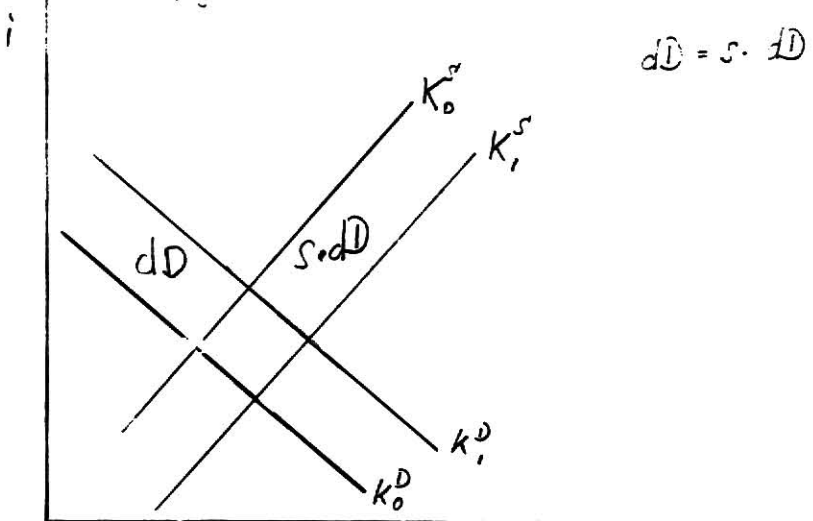
## 5. VALIDITY OF THE TRANSFER APPROACH IN A RECESSION

K.D. Henke claims the validity of the transfer approach in one of his articles about distribution effects of public debts.

One assumption of the transfer approach is that the interest rates will rise after an expansion of the public debt. Hence, Henke questions, what would happen to income distribution if interest rates would stay the same? The interest rates would stay the same in an economic trough, where the demand for capital would be very high, because of a low profitability of investment in the near future [24.p.221].

The interest increase caused by the increasing demand for capital due to a public debt can be totally absorbed by the money creation effect of purchasing bonds, which has a decreasing effect on the interest rate. Therefore, in a case when the marginal propensity of savings is equal to one, meaning an oversupply of capital exists, the increase of interest rates due to a public debt can be totally absorbed. [see figure 4.2.]. Even Henke doubted whether the marginal propensity of savings could realistically be equal to one and argued that even in a very strong recession individuals usually consume a part of their income. Therefore a smaller increase in interest rates, though not a total disappearance of an interest effect, could be assumed. In other words Henke agreed that even in a recession the increasing interest rates caused by a public deficit cannot be fully absorbed.

FIG. 4.2.



Only when  $s = 1$   
 and when there is no  
 income sensitive con-  
 sumption is this case  
 true. {figure out of  
 [20,p.442]}.

Henke's recommendation of the transfer approach had as many critics as the original. One of the criticisms of Henke's analysis is that the distribution of additional interest income due to an additional debt is not the main point of the transfer approach. Rather the distribution between overall interest income recipients, not between additional interest receivers [1,p.73] [24.p.222], is analyzed in the Transfer Approach. Andel and Gandenberger do not see a severe analytical difference between the recession and the full employment case. In neither is the transfer approach valid.

In the following section Gandenberger analyzed, on a small scale, the impact of public debts and especially the arguments of the transfer approach [24,p.232].

## 6. Empirical illustration

The following part is based on an empirical analysis in West Germany. The results of this analysis cannot be generalized because of the size and strong international economic relations of the country. Therefore, the use of the results are limited to countries with a similar social and economic environment [24,p.227].

To follow the logic of the transfer approach, one has to observe which income class receives interest income. A crude division of interest recipients in private banks, among foreign creditors<sup>1</sup> and private households shows a result incompatible with the transfer approach. More than two-thirds of the total amount of interest income is earned by private banks, 13% by foreign investors and 10% by private households. Hence, private households are more or less an insignificant number of interest receivers, not having an strong impact on direct distribution. But private banks are usually owned by private stockholders, and therefore, they gain from profitable investment of their banks, which usually increases their stock value. But this indirect aspect was not analyzed by Gandenberger.

Gandenberger's analysis proved another important point of the transfer approach, which is the amount of interest payments to private households. 3 billion DM compared to 30 billion DM total amount of interest payments is not an amount which causes a

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1. only in an open economy model

strong distribution effect. Individuals with an income greater than 20000 DM monthly, which could be considered a very rich class, are not included in this analysis. Therefore, since Gandenberger's partial analysis only applies to certain groups of individuals, it can only be used as an approximation. In addition, Andel argued, that an empirical analysis will cause nearly unsolvable problems of accountability: i.e. which loan causes which burden or refinancing costs to whom and who gains from it.

Rudi Kurz described Gandenbergers results as follows

Table 1

Net income of households monthly data in DM	households  in %	interest income  in %	tax burden  in %
less than 800	5%	1%	1%
800 - 1200	10%	5%	2%
1200 - 1600	10%	7%	4%
1600 - 2000	11%	8%	6%
2000 - 2500	14%	12%	10%
2500 - 3000	13%	13%	12%
3000 - 4000	19%	24%	25%
4000 - 5000	10%	15%	16%
5000 - 10000	7%	14%	20%
10000 - 20000	1%	3%	4%

Datas of table out of: Rudi Kurz; Staatsverschuldung und Einkommensverteilung  
in: Konjunkturpolitik vol 30 Heft 4 1984

Comparing Column 2 with column 3 one can deduce that the main burden of tax payments is carried by middle and higher

income classes, while interest income is earned by middle classes. Therefore, the transfer approach does not find an empirical proof with every exception.

## CONCLUSION

In this paper I introduced four different concepts concerning the topic of deficits and their impact on income distribution. The first three deal with, whether a shift of a burden to the future is possible. While proponents of the New Orthodoxy claim that there is no shift of a burden at all. Buchanan denies this argument in his utility approach and indicates that the future generation is burdened by reduced consumption. Modigliani and other proponents of the aggregate investment approach propose the idea that a possible shift of a burden is buried in a lower inheritance of capital formation from the former generation. The first three approaches, therefore, can be named as intergenerational. In the transfer approach, however, it is argued that an intragenerational distribution effect exists because of payments to bondholders who receive more transfers than they pay in taxes and taxpayers who service and repay the debt lose wealth.

It is necessary to point out that if an expert talks about a future burden in the form of an extraordinary tax one should know what kind of tax he means. A flat tax, for example, would have a different distribution effect than a progressive income tax. Furthermore it is questionable whether the history shows increasing taxes in relation to an increasing debt, and if there is a correlation between taxes and debt, what is the time lag of a tax due to a deficit of a former generation?

None of the authors, who are responsible for these approaches, except Gandenberger, had empirical proof for their arguments. And Gandenberger, who tried a small scale empirical illustration, found ambiguous results.

The following table and graphs shall not substitute for the missing empirical proof of the experts, but shall be seen as an attempt to show an empirical overview about the U.S. deficit, federal receipts, interest income and personal income.

Column (6) shows the part of interest income in total personal income. With an increasing deficit, not only the absolute amount of interest income has increased, but the percentage of interest income on total personal income has increased as well. In other words the percentage of interest income on personal income is more than three times as high as in the initial year of 1950.

Column (7) shows the deficit or surplus per capita. In the initial year of 1950 one U.S. citizen had a surplus of \$60.40 per year. Up until 1970 this number was either positive or negative but represented no dramatic peaks or troughs; but from 1970 on the deficit per capita was steadily increasing up to \$761.60 in 1983. This number is more than 30 times higher than the deficit per capita in 1952.

Column (8) shows a steadily increasing amount of federal receipts per capita, and does not show any serious peaks or troughs.

This small empirical illustration is neither satisfactory nor is it sufficient, but if the argument of a shift of a burden in the future holds undoubtedly true, the nominal burden per capita should have been increased in the past thirty years.

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1. The real burden per capita has increased from \$23.9 deficit in 1952 to \$745.5 deficit in 1984



TABLE 1

(1) Year	(2) Population x 1000	(3) Federal deficit or Surplus in billion \$	(3) pers. Interest Income in Billion \$	(4) pers. Income in billion \$	(5) Federal receipts in billion \$	(6) (3)/(4) in %	(7) (2)/(1)	(8) (5)/(1)
1950	152,271	9.2	9.7	227.2	50.0	4.3	60.4	328.4
51	154,878	6.5	10.5	254.9	64.3	4.1	41.9	415.2
52	157,553	-3.7	11.2	271.8	67.3	4.1	-23.5	427.2
53	160,184	-7.1	12.5	287.7	70.0	4.3	-44.32	436.9
54	163,026	-6.0	9.1	289.6	63.7	3.1	-36.8	390.7
1955	165,931	4.4	14.9	310.3	72.6	4.8	26.5	437.5
56	168,903	6.1	16.7	332.6	78.0	5.0	36.1	461.7
57	171,984	2.3	18.8	351.0	81.9	5.3	13.4	476.2
58	174,882	-10.3	20.3	361.1	78.7	5.6	-58.9	450.0
59	177,830	-1.1	22.5	384.4	89.8	5.8	-6.2	504.9
1960	180,671	3.0	25.0	402.3	96.1	6.2	16.6	531.9
61	183,691	-3.9	26.4	417.8	90.1	6.3	-21.2	534.0
62	186,538	-4.2	29.0	443.6	106.2	6.5	-22.5	569.3
63	189,242	0.3	32.2	446.2	114.4	6.9	1.6	604.5
64	191,809	-3.3	35.6	499.2	114.9	7.1	-17.2	598.7
1965	194,303	0.5	39.7	540.7	124.3	7.3	2.6	639.7
66	196,560	-1.8	44.4	588.2	141.8	7.5	-9.2	721.4
67	198,712	-13.2	48.3	630.0	150.5	7.6	-66.4	757.4
68	200,706	-6.0	53.4	690.6	174.4	7.7	-29.9	868.9
69	202,677	8.4	61.1	754.7	196.9	8.0	41.4	971.5
1970	205,052	-12.4	69.4	811.1	191.9	8.5	-60.4	935.9
71	207,661	-22.0	74.8	868.4	190.6	8.6	-105.9	956.4
72	209,806	-16.8	80.9	951.4	227.5	8.5	-80.1	1003.9
73	211,909	-5.6	93.9	1065.2	258.6	8.8	-20.4	1220.3
74	213,854	-11.5	112.4	1168.6	287.8	9.6	-53.7	1345.7
1975	215,973	-69.3	123.2	1265.0	287.3	9.7	-320.9	1330.3
76	218,035	-53.1	132.5	1391.2	331.8	9.5	-243.5	1521.2
77	220,239	-45.9	152.8	1540.4	375.2	9.9	-200.4	1703.6
78	222,585	-29.5	179.4	1732.7	431.6	10.4	-130.7	1939.0
79	225,055	-16.1	210.7	1951.2	493.6	11.2	-71.5	2193.2
1980	227,738	-61.2	266.0	2165.3	540.9	12.3	-260.7	2375.1
81	230,019	-64.3	331.8	2429.5	624.8	13.6	-279.5	2716.3
82	232,309	-140.2	366.6	2584.6	616.7	14.2	-637.9	2654.6
83	234,496	-178.6	376.3	2744.2	641.1	13.7	-761.6	2733.9
84	236,634	-176.4	434.8	3013.2	703.5	14.4	-745.5	2972.9

Data out of "Survey of Current Business"

Explanation to column 6-8 (all Data between 1950 and 1984)

Column (6): Percentage of interest income on total Personal income (3)/(4)x100

Column (7): Deficit per capita (2)/(1)

Column (8): Federal receipts per capita (5)/(1)

Fig. C.1

Percentage of interest income  
on total personal income in %

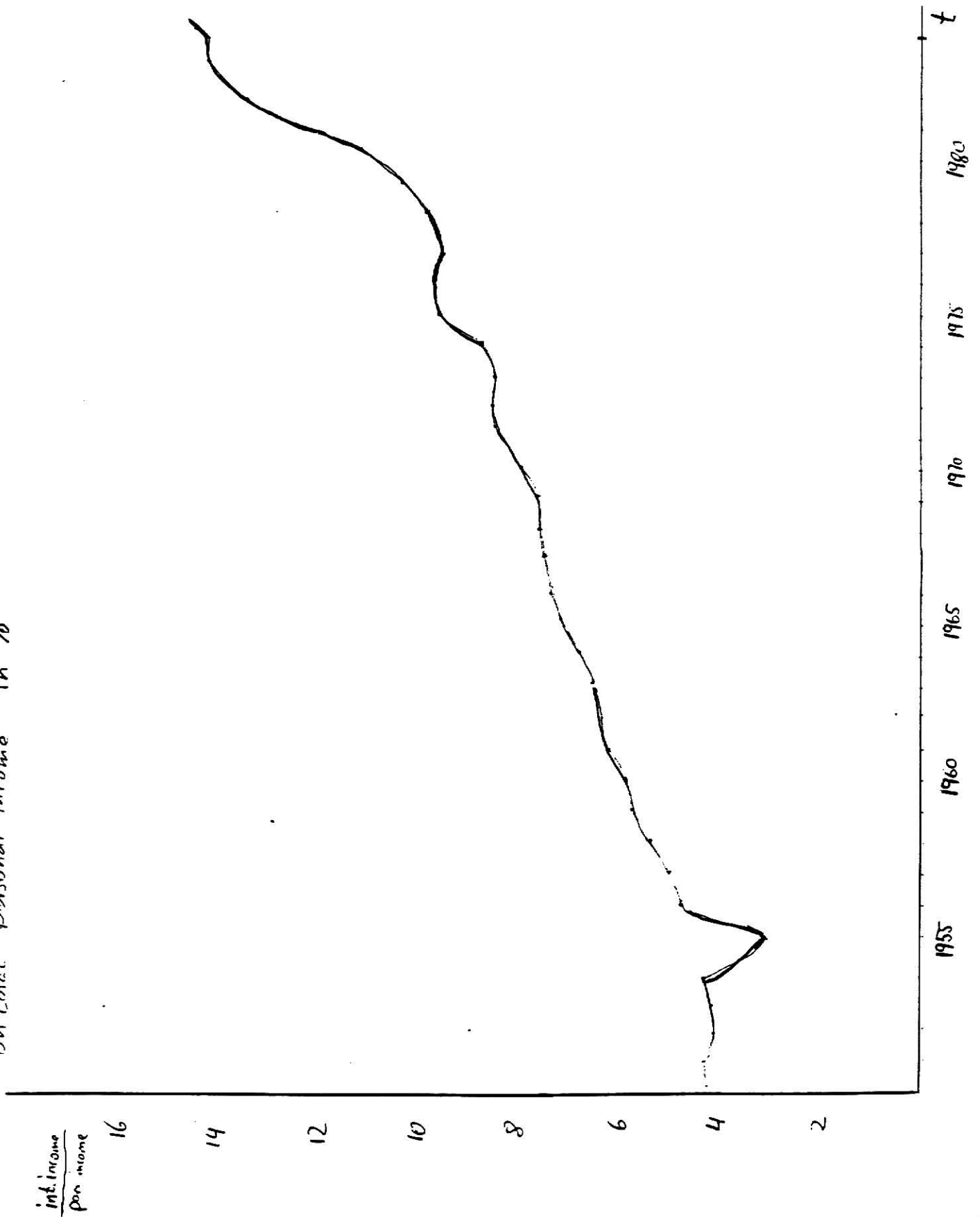


FIG C.2

in US \$ per capita

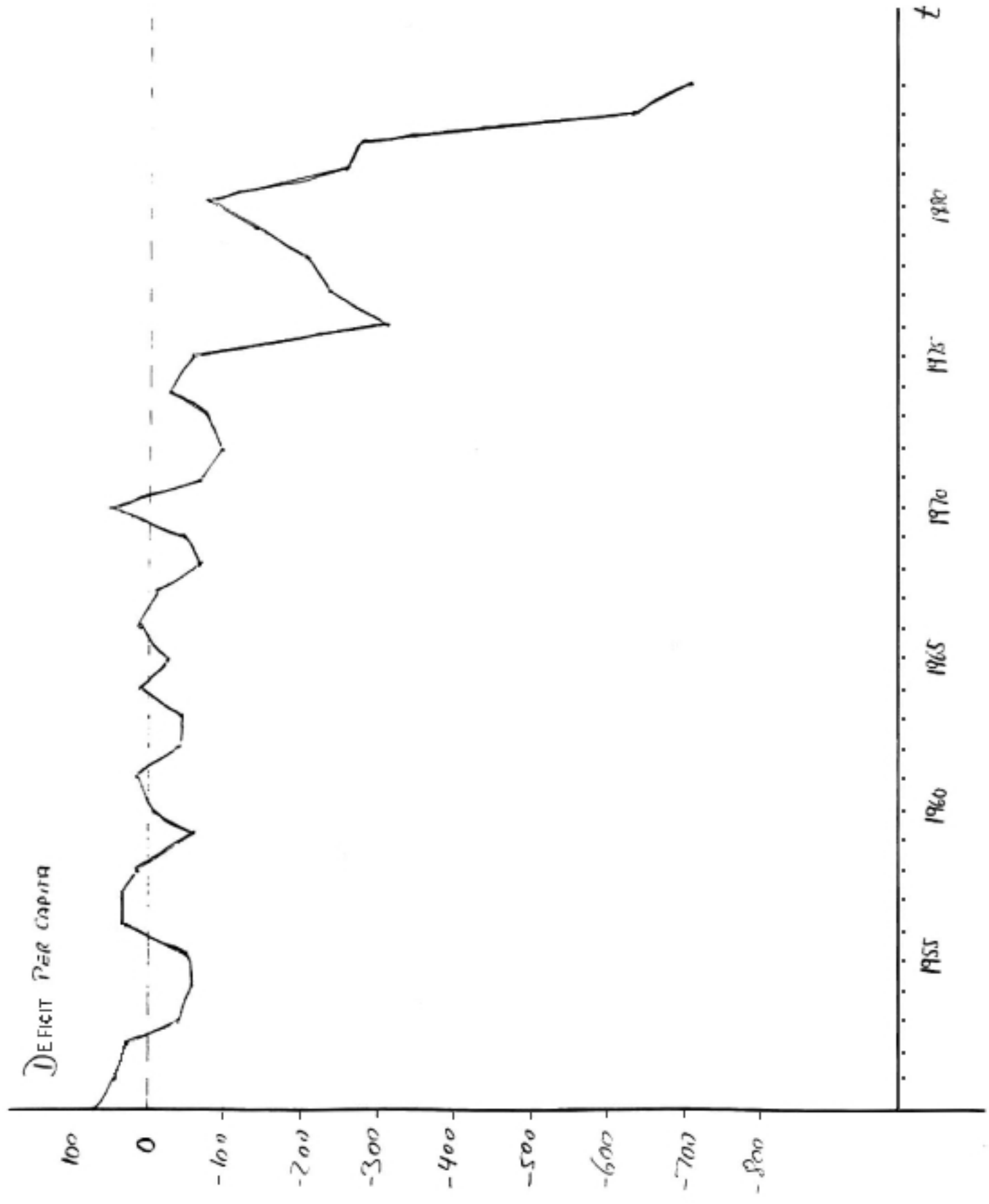
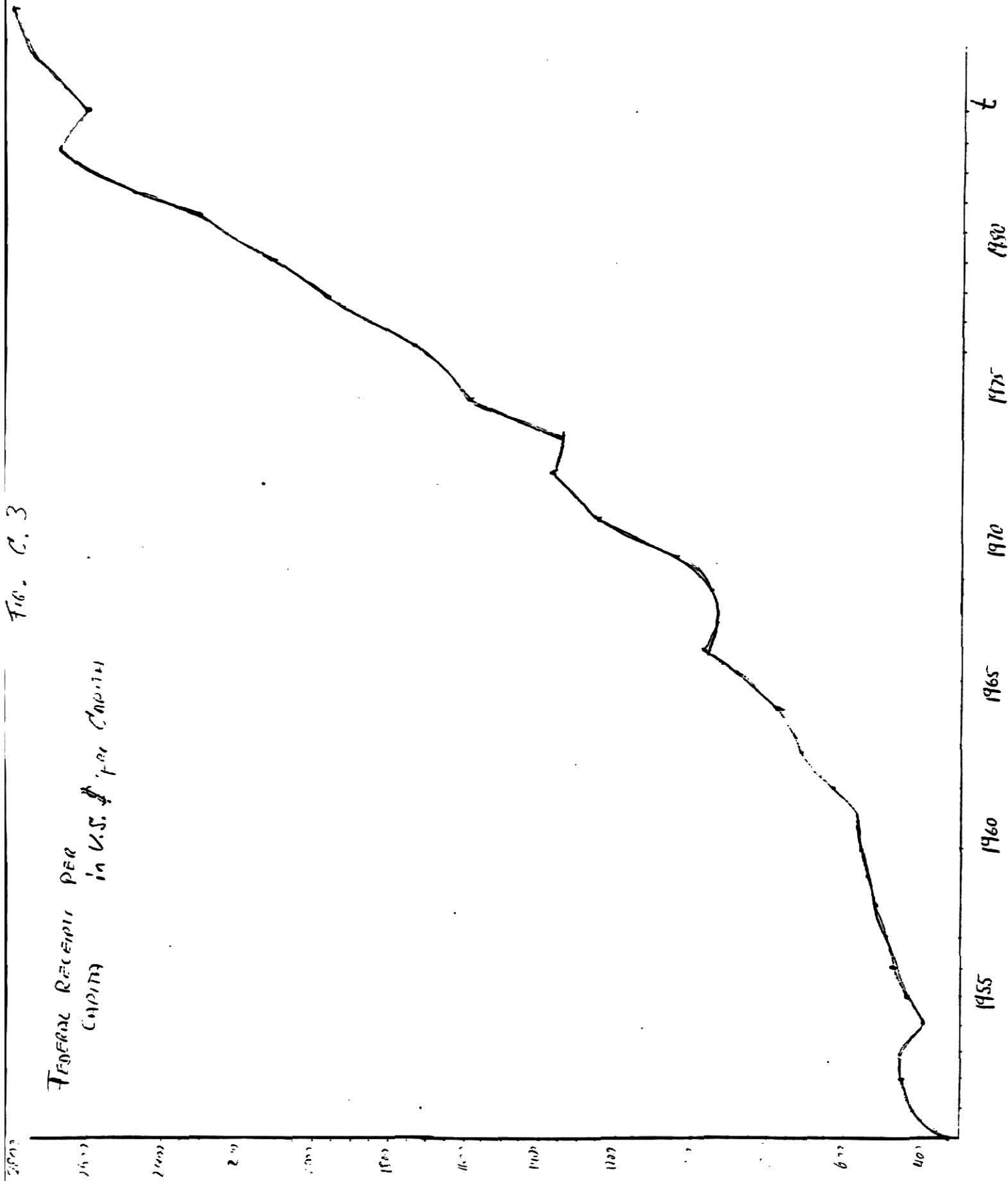


FIG. C. 3

FEDERAL RECEIPTS PER  
CAPITA in U.S. \$



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IMPACTS OF FEDERAL DEFICITS ON INCOME DISTRIBUTION

by

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Dipl. Volkswirt Justus Liebig Universitaet Giessen 1984

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AN ABSTRACT OF A MASTER'S REPORT

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## ABSTRACT

The analysis considers how federal budget deficits might affect is the distribution of income within and between generations. The distribution effect within one generation is the so called intragenerational distribution, and the distribution of income between two or more generations is the so called intergenerational distribution.

Three authors of different approaches to analyze the impact of federal deficits deal with the distribution over time; namely they consider whether a shift of a burden to the future is possible. The author of a fourth approach discusses the distribution between economic classes within one generation.

All theories compare differing methods of financing an additional government expenditure. The two financing alternatives considered here are a deficit spending and an extraordinary tax to finance the additional public project.

The first approach is the so called New Orthodoxy, named by Buchanan who is the major critic of this idea. The proponents of the New Orthodoxy, such as Meade and Lerner, argue that there is no shift of a burden to the future, but rather a shift of resources between the public and the private sector of an economy due to a public debt. This shift of resources does not cause a burden in the future because, according to the New Orthodoxy, one cannot use resources from the future, and therefore, the term "we owe it to ourselves" was created. This expresses the macroecono-

mic views of Lerner and Meade that the New Orthodoxy did not consider the individual as a single economic object, but rather as a part of the total economy. "We owe it to ourselves" means that it is not possible to shift a burden because the creditor and the debtor are elements of the same society.

The second approach, created by Buchanan, is the so called Utility Approach, which is based on the framework of microeconomic, utilitarian ideas. Buchanan argues that future taxes, caused by issuing a debt, create a burden in the future due to a consumption cut of the higher taxed future generation. This lower consumption level shifts the taxpayers to a lower utility level, while bondholders, when the bonds are repaid, have no change in utility. In his "Theory of Choice" Buchanan defended this idea of a future burden while isolating some of the false paradigms of the New Orthodoxy.

The third approach is named the Aggregate Investment approach, and was developed by Modigliani and Vickrey. Their major argument is that taxation affects consumption and investment, but an increased deficit will withdraw resources from investment. This investment cut will provide less capital formation in the future and therefore harm economic growth. Neissner, another proponent of the aggregate investment approach added depreciation allowances to Modigliani's framework. Neissner argued that current depreciation allowances will also affect future capital formation and can also be held responsible for the future burden.

The category of intragenerational approaches is represented by the transfer approach. Meade, a proponent of the New Orthodoxy, already admitted a possible uneven distribution between taxpayers and bondholders. Musgrave developed this idea as well as the German economists Gandenberger, Andel, and Henke. Gandenberger calls the transfer approach a distribution from the bottom to the top, because the major idea of this argument is that individuals purchase bonds and all taxpayers are held responsible in the form of higher taxes in the future. Therefore, taxpayers finance the interest income of bondholders.