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THEORIES OF GROWTH IN GOVERNMENT SHARE: SOME REFLECTIONS*

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I. INTRODUCTION

The literature on the growth of government spending is voluminous. It spans several disciplines (economics, history, law, politics, public administration, sociology), dozens of theories together with their cross-country and time series tests, and almost a century of writing (since Wagner's Law was published in 1890).[1] Shoup (1984), after scanning this literature, concludes that there is surprisingly little mention in it about the publicness of government expenditure or of how jointness can influence the growth of government share. He questions whether research may have been focused too narrowly, and given the variety of theories and empirical results, may still be some distance from a synthesis in this area.

In this paper we pursue Shoup's questions by offering some reflections on the narrowness of focus and distance from synthesis of the government spending literature. Following Shoup, we restrict our comments to the growth of government spending on goods and services ("exhaustive expenditure"), omitting transfer payments. In section II we outline a partial synthesis of the existing theories. Section III discusses jointness over users while IV relates the government spending literature to international trade theory. Section V concludes with suggestions for further work in this area.

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*This paper was presented before the annual meeting of the American Economic Association, Dallas, Texas, 1984.

[1]For example, see the literature reviews and bibliographies in Beck (1982), Bird (1979), Lowery and Berry (1983) and Watson (forthcoming).

Our major conclusion is that the literature, while closer to a synthesis than Shoup suggests, has been focused too narrowly. Much work needs to be done to broaden the theoretical base by including, for example, international trade and public goods results, and to deepen the empirical work with detailed, disaggregated studies. This widening and deepening should create a more coherent and satisfying theory of government expenditure share than we have today.

II. TOWARDS A GENERAL THEORY OF GOVERNMENT EXPENDITURE ON GOODS AND SERVICES

There are many theories of government expenditure growth. Shoup (1984) discusses five: Wagner's Law (1890), the Peacock-Wiseman (1961) displacement effect, Baumol's technological lag (1967), Niskanen's bureaucratic power model (1971) and Beck's rising factor costs (1981, 1982), and then introduces his own jointness over users theory (1976). There is a simple, yet illuminating, way to link these theories. Since they all analyze government provision of goods and services, for which there must be a demand and a supply, the usual <u>exogenous factors affecting demand and supply</u> must apply here.

In introductory economics we teach that the demand function for commodity X is:

$$Q_x^d = f(P_x, P_y, I, \text{tastes}, N, I \text{ dist}) \qquad (1)$$

That is, quantity demanded depends on own price, prices of related goods, income, population and income distribution. The supply function for X is:

$$Q_x^s = h(P_x, P_y, P_f, \text{goals}, \text{tech}) \qquad (2)$$

or, quantity supplied depends on own price, prices of related products, cost of factors, goals of the firm and technology. Treating government expenditure as $P_g \cdot G$ where P_g is a price index of government output, and G a volume measure, we can analyze the supply and demand for G using (1) and (2).

With this framework, a synthesis of the various theories of growth in government spending is possible. Wagner's Law is a

demand-side theory: the demand for G grows due to rising incomes and urbanization. Peacock and Wiseman is also demand-oriented: a social crisis causes a change in tastes in favor of public output. Baumol's model is supply-oriented (a technology lag causes the supply of G to fall), as is Beck's (rising factor costs reduce Q_g^s). Niskanen's bureaucratic model can be treated as a change in goals of the firm. Lastly, Shoup's jointness is supply-oriented: a rise in N causes the per capita average cost of providing G to fall so that each household perceives an increase in supply. It is clear that all six theories influence the equilibrium price and quantity, and thus total expenditure on G.

Other theories of government share can also be fitted into this framework.[2] (1) The fiscal illusion model argues that voters underestimate P_g due to lack of information or fiscal illusion and thus the demand for G rises. (2) The theory that growing interdependencies between Western economies are creating state mercantilism can be interpreted as a change in policy goals inducing a rise in supply of G. (3) Similarly, the view that "leftward"-leaning governments may raise the supply of G more than "rightward" governments (or federalist more than centralist governments) can be treated as a change in goals of the firm. (4) The demonstration effect argues that as the public becomes more aware of inequities tastes change in favor of increased demand for G. (5) The revolt against higher tax levels in some U.S. states can be analyzed as a change in tastes or fall in income causing a fall in demand. The list could be much longer than this, but clearly most (if not all) of the existing theories can be fitted into traditional demand-supply analysis.

Arranging the theories in this manner also identifies places where theories are missing or have been ignored. For

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[2]See Lowery and Berry (1938), Watson (forthcoming) and their references for details of these theories.

example, the introduction, or change in price, of private substitutes and complements can affect both the demand and supply of G. Unconditional grants-in-aid, if viewed by state residents as partly financed by taxes on nonresidents, can induce an increase in demand for state government goods in response to the perceived fall in tax price. Changes in the distribution of income can affect the demand for G, and technological improvements can increase supply.

Traditional demand-supply analysis also stresses the importance of market structure to the equilibrium price and quantity. This is true for government goods and services, some of which are provided by government departments and financed by general tax revenues; others by private regulated monopolies or government enterprises financed by user fees.[3] The nature of the good or service is also important: whether externalities exist, the extent of economies or diseconomies of scale, the degree of publicness, whether the good is a final or intermediate product, if it can be imported or exported. Lastly, the time period under consideration is a relevant variable: demand and supply are more elastic in the long run, exogenous variables tend to change their importance over time, uncertainty plays a less important role in the long run.

In summary, we argue that most (if not all) of the existing theories on growth in government share can be incorporated into one theory of the demand and supply of government goods and services. Each theory stresses a different exogenous variable, but since they all influence the "market for G," they should be treated as complementary theories rather than substitutes. Using

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[3]In Canada the replacement of government departments by government enterprises (Crown Corporations) has tended to reduce government's share of GNP since total expenditures and revenues of departments are included in the National Accounts but only net profits or losses of enterprises. For example, the scope of government was reduced in 1980 when the Post Office was changed from a department to a Crown Corporation.

this approach a synthesis is possible--one that also stresses the importance of market structure, the nature of the commodity and the time period involved.[4,5] Now let us see how jointness can be incorporated into this synthesis.

III. JOINTNESS AND THE GROWTH OF GOVERNMENT SHARE

The growth of government share is usually measured in one of two ways: (1) the ratio of nominal government expenditure on goods and services to nominal GDP, or (2) the ratio of constant dollar government expenditure to constant dollar GDP. Beck (1981, 1982), using data for 13 countries for 1950-77, and Watson (forthcoming), using data for 19 OECD countries for 1951-80, both demonstrate an interesting anomaly: while the government share has risen according to the first measure, it has fallen under the second measure. Shoup (1984) argues that one possible explanation is that government goods exhibit jointness and he questions why its impact has been neglected in the government share literature.

We suggest two possible explanations for this neglect: the effects of jointness on government share are not well understood and/or most government goods are believed to be quasi-private. If these explanations are correct, we must show the importance of jointness to the growth of government share and demonstrate that sufficient publicness exists in practice for jointness to matter. We address each of these issues in turn.

Shoup (1976) offers the best explanation of the relationship between jointness and government share, and we shall follow

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[4]It should be clear that this approach can be used to compare the composite commodity G with a composite private good X, or to anaylze the market for an individual government good G_i where i indexes the number of government commodities.

[5]This may be one reason why empirical tests of the different theories have not been very successful. Usually such tests ignore supply-side variables, are performed on one theory at a time, and use "all government spending" as the dependent variable (for example, see Lowery and Berry (1983)).

it here. Let g be per capita consumption of a government good and $N^{\alpha}g = G$ be total consumption where N is the number of identical households and α the degree of jointness. If $\alpha = 0$ then G is a pure public good and $g = G$; if $\alpha = 1$ we have a quasi-private good where $Ng = G$. Let G be produced under constant costs so that average cost, AC, and marginal cost, MC, are equal. This is illustrated in Figure 1 where we assume G is a pure public good initially.

With N_o households, per capita average cost is AC/N_o. Given the household's demand curve, D_g, he consumes g_o units for an expenditure of $(AC/N_o)g_o$. Total expenditure by all households is $AC \cdot g_o$. Now let the population rise to N_1. Per capita average cost falls to AC/N_1, inducing a rise in consumption to g_1. Per capita expenditure is now $(AC/N_1)g_1$ and total expenditure is $AC \cdot g_1$. If the household's demand curve is inelastic, the fall in tax price causes a less than proportionate rise in g and per capita expenditure falls. Since per capita spending falls while N rises, total expenditure must rise less than the rise in N. If the demand curve is elastic, per capita expenditure rises as the population grows so total expenditure increases faster than the population. And lastly, if the elasticity is one, per capita spending is constant for all population levels and thus total spending rises as fast as the population.[6] Therefore, if G is a pure public good total expenditure on G rises (falls) as the price elasticity of demand, E, is elastic (inelastic).

We can now relate jointness to the two measures of growth in government share. Let x be per capita consumption of a composite private good, so that $Nx = X$ is total consumption, and $P_x X$ total expenditure, on private goods. Then the first measure is

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[6]In mathematical terms, letting a dot above a variable represent percentage change, we have: $\dot{(AC/N)} < 0$ and $\dot{g} > 0$ so that $\dot{(AC/N)} + \dot{g} \gtrless 0$ as $E \gtrless 1$ where E is the elasticity of demand for g. Therefore $\dot{(AC/N)} + \dot{g} + \dot{N} \gtrless \dot{N}$ as $E \gtrless 1$.

$P_gG/(P_gG + P_xX)$. Assuming constant costs and perfect competition, price equals average and marginal costs in each industry. Now let population increase while holding per capita income constant. Since total spending on G rises more (less) than in proportion to N as $E \gtrless 1$ and spending on X rises in proportion to N, we conclude that the share of P_gG in GDP rises (falls) when N increases as $E \gtrless 1$--assuming G is a pure public good.

The second measure of government share is simpler: $G/(G + X)$. Since $X = Nx$ and $G = g$, again the government share depends on the elasticity of demand for g. If $E \gtrless 1$ the percent rise in g is more (less) than the percentage rise in N, and thus $G/(G + X)$ rises (falls) as N increases.

Therefore both measures of government's share in GDP depend upon the price elasticity of demand for government goods. Since most empirical estimates of E are below one,[7] population increases should lower the share of G in GDP in both nominal and constant dollars.

This conclusion must be modified where government goods are congestable. Following Shoup (1976, 1984), we measure congestion by how much government costs must increase to maintain the initial level of service as population rises. Returning to Figure 1, we now assume that as population rises from N_o to N_1, in order to maintain service at g_o average cost increases from AC to AC'. Per capita cost thus rises from AC/N_1 to AC'/N_1 and consumption falls from g_1 to g'. If $E \gtrless 1$, the fall in g is more (less) than proportionate to the rise in tax price so that per capita expenditure falls (rises). Total expenditure thus rises less (more) than in proportion to population for $E \gtrless 1$.

In terms of the nominal measure for government share, the introduction of congestion (for $E < 1$) therefore increases the ratio compared to the pure public goods case. Note, however,

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[7]See, for example, Borcherding and Deacon (1972) and McMillan, Wilson and Arthur (1981).

that as long as $\alpha < 1$ and $E < 1$ it remains below the initial government share, so increases in N are associated with a falling government share.[8,9]

It is clear then that publicness coupled with inelastic demand for government goods does reduce the share of government in GDP as population rises. However, if publicness does not exist, this theory is interesting but unimportant in practice. The few studies that have been done have found α to be close to unity (see e.g., Borcherding, Bush and Spann (1977) and the review in Watson (forthcoming, Ch. 6)). However, a recent study by McMillan, Wilson and Arthur (1981) questions these results. Separating data on seventy-eight Ontario municipalities into small (below 10,000 population) and large (above 10,000) units and calculating α values for different categories of municipal expenditures, they find α values close to one for large municipalities but significantly below one for small units. Their explanation for this discrepancy is that service facilities are replicated at optimal ($\alpha = 1$) size in the large municipalities whereas small

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[8]If $\alpha = 1$, then AC must rise to AC" where $AC/N_o = AC"/N_1$ in order to maintain service at g_o. That is, each household consumes g_o and total consumption is $N_1 g_o$. Regardless of the price elasticity, population increases now affect G and X equally so the government share is unchanged. As long as $\alpha < 1$, $AC/N_o > AC"/N_1$ and $g" > g_o$ so that elasticity of demand affects the share.

[9]The mathematical proof is in Borcherding, Bush and Spann (1977, 227, fn. 17) where (using our symbols and assuming $d\alpha/dN = 0$) public expenditure rises faster (more slowly) than population as $(\alpha - 1)(1 - E) \gtrless 0$. If either $\alpha = 1$ or $E = 1$ then public expenditure rises as fast as N so government's share in GDP is constant. If $\alpha < 1$ and $E < 1$, government's share falls as N rises, and the smaller is α the lower is the government share. If $\alpha < 1$ and $E > 1$, however, the government share rises, and the smaller is α the larger the rise. (Note that for $\alpha = 0$ the condition reduces to $E \gtrless 1$ as shown earlier.) This proof also applies to the constant dollar measure of government share which is now $N^{\alpha}g/(Nx + N^{\alpha}g)$.

units tend to have only one service facility with unexploited jointness. Aggregating data over many service facilities hides this jointness and produces empirical estimates of $\alpha = 1$. Estimates of α at the individual service delivery level, however, show substantial publicness. If the McMillan, Wilson and Arthur thesis is correct, then jointness does exist and is simply hidden by aggregation.

In summary, jointness coupled with inelastic demand tends to reduce government's share in GDP as population grows. Since empirical evidence of jointness does exist, the theory of government expenditure growth needs to incorporate it. However, note that publicness does not explain the discrepancy between a rising nominal and falling constant dollar government share since it predicts falling shares for both measures. To explain this discrepancy we must turn to international trade theory.

IV. INTERNATIONAL TRADE THEORY AND THE GROWTH OF GOVERNMENT SHARE

The narrow focus of the government share literature is clearly demonstrated by its almost total disregard of international trade theory. This is surprising because the theory of economic growth and international trade is a well-developed body of work with straightforward applications to government spending growth.[10]

For example, the Heckscher-Ohlin theorem predicts that each country has a comparative advantage and tends to export commodities that make intensive use of its abundant factors, while having a comparative disadvantage and importing commodities that intensively use its scarce factors. That is, if G is labor intensive and X is capital intensive, labor-abundant countries tend to export G and import X, while labor-scarce countries tend

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[10]The theories outlined below can be found in any good undergraduate textbook in international trade, for example, Salvatore (1983).

to import G and export X. Free trade in G and X then equalizes commodity prices, and also factor prices, between countries.[11]

Now assume the capital stock in one country grows. The Rybczynski theorem predicts that, at unchanged P_x/P_g, the volume of X expands while G falls. This is illustrated in Figure 2 where initially production takes place at point A. Since X is capital-intensive relative to G, a rise in the capital stock shifts the transformation curve outward and towards the X axis. If $P_x/P_g = p$ does not change (and it will not if this country is a Small Open Economy), output of G must fall in order to ensure full employment of labor and capital. International trade theory thus provides us with another explanation for the decline in government's share of GDP: if the factor used intensively in X grows faster than the factor intensive in G, then at unchanged commodity prices, $G/(G + X)$ falls as does $P_gG/(P_xX + P_gG)$.

If commodity prices can change, assuming X and G are normal goods, we expect increased production of both goods. In this case, the economy moves from point A to C as P_x/P_g falls to p'. This tends to raise the government share but, normally, the share is still lower than initially (the ray through OA is steeper than the ray OC).[12]

The Rybczynski theorem is also useful as an interpretation of Baumol's technological lag. Assume technological change occurs only, or more rapidly, in the X industry. Then the transformation curve shifts as in Figure 2. At unchanged P_x/P_g, G

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[11]This analysis must be modified to the extent that government goods are nontradable, tastes differ or trade barriers exist, but the basic idea still applies.

[12]If G is labor intensive, an increase in labor raises G and lowers X at unchanged P_x/P_g. This effect therefore works in opposition to jointness over users. Suppose, however, population is unchanged while the proportion in the labor force rises (entrance of the baby-boomers in the 1970s) then the Rybczynski effect dominates.

must decline as the economy moves from point A to B (or alternatively, for G/X to remain unchanged, P_x/P_G must fall). We can relate this to Shoup's discussion (1984) about Beck and Baumol. At unchanged P_x/P_g, Baumol's technology lag in G implies G/X falls. As a result, the share of G in GDP declines, and the fall is the same measured in nomimal or real terms. However, if G/X is unchanged and only P_x/P_g falls, in constant dollars G's share is unchanged while in current dollars it rises.[13] If, as we expect from the Rybczynski theorem, the fall in P_x/P_g partly offsets the rise in X/G, the nominal share falls but more slowly than the constant dollar measure. Thus Beck's and Watson's empirical findings are consistent with Baumol's technological lag hypothesis.[14]

Another reason why international trade theory needs to be incorporated into the government share literature is that trade destroys the equality between production and consumption. In

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[13] In nominal terms we have $P_gG/(P_gG + P_xX)$ which reduces to $1/(1 + (P_x/P_g)(X/G))$. In real terms we have $G/(G + X)$ which reduces to $1/(1 + X/G)$. If prices are constant so that X/G rises, the two measures yield the same falling share. However, if X/G is constant and P_x/P_G falls, the nominal share of G in GDP rises while the constant dollar share is unchanged.

[14] In fact, Beck's deflating method implicitly assumes a technological lag in G. He deflates P_gG by an index of government expenditure (which is basically an input cost deflator) and GDP by an output price deflator. Assuming labor is the only factor in both industries, then marginal cost is the wage rate divided by the marginal productivity of labor (W/MPL). Since P = MC, prices rise at the rate $\dot{w} - \dot{MPL}$. Deflating the numerator, P_gG, by a wage index implicitly assumes $\dot{P}_g = \dot{w}$ or $\dot{MPL} = 0$ in the government sector. On the other hand, deflating the denominator, GDP, by an output price index does allow for productivity gains. Beck's deflating method thus implicitly assumes a technology lag in the G sector. To the extent that the G deflator underestimates MPL, the constant dollar G/GDP ratio is downward-biased.

Figure 2, before-growth consumption is at point D while production is at A, i.e., G is imported and X is exported. The share of G in total consumption is higher than its share in production (i.e., the ray OD is steeper than the ray OA). In terms of real resource use, the share of G in total production matters; in terms of national welfare, the share of G in total consumption is important.

Factor growth can affect these two measures differently. For example, growth in capital causes the production ratio OA to rotate downwards to OB while the consumption ratio OD (= OE) is unaffected, assuming homothetic tastes. It is quite possible for G/X to fall in production terms and rise in consumption terms, or vice versa. This is important because the National Income Accounts measure G as expenditures on local goods plus imports. (The accounts show C + I + G + X - M where imports (M) are netted out from consumption (C), investment (I) and government spending.) That is, our measures of G are consumption, not production, measures, and where imports exist these measures both differ and are affected differently by exogenous events. If the purpose of calculating trends in government share is to assess real resource use it is the production measure we want.

In summary, international trade theory has many useful insights to offer about the growth of government share. Some ideas are outlined here, but more work must be done to incorporate these insights into government expenditure theory.

V. FINAL REFLECTIONS

In this paper we outlined a proposed synthesis of the many different theories about growth in government share into one general framework analyzing the demand and supply of government goods. In addition, we broadened this synthesis to include jointness and some international trade theory. What implications does this framework have for future empirical work in this area? We make the following suggestions: (1) Government expenditures on goods and services and on transfers should be analyzed

separately. (2) The inflation component, but not relative price changes, should be removed from the share measure. An improved price deflator that incorporates productivity growth in G needs to be developed. (3) If output measures are desired, imports should be subtracted from the National Accounts figures. (4) The analyses should be time series rather than cross-country and include both demand and supply factors in order to properly test the theories. (5) Disaggregated studies are preferable to aggregated ones since demand and supply factors, market structure and the nature of the product are all product-specific variables. It would be useful to disaggregate by function, degree of publicness, level of government, market structure, factor intensity, degree of international trade, etc.

In conclusion, we support Shoup (1984) in his call for more detailed, product by product, empirical work in this area. Aggregation may be hiding more than jointness...it may be hiding a coherent, integrated theory of the growth of government share.

Figure 1

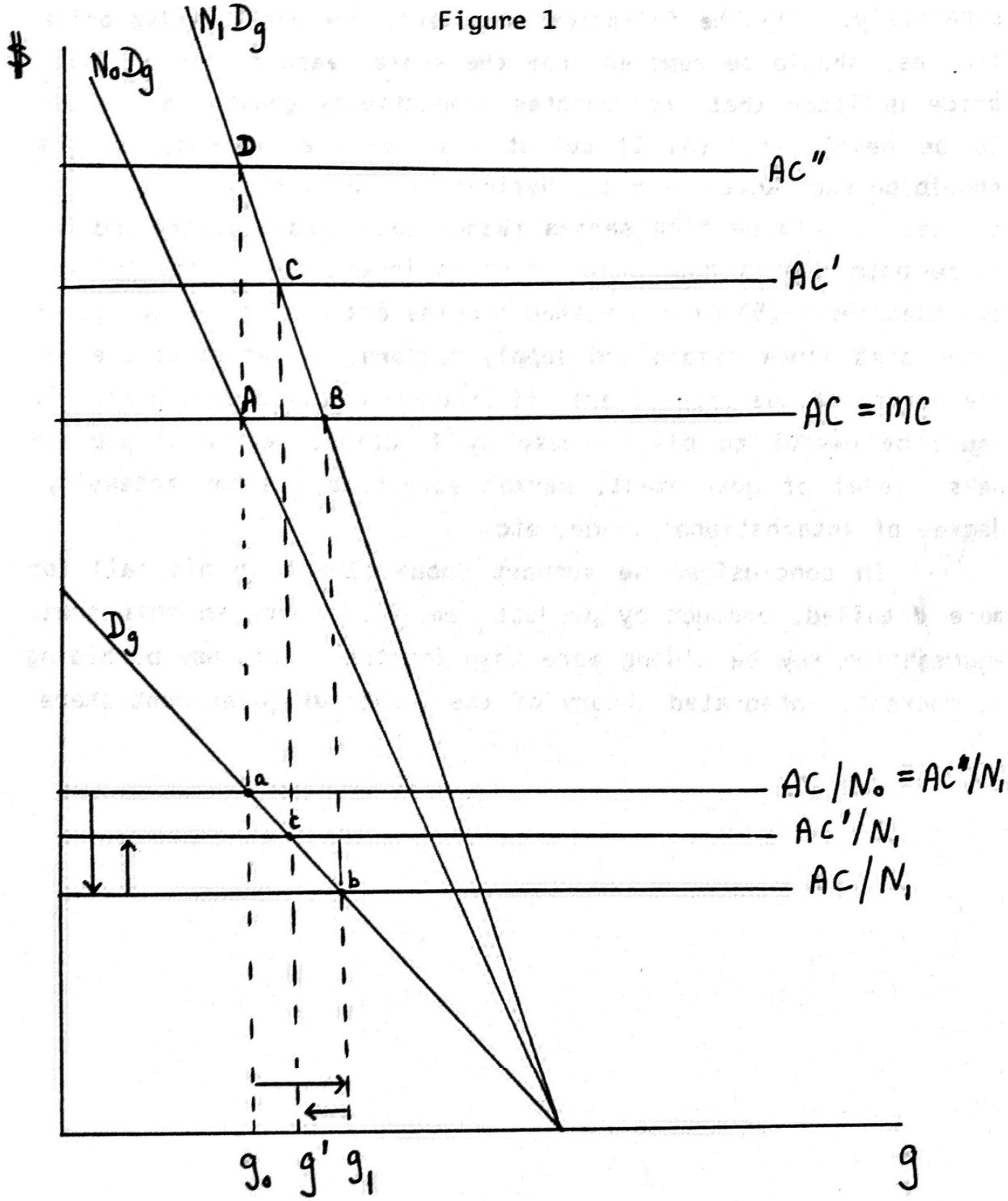
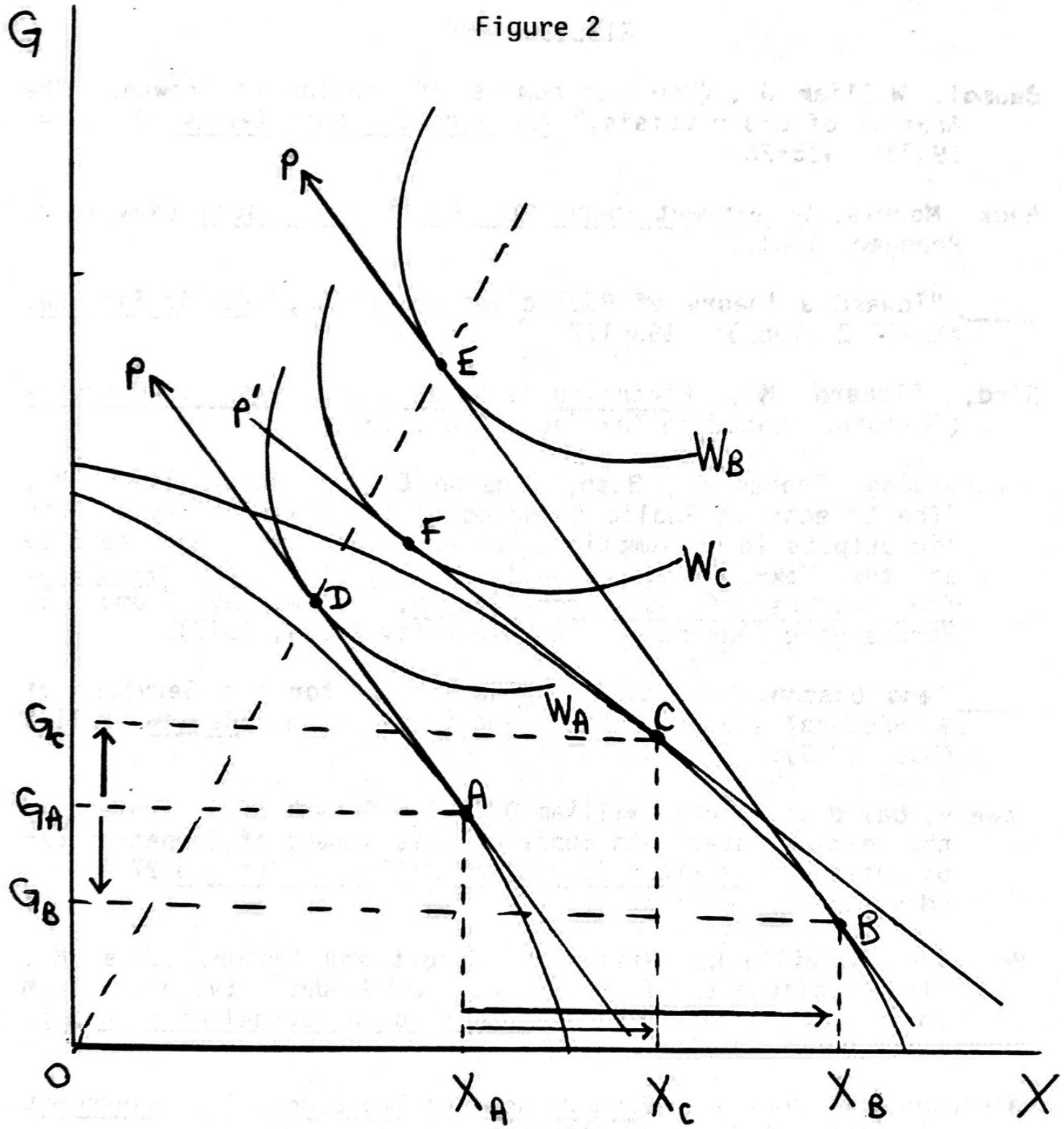


Figure 2



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