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DISTRIBUTION, INFLATION, AND
PUBLIC INDUSTRIAL ENTERPRISES

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Direct involvement of the state in the industrialisation efforts of less-developed countries (LDC) via public enterprises gained momentum during the Great Depression, and became ubiquitous with the spread of independence movements in the post-Second World War period. In many countries, state industrial enterprises played a major role in the creation and expansion of not only public sector specialties such as natural monopolies and infrastructure, but also the manufacturing industry. The classical justification for such activities has been the inability or unwillingness of the fledgling private sector to undertake certain projects due to size, riskiness, long-gestation periods, or relatively small financial markets. 'Mixed economies' emerged as state-sponsored enterprises were created to fill this vacuum and to play a vital role in the achievement of a number of other goals, including employment generation, regional development, and ensuring social justice.

Free-market economists have always been skeptical of the effectiveness of this strategy. The profession's rising conservatism and misgivings of the interventionist state during the 1970s also influenced development economics. As more and more economists and policy-makers joined in the celebration of the efficacy of the 'market solution', the skepticism against the public sector turned into outright animosity.¹ 'Market failure' was purged from the discourse and replaced by 'government failure'. Gradually, the state came to be seen as *the* problem, and not the (or a part of the) solution. The current wisdom dictates that public enterprises are obstacles to successful macroeconomic adjustment, and the culprit of a plethora of ills ranging from technical inefficiency, budget deficits, inflation, unfair competition with the private sector and crowding out of private investment, to political patronage and corruption. In the last decade, recommendations of the World Bank and the IMF to their client countries invariably included reforming, liquidation or privatisation of these enterprises.

There exists a substantial micro-level analytical literature on public enterprises, focusing on optimum pricing. The discussion of the macroeconomic effects of the public enterprises is also voluminous but generally descriptive, firm-based and anecdotal.² On the

¹ The following words on the case of Sub-Saharan Africa is representative of the sentiments, if not subtlety, of the critics of the public sector: 'Overall, African public enterprises present a depressing picture of inefficiency, losses, budgetary burdens, poor products and services, and minimal accomplishment of non-commercial objectives ... Many public enterprise "white elephants" litter the African landscape' [Nellis, 1986: 42-3].

² As pointed out by Kirkpatrick [1986] and Millward [1988] in their surveys, not even the inefficiency of the public sector relative to the private, considered to be 'self-evident' by many, is based on solid statistical evidence. The primary reason for this turns out to be that public and private enterprises seldom coexist in the same industry and therefore are not comparable. As I shall argue, this pattern has critical macroeconomic

analytical side, the macro model implicit in most of these studies is of the standard monetarist type: public enterprises run deficits, due to inefficiency and/or political meddling; these deficits are financed by credit extension from the Central Bank; given exogenously determined output level, monetisation of deficits creates inflation [Gray, 1984].

My purpose in this paper is to explore the macroeconomic implications of the public enterprises by taking into consideration two features of public enterprises that are overlooked or ignored by standard monetarist analyses. First, there is a sectoral demarcation between the private and the public sectors in most of the mixed economies: the public sector primarily produces intermediate goods required by the private sector. Thus, the relationship between the public and the private sectors is one of complementarity, not competition. Secondly, the prices of public sector goods are usually determined administratively by the government or its agencies. Together, these observations imply that the state can subsidise or exploit the private sector via pricing of public sector products.

In this paper, these attributes are taken into consideration in analyzing implications of the coexistence of the private and the public sectors, and the impact of public sector pricing on capacity utilisation, profit rate, inflation rate and distribution of income between profits and wages. The analytical framework also stands in sharp contrast to that utilised by the monetarists: first, the crux of all monetarist studies, the assumption of supply-determined full-employment, is dropped³; secondly, the analysis goes beyond the budget deficit–inflation axis and emphasises the macroeconomic effects of distributional shifts associated with the state intervention into the economy via public enterprises. I construct a simple Kaleckian model, where the players are the capitalists, workers and the state, to explore the following questions: how does the public sector affect the level of aggregate economic activity, and who benefits and who loses from the operations of the public sector? Ancillary to these are the issues of usefulness of the public sector as a stabilisation tool, and the implications of rampant disguised unemployment in public enterprises. I demonstrate that answers to these questions depend critically on the pricing of the public sector products, or more specifically, whether the mark- ups on public sector goods are positive or negative.

implications.

³ I do not dwell on the relative merits of these alternatives, specifically the debates on exogeneity of real output. It has been well-studied to require separate treatment here.

In section I some salient features of public enterprises are discussed. This section provides a backdrop to the analytical discussions of the following sections by providing some cross-country evidence on the macroeconomic significance of public enterprises, their sectoral distribution, and the practice of administrative pricing of the PIE products. Section II presents a macroeconomic model featuring the public and private sectors producing intermediate good and final goods, respectively. Commodity markets, financial market, inflationary dynamics and income distribution are discussed sequentially. The short-run comparative static responses of the model are analyzed in section III.⁴

I. THE NATURE OF PUBLIC INDUSTRIAL ENTERPRISES

The defining characteristics of public enterprises are the following: (i) they are owned/controlled by the state; (ii) they produce goods or services that are sold in the market. The focus here is on public industrial enterprises (PIE), and financial enterprises (public commercial and investment banks, insurance companies) are ignored. Disparate definitions of the public sector, inconsistent and inadequate statistical information usually plague the efforts to make cross-country comparisons of PIEs. Fortunately, meticulous comparative data are compiled by Short [1984] for more than 90 countries. His data indicate that PIEs operate in all kinds of economic activity and constitute a significant proportion of output and investment in industrial and developing countries alike. Based on a sample of 59 developing countries, Short reports that, on the average, public sector output accounted for 9 percent of gross domestic product over, roughly, the 1960–1980 period. There is wide variation among the countries, however, ranging from one percent in Nepal and Philippines to 25 percent in Tunisia and 37 percent in Zambia. Public sector investment, on the average, constituted 27 percent of the total investment. On the basis of a smaller sample, the World Bank [1985] also provides data that support Short's figures: PIE output constituted 42 percent of the industrial output, 13 percent of GDP and 32 percent of investment in eight developing countries in 1982. Again the share of PIE output in GDP was highly variable among the countries, reaching as high as 30 percent in Zambia

⁴ Certain macroeconomic aspects of the public enterprises are not covered in this paper. First, public investment typically constitutes fifty percent of capital formation in the LDCs. Second, public sector may benefit the private sector via other channels besides price subsidisation, such as uninterrupted flow of inputs at stable prices and, thus, reduced uncertainty in the input markets. Third, the state sector may have other objectives, such as regional development and employment creation. Fourth, since the 1970s, public enterprises have borrowed heavily in the international markets, and became major players in the international debt crisis. All these have macroeconomic repercussions and are likely to have significant effects on the private sector behavior. Yet, they all lie outside the scope of this paper and are going to be ignored.

and as low as 3 percent in Ghana. In most countries, however, the figure hovered around 10 percent. World Bank data also provide employment figures that are impressive. On average 36 percent of industrial labor force was employed by public industrial enterprises in eight countries, ranging from 13 percent in Israel to 85 percent in Zambia.

Large size, high capital-intensity and capital-output ratios, and strong forward linkages are characteristic features of PIEs [Choksi, 1979; Jones and Mason, 1982], and are indicative of their sectoral orientation. Cross-country data presented by Short [1984] and Ayub and Hegstad [1986] confirm that PIEs are disproportionately involved in the production of inputs or intermediate goods. Traditionally, public utilities (water, gas, electricity) are owned almost exclusively by the PIEs. The public sector also dominates telecommunications and non-road transportation; telecommunication is almost all public-owned in the countries in the Ayub and Hegstad [1986] sample. Natural resource industries (natural gas, petroleum, coal and other minerals) rank next, although in these sectors the inter-country variations are more significant. More than 75 percent of mining is under the control of PIEs in India, Brazil, Ghana, Senegal, Tanzania and Bolivia, for instance. For many others this figure is above 25 percent. Compared to these industries, public enterprises are less prevalent in the manufacturing industry, but are critical nevertheless. On average 25 percent of manufacturing output is produced by the public sector in LDCs [Short, 1984: 125] and the share of the public sector in manufacturing industry has increased over the last decades. More significantly, the public sector is most prominent in heavy industries (iron, steel, refining, and petrochemicals) followed by motor equipment and cement. PIEs also exist in other manufacturing industries, such as textiles, and in construction, trade services and agriculture, but at a much lower level.

Systematic cross-country data on the pricing practices of the PIEs do not exist, but country specific studies provide evidence for widespread administered pricing. Since PIEs operate in monopolistic or oligopolistic markets they have significant control over the pricing of their products. These prices are determined by various agencies of government, such as the relevant ministries or price control boards, by a cost-plus method which often does not yield a positive rate of return [Choksi, 1979; World Bank, 1979: 64; Ayub and Hegstad, 1986: 12, 25, 35; Floyd, 1984: 17; Nellis, 1986: 21]. Mehdi [1987: 77, 80] reports that more than 65 percent of the products of the public sector in Pakistan are strictly controlled by the government and, furthermore, that these prices do not cover the full cost

of production. In Mexico the state, as a policy, kept the PIE product prices down in a wide range of intermediate goods, including steel, petrochemicals and fertilizers, to benefit the companies using PIE output [Treat, 1981; Philip, 1984: 36]. Saulniers [1988: 146-7] reports that the Peruvian government manipulated income distribution for its political advantage by controlling public sector products prices. In Brazil, in contrast, the state interference into public sector pricing was far less frequent, although in certain individual prices (essentially steel) were kept relatively low [Treat, 1983].

Macroeconomic implications of these features of public enterprises have not been issues of much interest to mainstream economists. Surprisingly little has been written on the subject. The demarcation between the public and private enterprises noted above is generally interpreted as a natural outcome of the tendency of the state sector to concentrate in industries characterised by economies of scale, natural monopolies, etc. Price controls on PIE products and rampant underpricing are also considered as natural outcomes of the 'fact' that the objective of the public sector is to serve the public and not to maximise profit. These statements fall short of addressing ramifications of the complementarity of the private and the public sectors and, therefore, are not very informative. Paradigms alternative to the neoclassical development economics, however, have commented more extensively on these matters.

The political economy approach to public enterprises puts under the spotlight the interplay of social, economic and political forces that form and shape state policies towards public enterprises. On the basis of country specific class coalitions and conflicts, Ahmad [1982] draws a typology of post-colonial era public enterprises where the role of the state sector ranges from supplanting to supporting the private sector. Characteristics of PIEs discussed above fit best the first pattern identified by Ahmad, where the indigenous bourgeoisie, entrenched with independence and often coalesced with the bureaucratic-military elite, is a dominant force in the formation of state policies [Ahmad, 1982: 59]. Similarly, Fitzgerald [1977] distinguishes between two fundamental types of state intervention in Latin America: one that nurtures private sector through provisioning of raw materials and basic inputs, and, the other that undertakes all major resource allocation activities in lieu of the private sector. India, Pakistan and South Korea are Ahmad's examples to countries where the state supported private sector via PIEs. Turkey [Richards and Waterbury, 1990: 187] and Brazil [Treat, 1983: 136] are earlier examples where state interventions started

along such lines in the 1930s and early 1940s, respectively. Cardoso and Faletto [1979: Ch. 5] also discuss the simultaneous growth of private sector and rising involvement of the state in basic industries and infrastructure as an essential characteristic of import-substitution in Brazil, Chile, Mexico and Argentina, and attribute each country's somewhat distinct experience to their class structures.⁵ What is common to all these countries is that in each case the state had an active role in promoting and bolstering private industrial capital as well as in development of the domestic market by creating an industrial work force. In sum, the political economy approach examines the rise and current demise of PIEs against the backdrop of development of capitalism in the Third World.

It should also be pointed out, however, that these are mostly historical analyses and they do not venture into the specifics of identification and examination of the channels through which PIEs interact with the rest of the economy. Similarly, discussions on the pricing of the PIE products are generally carried out without reference to a macroeconomic framework. Several motives are suggested to explain the patterns observed in pricing of the public sector products. The first is to attempt to use PIE pricing as an anti-inflationary instrument. Price controls are observed to become more pronounced during inflationary periods in Brazil (1961–63 and 1976–79) [Trobat, 1983: 186] and Mexico [Phillip, 1984: 19–20]. Floyd [1984: 19–20] also comments on the widespread use of administered PIE prices but dismisses them as useless for stabilisation purposes on the grounds that these products carry insignificant weight in the price index. Alternatively, the state may target the alleviation of a fiscal crisis by maximizing public revenues via pricing. One case in point is Turkey in the 1980s, where the average rate of inflation lagged behind the rate of change of public sector price inflation [Celasun and Rodrik, 1989].

Far more frequently mentioned is the distributive motive. It is often alleged that income redistribution is the objective of the public sector pricing decisions [Floyd, 1984: 19]: price controls on utilities, transportation and consumer goods such as textiles supposedly aid low-income groups. Who the beneficiaries are, however, is subject to debate. Contrary to the populist rhetoric, many argue that pricing of PIE products is generally regressive, benefitting predominantly the private firm owners and affluent consumers at the expense of other classes [Choksi, 1979, 47, 89; Gillis, 1980: 283–4; World Bank, 1983:

⁵ However, it would be an oversimplification to say that the state acts, always and everywhere, as a handmaiden of the private sector. Richards and Waterbury [1990: 215] provide examples from the Middle East where the state oscillated between bolstering and displacing private sector.

76; Jones, 1985; Saulniers, 1988: 147]. At a more aggregate level, class-based analyses imply that PIE pricing is a policy tool in strengthening the capitalist class [Ahmad, 1982: 61]. Although instructive, these deliberations on who benefits or loses from the operation of PIEs and price controls on PIE products are incomplete due to the lack of a macroeconomic framework. Without the latter, there is no way to ascertain the interactions between redistribution and economic aggregates and therefore the analysis remains partial and potentially misleading.

The economic model presented in the following sections is informed by these discussions of the role of the state in the Third World countries and the distributional issues associated with the public sector. It formalises the insights of these discussions and, in doing so, contributes to these debates by raising certain macroeconomic considerations neglected hitherto.

II. THE MODEL

II.a. Commodities Market

The analysis is based on a two-sector model where the private sector produces the final good, either consumed or invested, using labor (L), intermediate good (N) and capital (K). The intermediate good is produced by the public enterprises using labor as the only input. The public sector output level is assumed to be determined by private sector demand for intermediate goods which, in turn, is determined by demand for final goods or capacity constraints. Production in either sector is characterised by fixed-coefficients technology. I also assume that capital stock is fixed in the short-run and that the economy is closed.

Private firms operate in an oligopolistic environment. The final good price is determined, along Kaleckian lines, by a mark-up over the prime costs of production:

$$P = (1 + \tau)(W\ell + P_N n). \quad (1)$$

P and P_N are the prices of final and intermediate goods, W is the nominal wage rate, assumed to be equal across the public and private sectors, and ℓ and n are the reciprocals of average productivities of labor and intermediate good, respectively. τ is the private sector mark-up, assumed to be given at any point in time.

A similar formulation is adopted for the public sector pricing:

$$P_N = (1 + \kappa)W\ell_N, \quad (2)$$

where ℓ_N is the reciprocal of labor productivity in the public sector, and κ is the public sector mark-up. The term 'mark-up' is used in a much looser fashion in this context. In contrast to the private sector, the public sector mark-up may be zero or even negative.

Let L and L_N stand for total employment levels in the private and public sectors, respectively, and define $\phi \equiv L/L_N$. Assuming that input productivities are constant, ϕ is fixed.⁶ Putting together equations (1) and (2):

$$P = (1 + \tau)(1 + \kappa + \phi)W\ell_N n \quad (3)$$

On the demand side, total final product is divided between consumption expenditures of workers and capitalists (C), investment expenditures of the private sector (I), and state expenditures on final goods and services (G). I posit the simple consumption function, following Kalecki and Kaldor, whereby workers' marginal propensity to consume is unitary and the capitalists' is given by c_K . Assuming that taxes are levied only on profit income at the rate of t_K , aggregate nominal savings is found as:

$$PS = (1 - c_K)(1 - t_K)\rho PK, \quad 0 < c_K, t_K < 1.$$

It will be convenient to express all variables in per unit of capital terms. Dividing both sides of the savings equation by PK :

$$\frac{S}{K} \equiv s = (1 - c_K)(1 - t_K)\rho. \quad (4)$$

Before proceeding any further, it should be noted that the mark-up rule and the definition of the rate of profit implies a positive linear relationship between the rate of profit and capacity utilisation (u). Defining the latter as the ratio of final output to the capital stock, this relationship can be expressed as:

$$\rho = \frac{\tau}{1 + \tau} u, \quad (5)$$

⁶ In other words, disguised unemployment, a prominent feature of the public sector, is for the moment ignored. I will later consider the macroeconomic implications of disguised unemployment in the public sector.

which implies that the above analysis can be carried out in terms of capacity utilisation instead of the rate of profit as a measure of the level economic activity (for a given private sector mark-up).

Investment expenditures, as a proportion of the private sector capital stock, are assumed to be a linear function of the profit–real interest rate differential and ‘animal spirits’:

$$\frac{I}{K} \equiv i = i_0 + i_1[\rho - (r - \hat{P})], \quad i_1 > 0 \quad (6)$$

where r is the nominal interest rate, \hat{P} is the rate of inflation, and i_0 is the autonomous investment, capturing the animal spirits.⁷ Total state outlays have two components. The first, denoted by G_0 , is autonomous state spending (public works, military, health, education, etc.) and it is assumed to be fixed in real terms. The second component, the cost of production of the intermediate goods (i.e. public sector wage bill), is dependent on the level of economic activity. Total state expenditures, again per unit of capital, is then given by:

$$\frac{G}{K} \equiv g = g_0 + \frac{1}{\tau(1 + \phi + \kappa)}\rho, \quad (7)$$

where $g_0 \equiv G_0/K$. Total state revenues (T), on the other hand, is the sum of taxes and payments received from the private sector for the intermediate good. In per unit of capital terms:

$$\frac{T}{K} \equiv t = \left(t_K + \frac{1 + \kappa}{\tau(1 + \phi + \kappa)} \right) \rho. \quad (8)$$

Together these yield the budget deficit:

$$g - t = g_0 - \Psi\rho, \quad (9)$$

where

$$\Psi = \frac{\kappa}{\tau(1 + \phi + \kappa)} + t_K.$$

⁷ Note that equation (6) embodies the assumption of perfect foresight as the actual rate of inflation is used in the measurement of real interest rate. The case for this choice is based on simplicity. The gist of the analysis does not change significantly if a partial adjustment mechanism, such as adaptive expectations, is used instead.

The deficit is assumed to be monetised fully. Let H stand for the high-powered money and V be the money-capital ratio ($V \equiv H/PK$) assumed to be given in the short-run. This ratio is an indicator of the degree of financial intermediation: a lower V implies a more developed financial market and a higher level of financial intermediation. The government budget constraint is:

$$g - t = \hat{H}V. \quad (10)$$

where 'hat' denotes percentage rate of change of the relevant variable ($\hat{x} \equiv \frac{dx/dt}{x}$). Note that the sign of Ψ in equation (9) is ambiguous. For very high levels of subsidy (sufficiently negative κ) the parameter Ψ will be negative: given g_0 , a balanced budget is feasible for positive rates of profit only if $\kappa \geq -\frac{t\kappa\tau(1+\phi)}{1+t\kappa\tau}$. When this condition is satisfied an increase in the profit rate (capacity utilisation) raises tax revenue and closes budget deficit. Put differently, unless Ψ is positive, rising profit rate and expanding output imply constantly rising budget deficits and monetary expansion. Thus, the positive value of Ψ is required for stability. Also note that the assumption of constant velocity implies that $\hat{V} = \hat{H} - \hat{P} - i = 0$ or, using equation (10), $(g - t)/V = \hat{P} + i$: at the steady state, the public deficit and the associated creation of high-powered money should be sufficient to accommodate inflation and capital accumulation.

The next step is to put these pieces together to analyze the commodity market equilibrium. The strategy is to reduce these elements to the investment-savings identity. At equilibrium, the sum of investment and budget deficits is equal to private savings:

$$i + (g - t) = s.$$

Substituting from equations (4), (6) and (9):

$$i_0 + g_0 - \Theta\rho - i_1(r - \hat{P}) = 0 \quad (11)$$

where

$$\Theta = (1 - c_K)(1 - t_K) - i_1 + \Psi > 0$$

Following the standard stability analysis I assume that savings response to a change in the profit rate exceeds that of the investment *cum* budget deficit. Equation (11) is the *IS* function — combinations of rates of profit, nominal interest, and inflation that keep the

commodity market in equilibrium. As it is drawn in Figure 1 on the (r, ρ) plane for a given inflation rate. Given the assumed values of the parameters, the IS line is positively sloped ($\frac{dr}{d\rho}|_{IS} = -\frac{\Theta}{i_1} < 0$).

In the present context four parameters are important: t_K, κ, τ , and ϕ . Inspection of the term Θ reveals that the larger is the value of κ , the larger is the increase in private and net public savings in response to an increase in the level of economic activity. Thus, public productive activities can function as an automatic stabiliser. The public sector mark-up affects the slope of the IS curve: an increase of this parameter causes the IS to rotate clockwise indicating the contractionary impact of declining real wage. The private sector mark-up also affects the slope of the IS line but the direction depends on the sign of κ . Suppose that $\Delta\tau > 0$: the IS line rotates counterclockwise if $\kappa > 0$, clockwise if $\kappa < 0$, and stays put if the state sector mark-up is zero. Finally, a larger value of ϕ by definition indicates a relatively 'smaller' public sector. The IS line would be steeper or flatter with a larger value of ϕ , depending on the sign of κ : a positive κ , for instance, implies that IS is flatter with a higher ϕ . Exposition of the economics of these partial derivatives requires examination of the mechanics of income distribution.

II.b. Distributive Shares

Distributional shifts are central to this account as in any Kaleckian model. In order to facilitate the analysis, the determinants of income shares are considered in this section. Total income is divided between the public and private sector workers who earn wages, capitalists, who receive after-tax profits, and the state, to which taxes and net earnings from the sale of intermediate good accrue. Income shares of the claimants are:

$$\lambda_W = \frac{1 + \phi}{(1 + \tau)(1 + \phi + \kappa)}, \quad \lambda_K = \frac{\tau(1 - t_K)}{1 + \tau}, \quad \lambda_G = \frac{t_K\tau}{1 + \tau} + \frac{\kappa}{(1 + \tau)(1 + \phi + \kappa)}.$$

λ_W, λ_K and λ_G are the shares of the workers, capitalists and the state, respectively. These expressions indicate that income shares are affected by four variables, t_K, τ, κ and ϕ as follows:

- i. The tax rate affects only the capitalist and state shares, and leaves the wage share intact. An increase in the tax rate raises the share of the state at the expense of the capitalist class.

- ii. An increase the private sector mark-up lowers wage income and raises profits. The effect on share of the state is indeterminate, however. The share of the state would rise if the marginal increase in tax revenues exceeds the revenue loss arising from the lower level of public sector good sales.⁸
- iii. A change in public sector mark-up redistributes income between labor and the state because, given nominal wage, a higher public sector mark-up implies a lower real wage. The profit share is unaffected.
- iv. A change in the relative size of the public sector, ϕ , also has no effect on the capital share but redistributes income between labor and the state. The direction of the redistribution depends on the sign of κ . If $\kappa > 0$, a larger public sector (a smaller ϕ) means a larger labor and a smaller state share.

The relationships amongst these variables are illustrated, in part, in figure 2. The wage share is measured on the vertical axis and the public sector mark-up is measured on the horizontal. The λ_W axis intercept ($1/(1+\tau)$) is the wage share corresponding to zero public sector mark-up; a higher private sector mark-up causes it to move down, indicating a lower wage share and a higher profit share at all κ . The impact of ϕ on λ_W and λ_G depends on the sign of κ . A positive κ implies a positive relation between ϕ and λ_W . Lines 11 and 22 are drawn for two values of ϕ_1 and ϕ_2 , ($\phi_1 < \phi_2$). As ϕ increases, public sector becomes relatively less significant, the line rotates clockwise with this intercept as the pivot; labor is worse off if the public sector mark-up is positive and better off if negative.

II.c. Financial Markets

Total private wealth is given as the sum of the high-powered money (H) and the capital stock (PK), which follows directly from the balance sheets of the public, private and public firms, commercial banks and the central bank.⁹ It is assumed that the public holds a ratio φ of total wealth in the form of money, all in the form of demand deposits. This ratio is determined by the rates of profit, nominal interest and the expected inflation. Real money demand is:

$$L = \varphi(\rho, r, \hat{P})(H + PK)$$

⁸ This implies that if there is a subsidy in the first place ($\kappa < 0$), the share of the state definitely rises.

⁹ For detailed expositions of the financial markets from which the current description is derived, see Taylor [1983: 91-5].

As in the commodity market case perfect foresight is assumed. Money supply is equal to the product of the money multiplier (μ) and the high-powered money (H). In line with the commodity market analysis expressing all variables in per unit of capital terms, monetary equilibrium is:

$$\varphi(\rho, r, \hat{P})(1 + V) - \mu V = 0 \quad (12)$$

where $V \equiv H/PK$ is, as before, the inverse of velocity of money with respect to the capital stock. Equation (12) is the *LM* function which is the combination of rates of interest, profit and inflation that clear the money market. Total differentiation of the *LM* equation yields:

$$\mu V \left(\frac{\varphi_\rho}{\varphi} d\rho + \frac{\varphi_r}{\varphi} dr + \frac{\varphi_{\hat{P}}}{\varphi} d\hat{P} \right) - \frac{\mu}{1+V} dV - V d\mu = 0$$

where φ_i ($i = \rho, r, \hat{P}$) is the partial derivative with respect to the relevant variable. Along the traditional lines money demand varies directly with the profit rate/capacity utilisation and inversely with nominal interest rate and the rate of inflation:

$$\varphi_\rho > 0, \quad \varphi_r < 0, \quad \varphi_{\hat{P}} < 0,$$

which implies that, given the rate of inflation, *LM* line in the (r, ρ) space is positively sloped ($\left. \frac{dr}{d\rho} \right|_{LM} = -\frac{\varphi_\rho \varphi_r}{\mu \varphi_r} > 0$.) The money market equilibrium is illustrated in Figure 1 as the upward sloping line on the (r, ρ) plane. An increase in the inflation rate causes excess demand for money and shifts the *LM* schedule to the right.

For a given inflation rate, the *IS* and *LM* lines determine the rates of interest and profit. Combining these with the inflation schedule derived from the private sector pricing mechanism, all three variables are determined simultaneously. The inflationary process is explored in the next section.

II.d. Inflation

To close the model a simple inflation equation is derived from equation (3). It is assumed, for the sake of simplicity, that productivities of public and private sector labor and intermediate input are constant. Changes in the public sector mark-up and the relative size of the public sector are assumed to come at discrete intervals and at the discretion of the state. These once-and-for-all changes affect the price level but not its rate of change.

Under these assumptions, price dynamics are derived solely from the wage and private sector mark-up. From equation (3):

$$\hat{P} = \tau' + \hat{W},$$

where $\tau' \equiv \frac{d\tau/dt}{1+\tau+\kappa}$. Wage inflation is assumed to be a function of the level of economic activity, measured by the profit rate. Let ρ_W^* be the profit rate at which the wage inflation is zero. Then,

$$\hat{W} = \gamma_W(\rho - \rho_W^*) + \alpha\hat{P}, \quad \gamma_W > 0, \quad 0 < \alpha < 1.$$

The positive response of wage inflation to the rate of economic activity can be justified on the bases of the Phillips curve or bargaining models. For the purposes of this paper, the impact of the public sector on wage inflation is also an important factor. If one accepts the claim that public sector workers enjoy higher job security and negotiating power due to political reasons, and, furthermore, if there exists a demonstration effect whereby the private sector workers try to keep their relative (to public sector) wages intact, then, the parameter ρ_W^* is directly related to the size of the public sector (or alternatively, it is inversely related to ϕ). Put simply, mixed economies with relatively larger public sectors would expected to be more prone to wage inflation. The second term on the right-hand-side of wage inflation equation accounts for wage indexation which may vary between zero and 100 percent.

The mark-up dynamic is written as:

$$\tau' = \gamma_K(\rho - \rho_K^*)$$

where γ_K may be either positive or negative. The responsiveness of the rate of change of the mark-up to the level of economic activity is a contentious issue [Taylor, 1985: 390; Dutt, 1990: 65–7]. Neoclassical versions of mark-up pricing posit that the rate of change of the mark-up is a positive function of capacity utilisation. Marxian and Kaleckian analyses, on the other hand, reverse the sign, albeit on different grounds.¹⁰

In either case, it is not plausible that γ_K can be negative enough to dominate γ_L , and

¹⁰ The sign of γ_K has important implications for medium term dynamics. As will be seen in the following section, the response of ρ to a change in τ may be positive or negative depending on the sign of κ . If $\rho_\tau < 0$ the economy cannot reach a steady state unless $\gamma_K > 0$. Similarly, if $\rho_\tau > 0$, then stability requires $\gamma_K < 0$.

the rate of inflation is assumed to be positively related to the level of economic activity. Combining wage and mark-up dynamics inflation equation is obtained as:

$$\hat{P} = \frac{\Gamma}{1-\alpha}(\rho - \rho^*), \quad \Gamma > 0, \quad (13)$$

where:

$$\Gamma = \gamma_K + \gamma_W, \quad \rho^* = \frac{\gamma_K \rho_K^* + \gamma_W \rho_W^*}{\gamma_K + \gamma_W}.$$

The parameter ρ^* is the weighted average of ρ_W^* and ρ_K^* , at which the rate of inflation is zero. Inflation equation is depicted in Figure 1 as the *PP* line. Note that the increasing size of the public sector, measured by an increase in the public sector work-force, causes ρ_W and therefore ρ^* to decline and causes the *PP* line to shift upwards. Also note that the slope of the *PP* line depends *inter alia* on the level of indexation, and becomes steeper as α rises.

III. ANALYSIS

This section analyses the effects of changes in public and private sector mark-ups and the relative size of the public sector on income distribution and the rates of profit, interest, inflation, and capacity utilisation. The building blocks of the comparative statics analysis are equations (11), (12) and (13), depicted as the *IS*, *LM* and *PP* lines in Figure 1. In the (ρ, r) quadrant of the diagram the *IS* and *LM* schedules are drawn for a given inflation rate. A higher rate of inflation causes these lines to shift to the right, via the Tobin effect in the case of the *IS* and the 'running away from money' effect in the case of *LM* curve. Together, these schedules depict the combinations of the rates of profit and inflation which clear the commodity and money markets simultaneously. This locus is drawn in the (ρ, \hat{P}) quadrant as the *DD* line. Inflation equation (13) is also drawn on the same plane as the *PP* line. As discussed before, a higher degree of indexation implies a steeper *PP* line. For short-run stability the *PP* line has to be flatter than the *DD* line.¹¹ For expositional purposes, the state budget is assumed to be in balance initially, and that the rate of inflation is zero. Thus, by construction, *PP* line intersects the horizontal axis at ρ^* . Finally, the relationship between the capacity utilisation and the profit rate for given private sector

¹¹ By implication, less than full indexation of wages is a necessary (although not sufficient) condition for stability.

mark-up (equation (5)) is illustrated on the (ρ, u) plane as the CU line. CU line becomes horizontal at the level of full-capacity \bar{u} .¹²

The results of the comparative statics analysis are summarised in Table 1.

III.a. An Change in Public Sector Mark-up

What are the macro effects of a decline in the public sector mark-up (or equivalently, an increase in the rate of subsidy)? From equation (3), the price level declines and real wage increases, shifting income distribution in favor of labor, and against the state. At the given capacity utilisation and profit rates, this redistribution causes consumption demand to expand, raising the level of economic activity. Diagrammatically, the IS line rotates counterclockwise to IS' . High-powered money expands as a result of budget deficits. In combination with the lower price level, this causes the LM line to shift to the right, lowering the rate of interest and further raising capacity utilization and the profit rate. These changes are illustrated by the rightward shift of the DD line in Figure 1 diagram (c). The rate of inflation picks up with the higher profit rate and the rate of economic activity. The positive inflation rate also indicates a budget deficit at the new equilibrium.

To summarise, a change in the public mark-up leaves the capital share intact and affects only the labor share. The rates of profit, inflation and capacity utilisation all rise with a lower κ , and higher profit rate is associated with a higher real wage. A higher inflation rate is the outcome of expanding demand and its repercussions on unit costs, which, in turn, implies that it is futile to try to control inflation by keeping public sector prices in check; the outcome of such an attempt, at best, is a one-shot decrease in the price level.

III.b. An Increase in Private Sector Mark-up

Macroeconomic implications of private sector mark-up changes have attracted considerable attention, especially among the so-called 'stagnationists' who argue that redistribution of income from capital to labor induces economic growth [Taylor, 1985]. The public sector has significant implications in this context.

In the absence of public sector, an increase in τ raises the profit rate, lowers real wage and shifts income distribution away from labor to capital; declining worker consumption,

¹² In many LDCs it is also the case that supply rigidities (e.g. harvest failures, import shortages) impose limits on capacity utilisation. If the economy is operating at full-capacity then the natural extension of the model is to make u exogenous and τ endogenous; i.e. aggregate demand expansion affects only the price level via the private sector mark-up. This extension of the model is elementary. Since I avoid the agricultural sector and open-economy considerations, the full-capacity questions are not probed into.

TABLE 1: SUMMARY OF COMPARATIVE STATICS

	κ	τ			L_N		
		$\kappa = 0$	$\kappa < 0^1$	$\kappa > 0^2$	$\kappa = 0$	$\kappa < 0$	$\kappa > 0$
ρ	-	0	-	+	0	+	?
u	-	-	-	?	0	+	?
W/P	-	-	-	-	-	-	-
\hat{P}	-	0	-	+	0	+	?
λ_W	-	-	-	-	0	+	-
λ_K	0	+	+	+	0	0	0
λ_G	+	+	+	?	0	-	+

¹Stability requires $\rho_\tau > 0$.

²Stability requires $\rho_\tau < 0$.

in turn, lowers capacity utilisation, which brings the profit rate back to its initial level. A significant public sector, however, may have further ramifications, depending on the sign of κ . If $\kappa = 0$, then state revenue from the sale of public sector products is independent of the performance of the economy. As the rate of profit and the tax rate on profit income are unchanged, tax revenue and the budget deficit also remain constant, although declining capacity utilisation implies a larger income share for the state. Graphically, in Figure 3, the IS , LM and DD schedules remain fixed and the CU line rotates in the counterclockwise direction. For non-zero values of κ , however, declining capacity utilisation has further implications. Consider first the $\kappa < 0$ case. Declining capacity utilisation and lower demand for public sector products now also lower state outlays and the budget moves into a surplus. In other words, there is a redistribution of income from labor to the state, which in turn implies a further decline in aggregate demand. Graphically, in Figure 3, the IS line rotates in the clockwise direction and the LM shifts to the left, lowering the rate of profit. Declining aggregate demand also puts downward pressure on the rate of inflation as shown by the leftward shift of the DD line in diagram (c). An anti-inflationary pressure also emerges, in association with the budget surplus. The net change in the profit–real interest rate differential is indeterminate. If negative, investment demand also declines, accentuating the decline of the rate of profit and capacity utilisation. Otherwise, economic contraction may partially be offset by expanding investment demand.

What if $\kappa > 0$? In this case, a lower capacity utilisation diminishes leakages from the system. The impact on the state share or the budget is now reversed. Lower public revenues and the consequent budget deficit act as a buffer against the declining aggregate demand. In contrast to the previous case the IS rotates counterclockwise and LM shifts

to the right, raising the profit rate. The DD line shifts to the right, raising the rate of inflation. Although the net effect on the nominal rate of interest is uncertain, higher profit and inflation rates make it likely that investment demand expands. The net impact on capacity utilisation is ambiguous. If the capitalist consumption and investment demands are significant enough, capacity utilisation may indeed rise. How do these results compare with those of the stagnationists? Dutt [1984] and Taylor [1985], following Steindl, write investment as a function of capacity utilisation as well as the rate of profit. Thus, an increase in the private sector mark-up lowers investment demand as well as worker consumption, and the result is definitely stagnationist. The public sector strengthens the negative impact of the accelerator on investment, provided that the private sector is being subsidised via underpricing of public goods. If the public sector mark-up is positive, however, the stagnationist outcome may not follow. In this case, the budget deficit and higher inflation operate in the opposite direction to offset the stagnationist output decline.

III.c. The Size of the Public Sector (Or Declining Average Productivity)

The parameter ϕ is defined as the ratio of private to public sector employment and can be interpreted as an indicator of the size of the public sector: the larger it is, the smaller is the relative size of the public sector. The value of ϕ influences the magnitudes of changes in the profit rate, inflation rate and capacity utilisation discussed in the previous sections: the larger is the public sector, the larger are the shifts of the IS , LM and DD lines in response to changes in κ and τ . The macroeconomic impact of the changing size of ϕ is itself of some interest. One of the most common criticisms of the PIEs is the prevalence of disguised unemployment [Gillis, 1980: 272]. Social goals or political considerations allegedly lead to the hiring of workers with zero or negligible marginal productivity. Resulting inefficiencies have been a constant source of complaint for the international agencies. What are the implications of such political patronage for the model? Suppose that public sector employment rises without a corresponding increase in output (algebraically, ϕ declines). Price level increases and real wage declines. Provided that the private mark-up and tax rate are constant, the profit share remains unchanged. Again the redistribution is between the state and labor, and the share of labor may rise or fall depending on the sign of κ . If $\kappa < 0$, expansion of the public sector raises the budget deficit, implying an increase in the share of labor at the expense of the state. As consumption demand rises, capacity utilisation, the rate of profit, investment and aggregate demand

also rise. Graphically, the IS and LM curves both shift to the right. In addition, since ρ^* is inversely related to ϕ , a larger public sector creates an inflationary bias, shifts the PP line upwards and further expands the economy. If $\kappa > 0$, on the other hand, rising disguised unemployment in the public sector lowers real wage and the wage share, and the level of economic activity declines. In this case, however, inflationary impact of rising public sector employment via investment may work in the opposite direction offsetting the contractionary forces, and introduce ambiguity to the analysis.

III.d. Implications of Alternative Hypotheses about Public Sector Behavior

One caveat is in order. According to the model presented above, aggregate demand determines the volume of final good production, which, in turn, determines not only the quantity of the intermediate good but also public sector employment. Thus, it is assumed that PIEs layoff or hire workers readily as the economy contracts or expands. This assumption of ‘synchrony’ is highly disputable. Costs of changing employment levels by firms have attracted significant attention in macroeconomics and certain points raised in this literature may be applicable to the PIEs as well. More pertinent, however, is that worker layoffs in the public sector is by no means an ordinary task given the plurality of objectives of public enterprises and political risks.

Two alternative assumptions can be made regarding the employment/production behavior of the public sector. I label the first one the ‘ratchet’ hypothesis: during periods of expansion, the public sector hires new workers and raises production; when demand is slack, production is cut down but the redundant workers cannot be laid off due to political pressures or multiple public sector objectives. Consequently, the public sector employment can only move in the upward direction and disguised unemployment is symptomatic of recession periods. The second hypothesis is that the public sector does not vary the level of production and employment with the level of economic activity, but instead produces an ‘average’ amount, accumulating inventories during recessions and decumulating otherwise. According to this ‘production smoothing’ hypothesis, accumulation of inventories has adverse impact on the public sector budget and requires additional financing from the Central Bank, whereas decumulation implies, by the same token, a reduction in the monetary base.

Exploration of the micro foundations of these alternatives, wherein the focus is the firm’s objectives and the economic, social and political environment it operates in, is a

worthwhile project but does not concern us here. Lacking information on employment patterns of the PIEs, it is also not possible to discriminate between the three hypotheses on empirical grounds. Based on observation and conjecture, this paper merely points out the diversity of possible outcomes. The case for the adoption of the synchrony hypothesis in the previous sections is based on expositional convenience: given this analytical structure, it is relatively easy to demonstrate the implications of the alternative hypotheses.

The most significant implication of the ratchet hypothesis is the asymmetry it introduces into the analysis. Conclusions derived above remain intact under this assumption for changes in private or public sector mark-ups that lead to the expansion of economic activity. Shocks that lower level of economic activity (e.g. $\Delta\kappa < 0$, or $\Delta\tau > 0$ with $\kappa < 0$), however, have now ambiguous results since with the ratchet effect, the public sector nominal wage bill remains unchanged and the budget may or may not move into a surplus. Thus, the *LM* curve may now shift in either direction, and it is possible for the decline in the level of economic activity to be offset partially with an expansion of the monetary base.

The production smoothing hypothesis, on the other hand, implies a more 'stable' economy. An increase in κ , for instance, lowers the level of economic activity as discussed before, but due to the unchanging employment level, the decline in worker's consumption would be relatively less. In addition, there is another force which counterbalances the monetary contraction resulting from the aforementioned budget surplus: as the public sector is forced to finance accumulation of inventories by borrowing from the Central Bank, the *LM* line shifts in the rightward direction. Consequently the magnitudes of the declines in u and ρ are smaller. Unlike the ratchet hypothesis, the analysis is symmetric. Extension of the discussion to other shocks is routine and is not pursued here.

IV. CONCLUSION

In this paper a Kaleckian model is offered to analyze the macroeconomic implications of public industrial enterprises that produce solely inputs for the private industry. In the context of this model, public enterprise operations are shown to affect economic aggregates and income distribution in a variety of ways depending on the pricing of public sector products. The most important findings are: (i) subsidisation of the private sector via underpricing of public sector goods benefits not only capital by raising capacity utilisation and the rate of profit, but also labor by raising the real wage and the share of labor in

national income; (ii) these benefits come at the cost of a higher rate of inflation; (iii) as a corollary, it is self-defeating to utilise public sector pricing as an anti-inflationary tool; (iv) a higher private sector mark-up lowers the real wage but profit rate declines *à la* the stagnationists only if the share of the state rises as well, (i.e. if the public sector mark-up is negative); (v) an expanding public payroll accompanied by declining average productivity lowers real wages; it has positive effects on the wage share, rate of profit and capacity utilisation if it leads to a decline in the state share (i.e. if the public sector mark-up is negative).

The model is admittedly simple and, as seen above, modifications lead to indeterminate results. As mentioned in the introduction, a number of issues that are critical in a macro context, including public investment and public borrowing from abroad, are eschewed in this paper. The austerity of the model should be viewed as an asset and not a liability. The model provides a framework to identify and explain the mechanisms of interaction between the public and private sectors on the basis of two critical elements that have been hitherto ignored: first, the particular articulation of the public and the private sectors whereby the public sector concentrates in the production of intermediate goods used as inputs by the private industry; second, the administrative controls over pricing of public sector products. Even a simple model that features these essentials amply demonstrates the diversity of outcomes that may be expected in an economy with a significant public sector. The rest of the model can easily be modified or extended to incorporate other aspects of macro importance. The more difficult task, however, is to gauge the empirical relevance or significance of the findings. The lack of systematic data is a real hurdle to carry out econometric analysis on either cross-country or time-series basis. Perusal of the available information on the relative size of the public sector indicates that the implications of the public sector for the whole economy can be significant in many countries, which underscores the need for further theoretical and empirical research on the macro consequences of public industrial enterprises. The rampant clamor for the divestiture of these firms makes this project all the more critical.

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Figure 1: Comparative Statics of a Decline in Public Sector Markup

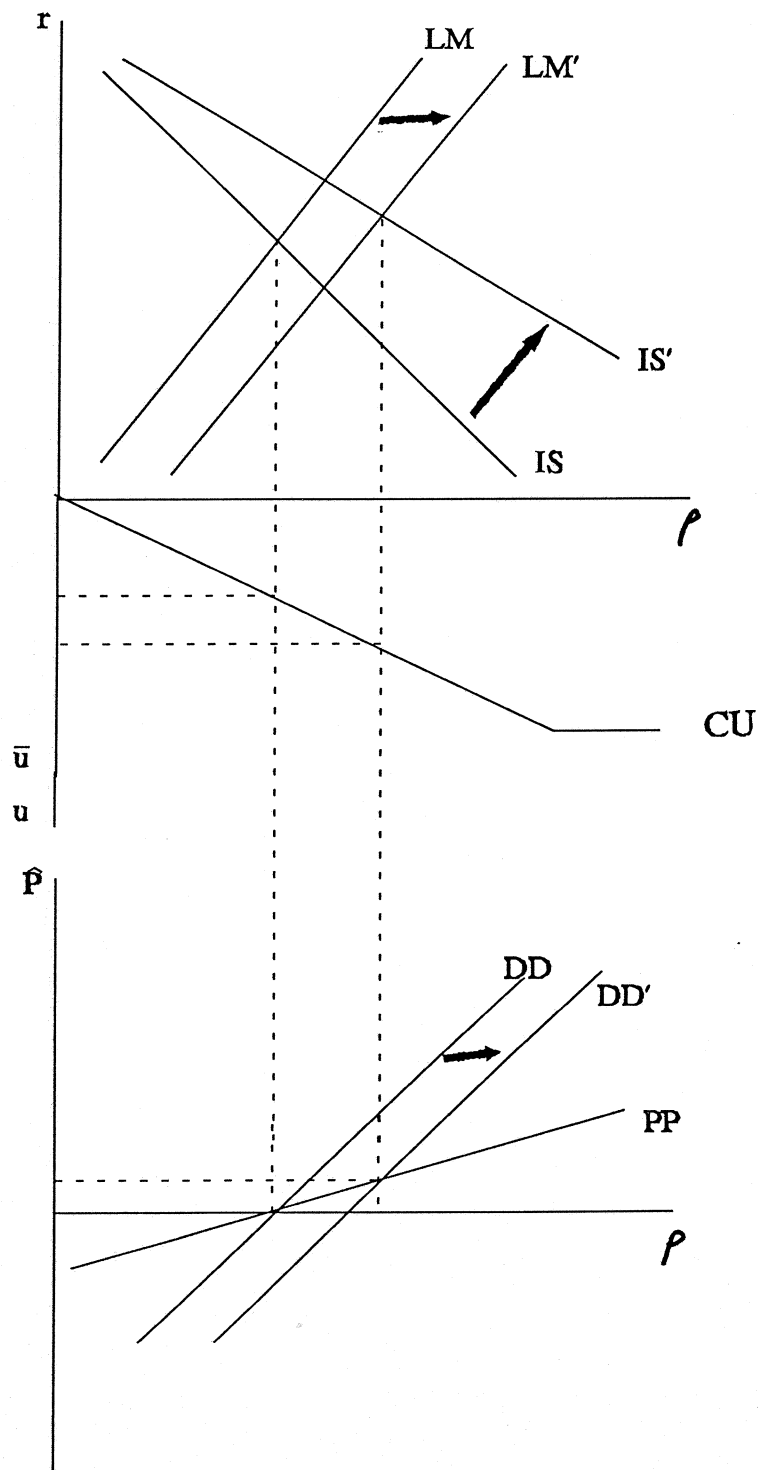


Figure 2: Impact of a Change in ϕ on Labor Share

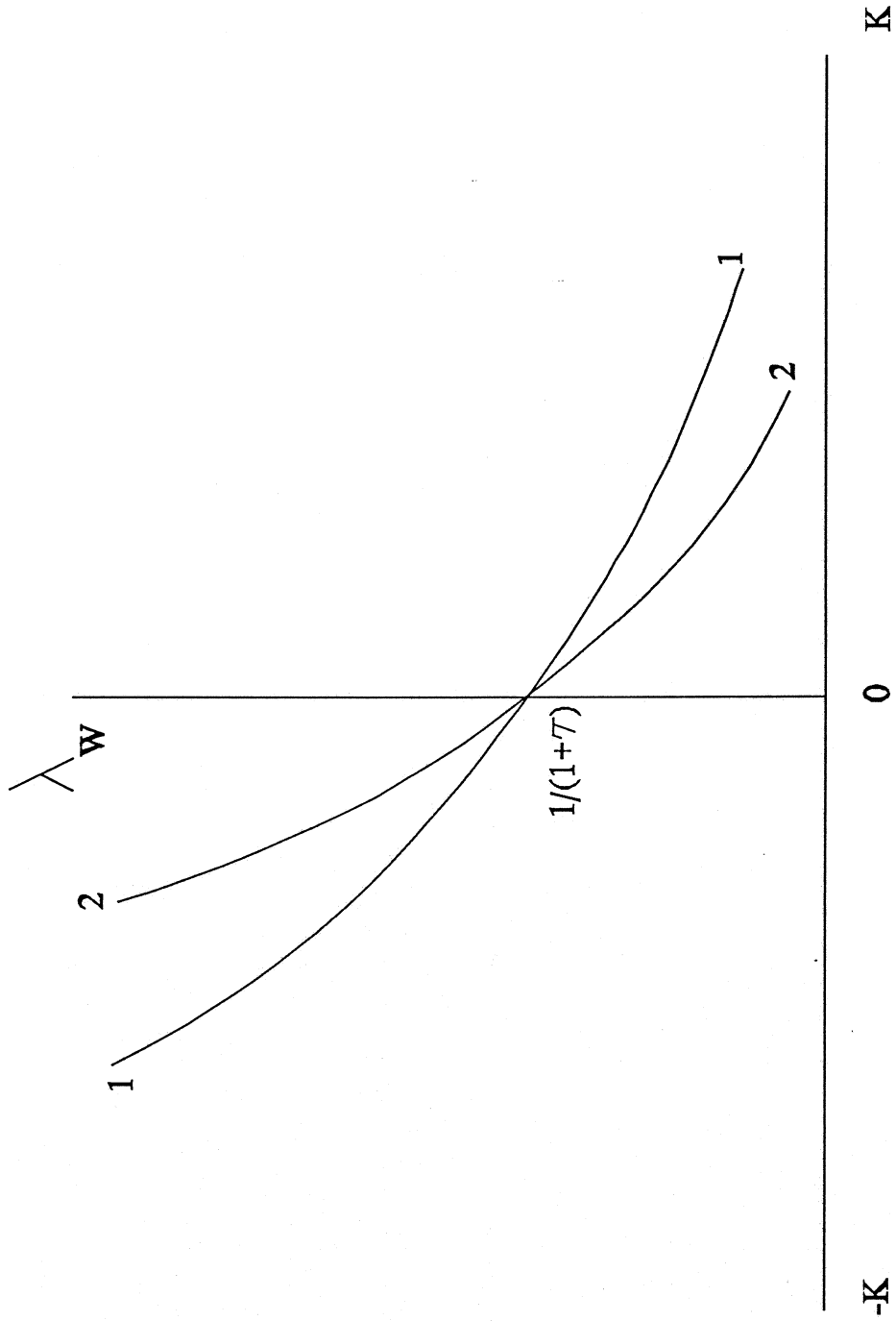


Figure 3: Comparative Statics of an Increase in Private Sector Markup ($k < 0$)

