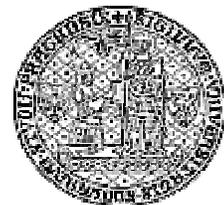


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The Pros and Cons of Banking Socialism

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The Pros and Cons of Banking Socialism

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Abstract:

When nominal wage rigidity is large, and banking sector oligopolistic, the benevolent government may prefer to regulate interest rates to boost labor demand. A government of a transition economy may postpone bank privatization to keep credit provision under control, as long as inefficiencies of state ownership are not prohibitive. We model a transition economy where the government initially owns enterprises as well as banks. The economy features constant wage, and strong market power of banks. Under these conditions, we identify when the government has incentive to privatize enterprises and/or banks. We derive conditions under which the banking socialism (the government owns banks, but privatizes enterprises) dominates other institutional modes: socialism, industrial socialism, and capitalism.

Keywords: privatization, banking, transition

JEL: D72, D78, E62, H20

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1 Introduction

The literature on privatization in transition often abstracts from differences in the financial and non-financial sectors (see Biais and Perotti 2002). Nonetheless, to privatize banks may be a largely different task than to privatize state-owned enterprises. Bank privatization implies loss of the credit channel as a policy instrument, which might be costly for an employment-maximizing government, facing strong unions and private banks with large market power.

In this paper, we seek an explanation why the benevolent government privatizes enterprises, but also keeps control of banks (banking socialism). The intuition of paper is driven by experience of transition economies which were, on the average, reluctant to privatize banks but not enterprises. Megginson (2005) calculated percents of total bank assets state owned in 1999 in 67 countries, and found the median for countries with “socialist origin” to be as high as 40%, and the average of 40.14%. For all other countries, the median was only 7% and the average 16.96%.

Gordon (2003) explains banking socialism by attempts to overcome distortions of corporate taxation; the government privatizes primarily capital-intensive firms, for distortions therein are relatively small. State-owned banks then provide cheap credit to privatized firms to overcome distortions. We complement this view by another plausible aim; the government may prefer credit control considering sticky wages and deadweight loss associated with market power of privatized banks.

As to the explanation of delays in bank privatization, Ambrus-Lakatos and Hege (1998) alternatively suggest that the bank sale may lead to excessive liquidation or even credit crunch. The reason is that the private owner has to signal hard-budget constraint to minimize moral hazard, but the signalling is costly. In our model, we do away without incomplete information on the credit market and therefore without signalling, following thus a parallel route of research.

Three topics in economics of transition are closely related to banking socialism: optimal sequencing of reform, modes of privatization, and the soft-budget constraint. Regarding sequencing (see, e.g., Lian and Wei 1998), we side-step the problem by studying a one-period economy. We thus focus on the short run, when voters evaluate the policy-maker retrospectively. It would be possible to extend the paper into more periods, and allow growth in the economy affect here exogenous parameters (e.g. efficiency gap), which would change the government’s optimum in next stages in favor of bank privatization, and nicely justify banking socialism as a transient phenomenon. However, no additional explanation beyond a simple change in parameters would be embedded in that plain extension.

The second stream of the literature concerns modes of privatization. On one side, there are influential papers emphasizing strategic (“Machiavel-

lian”) aspect of privatization, namely how the governing right-wing politicians structure the value of shareholdings to affect political preferences of the middle class (Biais and Perotti 2002). Dispersed ownership of capital is then a safeguard against possible renationalization, which explains why right-wing governments resort to underpricing and quick speed. On the other hand, a standard distributive mechanism may operate: efficiency gains from private ownership can be redistributed into the hands of the policy-maker’s constituency, mostly via underpriced assets (Ahrend 2002).

These explanations however omit the crucial importance of employment for the transition government, and the widespread use of privatization to further extra political and economic policy goals (see the comprehensive empirical study by Jones *et al.* 1999). Moreover, the strategic motive to prevent from re-nationalization (ensure time-consistent privatization policy) loses appeal in a global economy where transition countries struggle for FDIs, hence for credibility. A related issue is whether extra effort into maximization of employment is necessarily detrimental to efficiency; Börner (2003) argues that the commitment not to influence the profit-maximizing employment may be socially suboptimal, which invites a normative issue of desirable privatization, addressed by this paper as well.

The empirical literature on bank privatization is not as far-reaching as on general privatization, yet the main findings are nearly stylized facts: bank privatization improves bank efficiency (Clarke, Cull and Shirley 2005), the quality of the nation’s banking sector is significant determinant of bank privatization, but the political variables are not (Boehmer, Nash and Netter 2005). The latter invites an immediate inference that it is the median voter, not special interest politics, which is decisive.

The third extensive stream of literature, concerned with the soft-budget constraint, is also helpful for the purpose of our paper. Privatization is not only driven by efficiency gains and the ensuing transfers, but also by employment motive when labor markets feature some significant barrier to adjustment. Desai and Olofsgard (2006) attribute employment subsidies to asymmetric information on the incumbent government’s inability to promote job creation. This explains why the first-best policy, i.e. a comprehensive reform, is not adopted; the less competent politicians mimic the more competent ones by using hidden subsidies. We argue that information asymmetry is plausible yet not necessary; subsidies occur even when interests of the government is aligned with interests of the median voter as in early (normative) approach to soft-budget constraint, emphasized by Kornai, Maskin and Roland (2003).

In this paper, we consider private ownership genuinely private. Thereby, we abstract from institutional maze involved, for instance, in the Czech banking sector, where the state-owned banks in fact exerted ownership control over the privatized enterprises. In that particular case, the lack of alternative domestic private capital (shallow pocket) empowered banks to launch

major investment privatization funds, purchase shares in voucher privatization, and the non-privatized banks became ultimate owners of “privatized” enterprises.

In Section 2, we construct a transition economy with nominal wage rigidity and market power of banks. We find equilibria in four institutional modes (socialism, industrial socialism, banking socialism, and capitalism) in Section 3. In the next Section 4, we enrich the analysis of state-owned enterprises by the possibility to use profits for wage or credit subsidies. The last Section 5 concludes.

2 The economy

2.1 Enterprises

The economy consists of the brownfield (B) and the greenfield (G) sector. The brown companies are owned by the government, and can be privatized. The green companies are owned by the private sector and cannot be nationalized. Production requires labor L , capital K , and technology A , aggregated by a Cobb-Douglas function with parameters $1/2$ for labor and $1/4$ for capital,¹

$$Y_B = A_B L_B^{1/2} K_B^{1/4}, \quad Y_G = A_G L_G^{1/2} K_G^{1/4}. \quad (1)$$

The brown sector starts with an old technology, $A_B := a$; if restructured, the sector can imitate a new technology used by green companies, $A_G := 1$, where $a < 1$. We assume that restructuralization of a brownfield is conditional on private ownership. The technology parameter thus captures managerial and organization incentives (e.g. efficiency contracts with managers), which are assumed to be more effective in corporate sphere.

The output is sold on international market for fixed price P . The unit labor cost is w , and capital is purchased for r_G and r_B (in general case, we allow banks to discriminate between green and brown sectors).

The private owners of greenfields always maximize profits, that is they seek $(L_G, K_G) = \arg \max \pi_G = \arg \max P Y_G - w L_G - r_G K_G$. Denote $\Delta := P^4/64w^3$. We get

$$(L_G, K_G) = (2\Delta r_G^{-1}, w\Delta r_G^{-2}). \quad (2)$$

With this expression, we can derive that a privatized brownfield always restructures into a greenfield: by modifying (2) for private but still brownfield company, we get $L_B^{priv} = a^4 L_G$ and $K_B^{priv} = a^4 K_G$. Inserting into profit

¹The specific parameters are algebraically convenient. A more important limitation is that we use negative returns to scale, which allows us to avoid corner solutions for extremely rigid labor market. With exactly zero returns to scale, a more complex model would emerge.

equation yields $\pi_B^{priv}(r_G) = a^4 \pi_G(r_G) < \pi_G(r_G)$, so profits are strictly higher for the greenfield technology, for any level of interest rate r_G .

The government maximizes utility of the median voter. In the elementary case (Section 3), it simply maximizes labor demand of brownfields. In a more sophisticated case (Section 4), the government can use profits of brownfields and redistribute them as pure transfers or wage subsidies.

In the elementary case, the government is only restrained by the necessity to generate non-negative profits, $\pi_B \geq 0$. For any Cobb-Douglas production function with non-zero coefficients, even zero amount of capital contributes to the production, so the maximization of labor yields $K_B = 0$ and we obtain

$$(L_B, K_B) = \begin{cases} (P^2 a^2 w^{-2}, 0) & \text{if state-owned,} \\ (2\Delta r_B^{-1}, w\Delta r_B^{-2}) & \text{if privatized.} \end{cases} \quad (3)$$

2.2 Labor market

Let n be the measure of individuals in the economy. An individual $i \in 1 \dots n$ is working l_i units of time and enjoys $1 - l_i$ of free time. Only full-time contracts are available, $l_i \in \{0, 1/2\}$. Assume a constant wage rate w . The assumptions of discrete choice over extent of job and of extreme wage rigidity can be justified by the legacy of the socialist labor code, where the unions had a prominent position.² Notice that we forgo any heterogeneity in skills to capture aggregate effects.³

We define a quasi-linear utility function, where $f(1 - l_i)$ is for utility of leisure time, $g(wl_i)$ denotes utility of income, and $\omega_i \in [0, 1]$ denotes the individual preference for work,

$$U_i(w, l) = f(1 - l) + \omega_i g(wl). \quad (4)$$

For convenience, we use $f(x) = x^{1/2}$, $g(x) = 2x$, which satisfies unique optimum due to $f_x < 0$ (marginal utility is decreasing in leisure time) and $g_x = 2$ (marginal utility is constant in working time). Suppose ω is uniformly distributed on the interval $[0, 1]$, $\omega \sim U[0, 1]$.

Individual labor supply l_i^* is given by a binary choice, as the individual compares the utilities of accepting and declining a full-time job offer, $U_i(w, 0)$ and $U_i(w, 1/2)$. In other words, the individual labor supply l_i^* is derived from

²In fact we need only partial rigidity to derive our main results, but allowing for adjustment in wages would only bring excessive notation. We could also do without constraints on contracts, with the effect of a more complicated expression of total labor supply.

³Heterogeneity of workers in a spirit of Balla *et. al* (2005) would not change the model; if labor demand exceeded the size of high-skilled workers, they all would be employed, and the effect of unemployment would consider only low skilled workers. If not all high-skilled workers could be employed, the low-skilled workers would be beyond reach of a benevolent policy maker.

the individual reservation wage, for which the utilities are equal,

$$l_i^* = \begin{cases} 0 & \text{if } w < \frac{2-\sqrt{2}}{2\omega_i}, \\ \frac{1}{2} & \text{if } w \geq \frac{2-\sqrt{2}}{2\omega_i}. \end{cases}$$

Alternatively, for each wage, we can identify the marginal individual, who is indifferent between job and unemployment, as $\hat{\omega}(w) = \frac{2-\sqrt{2}}{2w}$. Total labor supply is $L_S = \sum_i l_i^* = \frac{n}{2}(1 - \hat{\omega})$ (recall uniform distribution of ω).

In market with hypothetically excess of demand ($L_S \leq L_D$), each individual supplying $l_i^* = \frac{1}{2}$ would be satisfied. In market with excess supply (the standard case of sticky-wage market), unemployment appears at amount $1 - \frac{L_D}{L_S}$; we assume random rationing, i.e. individuals with non-zero individual labor supply are randomly matched with available jobs. Hence, utility function depends not only on individual labor supply, but also on the status of the non-clearing job market:

$$\begin{aligned} U_i|_{\omega_i < \hat{\omega}} &= U_i(0) \\ U_i|_{\omega_i \geq \hat{\omega}; L_S \leq L_D} &= U_i\left(\frac{1}{2}\right) \\ E(U_i|_{\omega_i \geq \hat{\omega}; L_S > L_D}) &= \frac{L_D}{L_S} U_i\left(\frac{1}{2}\right) + \left(1 - \frac{L_D}{L_S}\right) U_i(0) \end{aligned}$$

We get the first comparative properties. An increase in wage and labor demand increases utility ($\frac{dU_i}{dw} \geq 0$, $\frac{dU_i}{dL_D} \geq 0$), while an increase in population enlarges the probability of unemployment when seeking a job offer, thus diminishes utility, $\frac{dU_i}{dn} \leq 0$.

2.3 Credit market

The banks set interest rate for lenders at r_C , and receive savings $S(r_C) = \sigma r_C$. Then, they distribute all credit borrowers: brown companies pay r_B and green companies pay r_G , $K_B(r_B) + K_G(r_G) = S(r_C)$. Suppose that savings come from households abroad, so the level of savings has no direct influence on utility of individuals considered in the model. (We could alternatively have minority of rich households providing savings, which wouldn't affect median voter's welfare.)

Efficiency of banking system is denoted by the parameter σ , where $\sigma \in \{\bar{\sigma}, \underline{\sigma}\}$. The more efficient banking system, the more savings are attracted for the identical level of interest rate. Although this definition looks like marketing efficiency, it can represent operational efficiency, risk management, and the like. Transition economy obviously starts with non-efficient banking, $\sigma = \underline{\sigma}$, while privatized banking system features $\sigma = \bar{\sigma} > \underline{\sigma}$, which reflects an assumption that the private owners dispose with contract and profit-sharing schemes which motivate managers to restructure.

2.4 Private banks

Besides improved operational efficiency, assume that the private banks have market power over lenders, given by stringent entry requirements and other banking sector regulation. Specifically, they can discriminate in price between marginal and inframarginal lenders. The marginal lender is paid r_C for his savings, while the inframarginal lender receives some $r < r_C$, which still exceeds opportunity costs. As a result, the banks don't pay $r_C S$ for savings at amount $S(r_C)$; suppose they pay exactly $\frac{3}{4}r_C S$.⁴

Private owners always maximize profits, π . We use that a profit-maximizing banker sets $r_G = r_B$, which is derived in Section 3.3. Thus, we can write $K(r_G) := K_G(r_G) + K_B(r_G)$, and private banks set $(r_C, r_G) = \arg \max \pi = \arg \max r_G K(r_G) - \frac{3}{4}\bar{\sigma}r_C^2$, under feasibility constraint $K(r_G) \leq S(r_C)$,

$$(r_C, r_G) = K(r_G) \left(\frac{1}{\bar{\sigma}}, \frac{3}{2\bar{\sigma}} - \frac{1}{K'(r_G)} \right). \quad (5)$$

2.5 Public banks

The government cannot employ an efficient contract scheme, thus the state-controlled banking sector is relatively inefficient. More to that, the state-owned bank cannot use market power over lenders, thus pays exactly $r_C S$ for credit at amount S .⁵ This difference can be attributed also to pronounced propensity for bailouts, incorporated into ex ante costs.

In the elementary case, suppose that the government is using banks as a source of cheap credit for enterprises, regardless of private or public. In the advanced case, the government can use bank profits as pure transfers or wage compensations. In the elementary case, maximization of labor demand obviously involves minimization of interest rate for borrowers, hence $r_C = r_G$. We denote this unified (socialist) interest rate r_S , $r_S := r_C = r_G$. The interest rate is constrained only by necessity to generate zero profits, $\pi = r_S K(r_S) - r_S S(r_S) = r_S [K(r_S) - \underline{\sigma} r_S] = 0$, which yields

$$r_S = K(r_S) \frac{1}{\underline{\sigma}}. \quad (6)$$

3 Ownership

We study the optimal decision-making of a government which is driven purely by interest in reelection. The sequence of activities is as follows. We begin in socialist status quo; the government owns brownfields and banks.

⁴Perfect discrimination would be for costs $\frac{1}{2}r_C S$, while non-discrimination is for $r_C S$. Our case is therefore exactly in the middle of the interval.

⁵This assumption could be relaxed without affecting the main result; the state-controlled bank could discriminate in price like the private bank does.

Then, the government decides whether to privatize banks, brownfields, both, or none. In each institutional configuration, banks and enterprises maximize objective functions as explained above. On the basis of that, individuals get utilities and re-elect the government. We abstract from political rents.

Since the utilities are linear in ω_i , the utilities for any of the four institutional options are quasiconcave in ω . Therefore, it is the individual with median preference $\omega_i = 1/2$ whose preference is decisive for the institutional configuration; if he prefers one institutional option to another, his preference must be backed by a majority of voters. Throughout the paper, we reasonably set that the median voter is job-seeking, in other words $\hat{\omega} < 1/2$ (otherwise, we would have a Monte-Carlo-like renters economy).

Anticipating preferences of a median voter, the reelection seeking government in equilibrium selects her optimum. As a result, identification of the optimal institutional choice requires utilities of the median voter.

The crucial question is what happens with profits and proceedings from privatization. As to profits of private owners, we suppose that they don't reflect in the utility of the median voter. One interpretation is that they flow abroad; another is that the share of investors in the population is negligible to be worth incorporating into the utilities. Profits of the government operating brownfields and banks can be used for direct transfers, or wage subsidies, which is studied in Section 4.

We recognize the following four institutional configurations:

Socialism (SO) Brownfields and banks are not privatized. Banks are inefficient ($\sigma = \underline{\sigma}$), and set such r_S that profits are zero. Brownfields are not restructuralized ($A_B = a$) and maximize labor demand up to the point of zero profits.

Industrial socialism (IS) Banks are private and efficient ($\sigma = \bar{\sigma}$), and maximize profits, setting (r_C, r_G) . State-owned brownfields are not restructuralized ($A_B = a$) and the state therein maximizes labor demand.

Banking socialism (BS) Banks are not privatized, thus inefficient ($\sigma = \underline{\sigma}$), setting r_S to have zero profits. Brownfields are privatized, restructuralized ($A_B = 1$), and maximize profits.

Capitalism (CA) Both banks and brownfields are privatized and restructured, ($\sigma = \bar{\sigma}$ and $A_B = 1$), and both maximize profits.

We are particularly interested in cases when banking socialism dominates not only socialism and industrial socialism, but also capitalism.

3.1 Socialism

The costs of socialism are obvious, namely large inefficiencies in all sectors. The low ability of a socialist bank to allocate credit efficiently is reflected by $\underline{\sigma} < \bar{\sigma}$, and the low performance in state-owned enterprises is reflected by $a < 1$.

What are the benefits of socialism? In banking sector, the government doesn't collect profits, so it may set a lower interest rate than the private banks, unless relative inefficiency is too large. In brownfields, the government is targeting the total amount of labor, not the marginal productivity of labor like the private owner.

We already know that for the socialist bank, $K_B = 0$, and it funds only the private (greenfield) sector. Since the private sector contributes to the total labor demand by $L_G^{SO}(r_S)$, it sets r_S so as to maximize the green labor demand. From (2) and (6), we have:

$$r_S^{SO} = \frac{1}{\underline{\sigma}} K_G(r_S) = \left(\frac{\Delta w}{\underline{\sigma}} \right)^{\frac{1}{3}} \quad (7)$$

Accordingly, the labor demand is as follows:

$$L_D^{SO} = L_B^{SO} + L_G^{SO} = \left(\frac{aP}{w} \right)^2 + 2\Delta^{\frac{2}{3}} \left(\frac{\underline{\sigma}}{w} \right)^{\frac{1}{3}} \quad (8)$$

3.2 Industrial socialism

Like in socialism, the brown sector requires no bank funding, so brownfield labor demand is identical to the case of socialism. However, labor demand of greenfield sector may differ. The private banks make credit more expensive because of market-power exploitation, but are more efficient, which lowers the interest rates. What is the optimal interest rate of the private bank for lenders, r_G ? By (5):

$$r_G^{IS} = \left(\frac{3\Delta w}{\bar{\sigma}} \right)^{\frac{1}{3}} \quad (9)$$

The green sector sets labor demand in accordance with (2) and (9), so:

$$L_D^{IS} = L_B^{SO} + L_G^{IS} = \left(\frac{aP}{w} \right)^2 + 2\Delta^{\frac{2}{3}} \left(\frac{\bar{\sigma}}{3w} \right)^{\frac{1}{3}} \quad (10)$$

Proposition 1 *Median voter prefers industrial socialism to socialism, if and only if $3\underline{\sigma} < \bar{\sigma}$.*

Proof In elementary model, only L_D is variable of institutional configurations. For median voter's utility, $\frac{dU_i}{dL_D} \geq 0$. By (2), $L_G^{IS} > L_G^{SO}$ if and only if $r_G^{IS} < r_S^{SO}$. As $L_B^{IS} = L_B^{SO}$, $L_D^{IS} > L_D^{SO}$ is equivalent to $L_G^{IS} > L_G^{SO}$. With (7) and (9), we easily rewrite $r_G^{IS} < r_S^{SO}$ into $3\sigma < \bar{\sigma}$. Putting all equivalences together complements the proof. \square

To lose credit channel but not privatize brownfields is thus suboptimal to socialist status quo, unless differences between banking sector performances are overwhelming. This drives our intuition on the importance of state control of banks when labor demand stimulation is politically desirable.

3.3 Banking socialism

In this case, the state controls the banks, but none of the productive sectors. Labor demand is maximized by provision of cheap credit.

We firstly consider possibility to lower interest rate to one sector at the expense of another sector. The pair (r_B, r_G) would have to satisfy $K_B(r_B) + K_G(r_G) = K_B(r_S) + K_G(r_S) = \sigma r_S^2$. Imposing capital demands of private owners from (2), the constraint re-writes into

$$\frac{1}{r_B^2} + \frac{1}{r_G^2} = \frac{\sigma r_S^2}{w\Delta}.$$

We maximize labor demand subject to $r_B = \arg \max L_G(r_G) + L_B(r_B)$ and the constraint above, which yields

$$\frac{1}{r_B^2} = \frac{\sigma r_S^2}{2w\Delta}.$$

This implies $r_G = r_B$. Selective credit manipulation is not a feasible way for the government aiming to boost employment. Moreover, as the state-owned bank minimizes credit, we have $r_S = r_G = r_B$. From that, we derive the optimal (lowest feasible) interest:

$$r_S^{BS} = \left(\frac{32\Delta w}{\sigma} \right)^{\frac{1}{3}} \quad (11)$$

By entering into labor demands of private firms (2) and using $L_B^{BS} = L_G^{BS}$:

$$L_D^{BS} = \left(\frac{2\Delta\sigma}{4w} \right)^{\frac{1}{3}} \quad (12)$$

3.4 Capitalism

In a full-fledged market, banks set r_G by (5):

$$r_G^{CA} = \left(\frac{96\Delta w}{\bar{\sigma}} \right)^{\frac{1}{3}} \quad (13)$$

The enterprises set factor demands as in (2), given the interest rate, r_G^{CA} :

$$L_D^{CA} = \left(\frac{2\Delta\bar{\sigma}}{12w} \right)^{\frac{1}{3}} \quad (14)$$

Proposition 2 *Median voter prefers capitalism to banking socialism, if and only if $3\underline{\sigma} < \bar{\sigma}$.*

Proof Analogically to proof of Proposition 1, we use that $r_G^{CA} < r_G^{BS}$ if and only if $3\underline{\sigma} < \bar{\sigma}$. \square

3.5 Pros and cons

Propositions 1 and 2 give, under all circumstances, a threshold condition for bank privatization. Privatization of banks is contingent only upon the relatively inefficiency of banks under private and public ownership; unless the difference is large, banks are better to rest under state control.

We look for all conditions under which banking socialism dominates other alternatives. By the threshold condition, we get that if banking socialism dominates capitalism, then socialism dominates industrial socialism. Therefore, we only rest to find the missing condition under which banking socialism dominates socialism.

Proposition 3 *Median voter prefers banking socialism to all alternatives, if and only if*

$$\underline{\sigma} > \max \left\{ \frac{\bar{\sigma}}{3}, \frac{16^3 w a^6}{[2^{\frac{5}{3}} - 1]^3 P^2} \right\}.$$

Proof Part one is implication of Propositions 1 and 2. Analogically to proofs of previous propositions, we have that utility of the median voter is maximized for maximum L_D . Re-writing $L_D^{BS} > L_D^{SO}$ yields $\underline{\sigma} > 16^3 w a^6 [2^{\frac{5}{3}} - 1]^{-3} P^{-2}$. \square

With Proposition 3, we can derive comparative properties leading to the dominance of banking socialism:

1. Narrow bank efficiency gap. The smaller is the efficiency gap of public banks ($\bar{\sigma}/\underline{\sigma}$), the less pronounced is incentive to privatize banks.

2. Development of financial market. The more efficient public banks (σ grows), the higher incentive to privatize brownfields. This may also be the case when total amount of savings increase, for instance due to external price liberalization.
3. Large technology gap. The higher is the technology gap between non-restructured and restructured brownfields ($1/a$), the more important it is to privatize brownfields.
4. Low wage rigidity. The lower wage rigidity (the clearer labor market), the better it is to privatize brownfields.
5. High product price. The higher price of the product P , the more beneficial is privatization of brownfields.

4 The use of profits

So far, we supposed that the government creates zero profits when owning brownfields and banks. This is optimal when profits have no other use and the only goal is labor-demand maximization. However, profits can be used in a variety of other ways, which contribute to the utility function. In the case of brownfields, a state-owned firm could create profits and redistribute them to all individuals. The second option is to withdraw profits from brownfields and use them as wage subsidies to greenfields and/or brownfields. These options modify optimums in socialist and industrial socialist cases.

4.1 Pure transfers

The government owning brownfields now decides to decrease production of brownfields from the scope where marginal labor productivity is very low, and use the profits for direct transfers. Suppose the profits Π_B are distributed by a uniform per capita transfer Π_B/n . The government aims to maximize utility subject to L_B and Π_B , where profits are generated by $\Pi_B = aPL_B^{1/2} - wL_B$.

We put the constraint into the utility function of the median voter ($\omega_i = \frac{1}{2}$), under assumption of positive unemployment ($L_D < L_S$), and the optimum yields the optimal (Π_B, L_B) , where

$$L_B = \left(\frac{2w - 2 + 2^{\frac{1}{2}}}{2(2 - 2^{\frac{1}{2}})} \right)^2 L_B^{SO}. \quad (15)$$

Hence, the extent of transfers and labor stimulation depend only on the level of rigidity, where $\hat{w} = \frac{3}{2}(2 - \frac{1}{2})$ is the critical level:

$$\begin{aligned} w \leq \hat{w} &\implies L_B \leq L_B^{SO} \implies \Pi_B \geq 0 \\ w > \hat{w} &\implies L_B > L_B^{SO} \implies \Pi_B < 0 \end{aligned} \quad (16)$$

This reveals that the government optimizes the magnitude of production in two ways. For sufficiently small rigidity, it generates positive profits that are redistributed among citizens. In a more relevant case (given positive unemployment), it creates deficit, paid by citizens, that is used for stimulation of production. Of course, the latter option requires that costless and non-distortional taxes can be imposed. If the government cannot tax, it is bound by liquidity constraint, and $L_B = L_B^{SO}$. Then, transfers are used as an instrument only for cases of low nominal wage rigidity; otherwise, the government fully stimulates production of brownfields, eliminating all profits.

We have an indication that the relative importance of direct transfers from brownfields declines in wage, i.e. with higher nominal wage rigidity. We can establish this finding formally. Since we have an additively separable utility function, where marginal utility of additional transfer and additional labor demand are constant, we can directly compare utility increases given by increase in transfers and decrease in the labor demand in brownfields (respectively, increase in taxes and increase in labor demand). For any pair (Π_B, L_B) , we have:

$$\begin{aligned} U(\Pi, L_B) - U(\Pi, 0) &= U(0, L_B) - U(0, 0) \\ U(\Pi, L_B) - U(0, L_B) &= U(\Pi, 0) - U(0, 0) \end{aligned}$$

Therefore, the relative importance of transfers to job-creation is given by

$$\frac{U(\Pi_B, L_B) - U(0, L_B)}{U(\Pi_B, L_B) - U(\Pi_B, 0)} = \frac{2(6 - 3\sqrt{2} - 2w)}{2\omega_i w + \sqrt{2} - 2}. \quad (17)$$

This reinforces intuition that each individual has different relative interest in maintaining transfers vs. creating jobs. The ratio clearly declines in ω_i , so those who value income highly welcome transfers relatively less than those who emphasize leisure time.

We can further maintain that an increase in wage (the more pronounced problem of nominal rigidity) leads to the higher role of job-creation and lower role of transfers. It is sufficient to examine how the relative importance of transfers declines in w for the median voter,

$$\frac{d \frac{U(\Pi_B, L_B) - U(0, L_B)}{U(\Pi_B, L_B) - U(\Pi_B, 0)}}{dw} = \frac{\sqrt{2} - 2}{(w + \sqrt{2} - 2)^2} < 0. \quad (18)$$

The median voter favors less transfers when the wage rate increases; a similar outcome could be derived for any i , where $l_i^* = \frac{1}{2}$. The only group which opposes that is the group of those who refuse to work ($l_i^* = 0$); for them, there is no trade-off between transfers and additional jobs, because $U(\Pi_B, L_B) - U(\Pi_B, 0) = 0$. In other words, when transfers are available, those out of the labor market are no more indifferent about the level of labor

demand, but prefer the demand that maximizes profits of brownfields. A bit paradoxically, it is the group of non-workers who push the government to behave like a private owner. Nonetheless, in our simple median-voter specification, they are not in majority unless $\hat{\omega} \geq 1/2$ (renters' economy).

Can banking socialism be chosen even under the possibility of direct transfers from brownfield profits? First, since the transfer option is identical in socialism and industrial socialism, the two differ only in the level of employment in greenfield sector, which is described in condition $3\sigma > \bar{\sigma}$. Therefore, this condition is unchanged. What surely changes is the other condition; since the case with positive transfers necessarily weakly dominates the case without transfers (which is a special case of zero transfers), we can conclude that σ has to pass a higher threshold to sustain victory of banking socialism. In particular, the modified condition writes as follows:

$$\sigma > \frac{a^6 w(w-1)}{(2^{5/3}-1)^3 P^2} \frac{2w+2^{1/2}-2}{w+2^{1/2}-2} \frac{w+2^{3/2}-3}{2^{3/2}-3} \quad (19)$$

4.2 Wage subsidies within brownfields

Excessive wage is the key source of mismatch between labor demand and labor supply. If the government can use a wage subsidy, it contributes to market clearing, even at an inefficiently high level employment. The labor supply can't adjust, but jobs that pay an effectively lower wage than w can be filled if the government provides a wage subsidy to the enterprises (e.g., in the form of social insurance deductions).

To pay a wage subsidy from state-owned brownfield profits is unfortunately nothing but a transfer from one pocket to another. Suppose that the government selects an optimal pair of transfer and labor in brownfields (Π_B, L_B) . This pair must be feasible, that is it corresponds to the production function, $\Pi_B = aPL_B^{1/2} - wL_B$.

Suppose the enterprises increase production with subsidized work, and generate additional profits Π_a . The profits have to be re-paid by wage subsidies at amount Π_a/L_B , therefore the effective wage paid by brownfields is $w - \Pi_a/L_B$. The new allocations have to satisfy

$$aPL_B^{1/2} - \left(w - \frac{\Pi_a}{L_B}\right) L_B = \Pi_B + \Pi_a. \quad (20)$$

By multiplication, we of course only replicate the standard constraint, so the optimal pair (Π_B, L_B) is identical. In other words, the government has no incentive to change behavior, and will not use wage subsidies for brownfields that are withdrawn from their profits.

4.3 Wage subsidies to greenfields

Government may target the wage subsidies into the greenfield sector, for greenfields have better technology than non-privatized brownfields, thus a higher potential of job-creation. How would that work? For the moment, we neglect the simultaneous possibility of wage subsidies and pure transfers and assume profits to be used exclusively as wage subsidies to greenfields. The government thus determines the size of the profits extracted, Π_a , and commands brownfields to produce as much as to cover costs plus the profit extracted, and distributed the profits to greenfields in a form of a wage subsidy per unit of labor Π_a/L_G . Therefore, greenfields operate with lower labor costs, namely $w - \Pi_a/L_G$. Labor demand in brownfields and greenfields then satisfy:

$$\begin{aligned} P\kappa L_B^{1/2} - wL_B - \Pi &= 0 \\ L_G &= \frac{P^4}{32r_G} \left(w - \frac{\Pi}{L_G} \right)^{-3} \end{aligned} \quad (21)$$

From maximization of $L_D = L_B + L_G$, we might get an (albeit extremely long) polynomial that would lead to the explicit solution. Here, a sufficient finding to derive is the relationship between L_B and L_G ,

$$L_G^{1/3} = L_B^{1/2} \frac{8P^{8/9}}{3(6wL_B^{1/2} + aP)}. \quad (22)$$

We want to check if the wage subsidies to greenfields are positive, or negative. In the latter case, the government would tax greenfields and use the revenues for the production of brownfields (of course only if such a corporate tax is feasible). The sign of wage subsidy is derived from the sign of profits; positive profits entail a positive subsidy and vice versa. Denote the labor demands when the wage subsidy is zero (known from preceding section) as $L_B(0)$ and $L_G(0)$.

First, for strictly positive profits, we have $\Pi_B > 0$, which implies $L_B < L_B(0)$ and $L_G > L_G(0)$. On the other hand, for strictly negative profits, we have that $L_B > L_B(0)$ and $L_G < L_G(0)$. To sum up:

$$\begin{aligned} \Pi_B > 0 &\implies \frac{L_B(0)}{L_G(0)} > \frac{L_B}{L_G} \\ \Pi_B < 0 &\implies \frac{L_B(0)}{L_G(0)} < \frac{L_B}{L_G} \end{aligned}$$

As we know the function $L_G(L_B)$ from (22), we can compute $L_G(L_B(0))$,

and compare:

$$\begin{aligned}
L_G(L_B(0)) > L_G(0) &\implies \frac{L_B(0)}{L_G(L_B(0))} < \frac{L_B(0)}{L_G(0)} \implies \Pi > 0 \\
L_G(L_B(0)) < L_G(0) &\implies \frac{L_B(0)}{L_G(L_B(0))} > \frac{L_B(0)}{L_G(0)} \implies \Pi < 0
\end{aligned} \tag{23}$$

We simply used the fact that relative share of employment between brownfields and greenfields has to be higher after a positive subsidy for greenfields, and lower after a negative subsidy (tax) for greenfields. In our example, we rewrite into conditions:

$$\begin{aligned}
w\underline{\sigma}^{1/3} < \frac{2^{21}}{7^9} &\implies \Pi > 0 \\
w\underline{\sigma}^{1/3} > \frac{2^{21}}{7^9} &\implies \Pi < 0
\end{aligned} \tag{24}$$

The incentive to favor greenfields instead of brownfields thus falls in wage rate, and efficacy (extent) of financial system. We also found that cheap capital is a substitute of government intervention; here, higher $\underline{\sigma}$ makes government less interested in assistance to capital-using sector, that is to greenfields.

5 Conclusion

This paper developed a model where the government seeking reelection by the retrospectively voting median voter doesn't privatize banks, and maintains status quo with the low bank efficiency. We identified two conditions which describe the willingness of the government not to privatize banks, but at the same time privatize state-owned enterprises. The two conditions also identify when any of the other three institutional configurations (socialism, industrial socialism, or capitalism) is optimal. The conditions can be used for comparative empirical studies on the relative benefits of delays in privatization of banks and enterprises.

In the simple model, the government couldn't generate profits. We extended that into a case when brownfields profits could be used as pure transfers, or wage subsidies for greenfields. In the case of pure transfers, we identified critical conditions for the non-negative level of transfers, and discussed political involvement of pure beneficiaries who are out of labor market. In the case of wage subsidies, we derived situations when subsidies are actually negative, namely represent additional taxes imposed upon greenfields.

The model can be enlarged by considering credit subsidies to greenfields paid from profits of brownfields. Enterprise privatization can also be modeled as an implicit labor market reform, aiming at reduction of wage rigidity. Another important option is to insert proceedings from the privatization sales into the cost-benefit analysis of the government.

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