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**An Impact of Privatization on Economic Growth and Poverty: A theoretical analysis<sup>4</sup>**

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**Абстракт**

Бид эдийн засгийн өсөлт, орлого хуваарилалт, ядууралд хувьчлалын үзүүлэх нөлөөг загвар хэрэглэн судлахыг зорьсон. Энэ загварт аж ахуй эрхлэх чадвар нь харилцан адилгүй агентууд ажилчин болох эсвэл хувийн бизнестээ менежер болох гэсэн сонголтуудын аль нэгийг хийнэ. (Энэ санаа нь Murphy, Schleifer, Vishny (1991) нарын "Allocation of Talent: Implication for growth" өгүүллэгт дурьдагддаг.) Бид төвлөрсөн төлөвлөгөөт эдийн засгийн тэнцвэр тодорхойлж өмнө нь улс эзэмшиж байсан капитал аж ахуй эрхлэгчдэд хэрхэн хуваарилагдсан болон зах зээлийн эдийн засгийг төвлөрсөн төлөвлөгөөт эдийн засагтай харьцуулах замаар эдийн засагт хувьчлалын үзүүлэх нөлөөг судалж байгаагаараа энэ өгүүллэг шинэлэг юм. Төвлөрсөн төлөвлөгөөт эдийн засагт, бүх агентууд улсын үйлдвэрийн ажилчид байсан, харин зах зээлийн эдийн засагт шилжсэнийн дараа хамгийн чадвартай агентууд аж ахуй эрхлэгч болохыг сонгож болох юм. Эдгээр аж ахуй эрхлэгчид нь эргээд чадвар багатай хүмүүсээ хөлсөлж ажлуулдаг. Капиталын зах зээл нь хувьчлалын шокуудын нөлөөг намжаахад чухал үүрэгтэй байдаг.

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## Introduction

We analyze the impact of privatization of publicly-owned assets, such as state companies and other state-owned assets, on economic growth and poverty reduction. Main objective of the paper is a creation of an economy-wide model to analyze a link between privatization, growth and poverty and an exploration of the impacts of privatization within the framework of the applied model. The economic model enables analysis both of *income and asset distribution effects* of privatization.

Privatization of state-owned assets, even of those not directly related to production, creates a possibility of new owners to use the privatized assets as collateral for obtaining credit from banks or other financial institutions and use the loans for investment, which in turn can considerably positively affect economic growth. Therefore, in our opinion, the impact of privatization of state assets is not limited to a mere revival of financial markets, as it is usually viewed (e.g. E. Sheshinski and L. López-Calva, *Privatization and its Benefits: Theory and Evidence*, 1998). The reason is that privatization can be seen as a financial stimulus for increasing investment and its main role is a proper and smooth redistribution of capital, which in many transition countries was allocated among all citizens with the help of various voucher schemes.

The proposed study of this overlooked role of privatization in the economic growth thus represents a very promising field, which links privatization of state assets to financial markets and further through investment to economic growth. The impact of investment on economic growth and poverty is further enriched by the behavior of agents who received privatized assets: indeed, if they consumed it, the privatization will have only a temporary positive effect on GDP through one-time increase in spending on consumption, yet if they invested privatized assets, their decision can have lasting effect on GDP through increased investment and higher growth rates. In the sample survey "Impacts of privatization on income distribution and poverty" 2003, results have shown that mass privatization had initially distributed wealth equally; however difference in the knowledge about the use of the distributed wealth causes more unequal distribution of asset and income.

## Related literature

In recent theoretical literature, privatization is usually considered to have an impact on economic growth from such microeconomic factors as an improvement of production efficiency through better managerial incentives, layoffs and more flexible pricing, and positive macroeconomic effects, such as improved taxation (Galal, et al. (1994, LaPorta and Lopez-De-Silanes (1998, Smith, et.al. (1996), and also Barberis, et al. (1996), Earle, et al. (1994) and Frydman, et al. (1997) for transition economies.) Galal, et al. (1994) and Chisary, et al. (1997a) study privatization in the general equilibrium framework. Demirguc and Levine (1994) and McLindon (1996) study the role of privatization in the revival of the financial market. Yet, to our knowledge, there is not yet a theoretical research, which explores privatization exactly in the way, which is proposed by our research team.



Philippe Agion, Patrick Bolton (1997) and Ferreira (1997) assume that a high yield "entrepreneurial" activity requires a fixed initial outlay of capital. In our case, entrepreneurs choose their activity based on comparison of possible profit and wages.

Ferreira (1997) assumes that individuals possess some initial wealth and they differ in its initial wealth allocations. In our model, we assume that people have different initial human capital but are allocated equal wealth initially.

Ferreira (1997) makes an assumption that expected end-of-period income is higher in the private sector than in the public sector. This is a very strong assumption. We do not employ such a strong assumption but derive the wages in a centrally planned and market economies separately from the modeling results and then compare these wages with each other.

The structure of the paper is as follows. First, we analyze equilibrium under the centrally planned economy. Then we analyze the economy after privatization of state-owned enterprises takes place and the new class of entrepreneurs is being born. The third section is devoted to a comparative analysis of various privatization schemes and the role of financial markets. The last section is devoted to conclusions and comments.

## The model

We develop a closed economy model with heterogeneous agents each living for one period. One good is produced using human capital<sup>5</sup>, capital and labor as inputs to the constant returns to scale production function. The population is normalized to one. Agents in the economy possess each one unit labor and are endowed with  $h_i$  units of human capital. The human capital is distributed from  $\underline{h}$  (lowest managerial skill) to  $\bar{h}$  (highest managerial skill) over the population. For simplicity, we assume that aggregate capital is equal to  $K$  and is constant and all produced goods are consumed. Similarly to Murphy, Scheifer, Vishny (1991), in order to concentrate on distribution effects of income, we assume throughout the paper that commodity price is fixed and we normalize it as equal to 1.

### The centrally planned economy

During the socialist era the government maintained a policy of equal income distribution, trying to provide relatively equal living standards for population. The government allocated great amount of resources to the social welfare sector. All enterprises were owned by the state and there was no private property or private sector. At the beginning of transition, wealth and income distribution was relatively

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<sup>5</sup> In this paper human capital refers mainly to managerial skill, which is not equally distributed over the population.



qual, in other words, nobody had private property.<sup>6</sup> Therefore we model a centrally planned economy in the following way.

In the centrally planned economy, the State or the government is the only producer and employer and all capital is owned by the State. All agents supply one unit labor and are employed by the State<sup>7</sup>. The State pays wages to labor and also distributes its production profit to the population. The State has its own human capital or managerial skill  $\hat{H}$  ( $\underline{h} < \hat{H} < \bar{h}$ ), which reflects the available human capital possibilities in the economy and cannot exceed or be lower than human capital of its population.

The production function of the State is:

$$y = \hat{H}^\alpha K^\beta L^\gamma = \hat{H}^\alpha K^\beta \quad (1)$$

where:  $\hat{H}$  - is State-owned human capital,  $K$  is aggregate capital,  $L$  is total labor stock, which is normalized to one and the production function coefficients are chosen such as  $\alpha + \beta + \gamma = 1$ . Thus, the production technology is a constant return to scale production function. Further,  $w$  is a wage of labor<sup>8</sup> and  $r$  is an interest rate. Let us assume that the State maximizes its profit,  $\pi$ . In this case, the State's problem is:

$$\max \quad \pi = \hat{H}^\alpha K^\beta - w - rK \quad (2)$$

First order conditions for profit maximization problem are following:

$$L: \quad MP_L = \gamma \hat{H}^\alpha K^\beta = w \quad (3a)$$

$$K: \quad MP_K = \beta \hat{H}^\alpha K^{\beta-1} = r \quad (3b)$$

According to the first order conditions, income share of human capital, capital and labor are given as in (4):

$$L: \quad w = \gamma Y \quad (4a)$$

$$K: \quad rK = \beta Y \quad (4b)$$

$$\hat{H}: \quad \pi_s = \alpha Y \quad (4c)$$

The State receives its reward as a manager, equal to  $\pi$ , as in 4c. Furthermore, we assume that the State pays wages to labor and also distributes its production profit to the population in an equal way. Let's formulate agent  $i$ 's income  $m_i$  as a sum of wage and a transfer payment, which the agent receives from the government and which is equal to a share of profit and capital income of the State.

<sup>6</sup> "Links between Privatization and Poverty/Inequality", Economic Policy Research Association and School of Economic Studies, NUM, sponsored by UNDP, 2003.

<sup>7</sup> Full employment is most important goal of the central planner.

<sup>8</sup> Wage is determined by the central planner as to clear the labor demand and supply market, where labor supply is equal to one.



$$m_i = w + (rK + \pi_i) / L \quad (5)$$

Because of normalization of the population to 1 and the profit maximization conditions the expression (5) is equal to GDP per capita,  $y$ .

$$m_i = \frac{y}{L} = y \quad (6)$$

Agents receive equal income  $y$  in a centrally planned economy, since wages and state-distributed benefits are equal. Therefore, in the centrally planned economy asset and income distribution is perfectly equal and GDP and GDP per capita is equal to  $y$ .

### Market Economy

Privatization is one of specific features of transition economies. Privatization has created initial capital or start capital for engaging in private business. For example, in Mongolia every citizen was given blue and pink vouchers worth 10 thousands MNT (in 1991 the official rate was about 15 MNT per 1USD), which total worth was equal to over 40 percent of the total state property according to estimates made at that time. As we can see, at the first stage of privatization everyone had an opportunity to own equal amount of assets. However, people's knowledge, skills, access to information related to economy, business and capital markets were different, which led to the situation when some increased their initial capital by hundreds times, while others were left with no capital. In other words, although start-up conditions were equal regarding shares of distributed capital, but start-up conditions regarding their knowledge of information on economy, business and capital markets were unequal. For instance, we can assume that the management of enterprises had more opportunities to access information on the enterprise and further prospects of business in the given field than workers of the enterprise. On the other hand, studies show that the enterprise workers had more information than outsiders in general.<sup>9</sup> That's why the privatization process and the market economy is modeled in our paper in the following way.

In the process of transition from the centrally planned economy to a market economy the State privatizes all its capital. During the privatization agents receive equal amount of capital  $k$ . The State withdraws from production so private entrepreneurs now are responsible for production rather than the State, and economic growth can be derived only from an increase in output of private sector. When agents become entrepreneurs, they use their own human capital or managerial skill in their production activity, borrow the capital for production at the market-determined rate  $r$  and hire labor at a market-determined rate of wage  $w$ .

Individuals now have two options: one is becoming an entrepreneur and one is becoming a worker and supplying labor.

<sup>9</sup> "Links between Privatization and Poverty/Inequality", Economic Policy Research Association and School of Economic Studies, NUM, sponsored by UNDP, 2003.



Agents, who choose to supply labor, earn income from two sources, namely from selling labor at a wage rate  $w$  and renting privatized capital at a market rate  $r$ . On the other hand, those agents, who choose to become an entrepreneur, earn income from employing their human capital and also earn interest on its privatized capital. They are becoming managers and owners of the private firms.

Ultimately, agents will compare income from these two options and will choose the one which earns greater income.

Formally, let us show income from both options. By becoming a worker and supplying labor, agent  $i$  will earn the following income.

$$m_i = w + rk \quad (7)$$

If agent  $i$  choose to become an entrepreneur, she/he will produce goods using the constant returns to scale production technology and her/his human capital or managerial skill:

$$y_i = h_i^\alpha k_i^\beta l_i^\gamma \quad (8)$$

The entrepreneur maximizes profit from the production:

$$\max y_i - wl_i - rk_i = h_i^\alpha k_i^\beta l_i^\gamma - wl_i - rk_i \quad (9)$$

where:  $k_i$ - capital,  $l_i$ - labor,  $h_i$ - agent  $i$ 's human capital. Entrepreneur's profit maximizing conditions define her/his factor demands. Labor demand of firm  $i$ :

$$MP_l = w = \frac{\beta y_i}{l_i} \quad (8a)$$

$$l_i = \left(\frac{\gamma}{r}\right)^{\frac{\gamma}{\alpha}} \left(\frac{\beta}{w}\right)^{\frac{1-\gamma}{\alpha}} h_i \quad (8b)$$

Capital demand of firm  $i$

$$MP_k = r = \frac{\gamma y_i}{k_i} \quad (9a)$$

$$k_i = \left(\frac{\gamma}{r}\right)^{\frac{1-\beta}{\alpha}} \left(\frac{\beta}{w}\right)^{\frac{\beta}{\alpha}} h_i \quad (9b)$$

Entrepreneurs' income  $m^e$  consists of return to his human capital and return to his physical capital.

$$m_i^e = \alpha y_i + rk \quad (12)$$

Agents compare income of these two options and choose the one with larger income. In other words, agents choose to become an entrepreneur if and only if the following condition holds.

$$m_i \leq m_i^e \quad \Leftrightarrow \quad w \leq \alpha y_i \quad (13)$$

After replacing  $y_i$  with production function and some manipulating, we get the following inequality.

$$h_i \geq \bar{h} = \frac{w}{\alpha} \left( \frac{r}{\beta} \right)^{\frac{\beta}{\alpha}} \left( \frac{w}{\gamma} \right)^{\frac{\gamma}{\alpha}} \quad (14)$$

The agents will choose to become an entrepreneur if they have human capital endowment equal to or higher than  $\bar{h}$ . Therefore  $\bar{h}$  is a threshold level of human capital endowment for becoming a businessman.

Let us define  $a \left\{ a = \frac{(\bar{h} - \underline{h})}{(\bar{h} - \underline{h})} \right\}$  as the share of entrepreneurs in the population (as the population is equal to 1,  $a$  is also the number of entrepreneurs). Thus  $1-a$  is the labor supply. Wage is determined by labor market equilibrium condition:

$$\underbrace{1-a}_{\text{labor sup ply}} = \underbrace{\int_0^a l_i di}_{\text{labor demand}} \quad (15)$$

Substituting  $l_i$  with entrepreneur  $i$ 's labor demand function and accounting for the uniform distribution of human capital, we get the following expression:

$$\underbrace{1-a}_{\text{labor sup ply}} = \underbrace{\left( \frac{\gamma}{r} \right)^{\frac{\gamma}{\alpha}} \left( \frac{\beta}{w} \right)^{\frac{1-\gamma}{\alpha}} \int_0^a (h_i) di}_{\text{labor demand}} \quad (16)$$

From (14), the equilibrium wage can be expressed as:

$$w^* = w(\alpha, \beta, \gamma, \bar{h}, \underline{h}, K) \quad (17)$$

One can see that wage increases with a number of entrepreneurs. ( $w_a > 0$ ). There are two reasons. First, labor demand increases with the number of entrepreneurs. Second, labor supply decreases with entrepreneurs' number as the population is constant.

The interest rate is defined by the capital market equilibrium condition:

$$\underbrace{K}_{\text{asset sup ply}} = \underbrace{\int_0^a k_i di}_{\text{asset demand}} \quad (18)$$

Aggregate capital supply is assumed  $K$ . Substituting into (16) entrepreneur  $i$ 's capital demand function, we get the following expression:

$$r^* = r(\alpha, \beta, \gamma, \bar{h}, \underline{h}, K) \quad (19)$$

Let us find aggregate production. The aggregate production is an integral of all entrepreneurs' production.



$$y = \int_0^a y_i di \quad (20)$$

In this market economy income distribution may be not equal, while asset distribution is perfectly equal.

### Comparative analysis of centrally planned economy and market economy

Asset distribution is perfectly equal in both economy. In centrally planned economy all agents have no capital, while in a market economy agents receive equal  $k$  amount of capital in the result of privatization.

Production in the centrally planned economy:

$$y = \hat{H}^\alpha K^\beta L^\gamma = \hat{H}^\alpha K^\beta$$

Production in the market economy:

$$y = \int_0^a y_i di$$

The comparison will proceed as follows.

1. Comparison of production and factor incomes in the centrally planned economy and the market economy.
2. Analysis of income distribution using the Lorentz curve and Gini coefficient.
3. Comparison of income distribution in the centrally planned economy and the market economy.

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