Privatization and Financial Market Development: Theoretical Issues

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Summary

Stock market capitalization in developed countries grew while massive privatization plans were in progress. It is however possible that stock market development would have occurred anyway. Below we identify features that are specific to share-issue privatizations (SIPs) and should a priori impact on market liquidity and market size. A positive correlation between such features and market development in a cross section of countries would support the claim that certain types of SIPs contribute to stock market development.

Keywords: Privatization, financial market development

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1 Introduction

One reason for governmental support of privatization programs has been stock market "development". This can be measured by several indicators, such as the increase in the number of listed companies, in market capitalization and in market liquidity. The last one is a key measure for three interrelated reasons. First, investors care about market liquidity rather than size, because it has a direct impact on their trading profits. For instance, sell orders in a thin markets decrease both asset price and the sellers' revenues. As a consequence, companies also care about liquidity rather than size of the secondary market because it affects the cost of raising equity capital. Investors are willing to pay a higher price for a stock issue if they expect a more liquid market. Second, some theories link the size of a stock market to its liquidity, which is modelled as a public good subject to the usual underprovision problem. Therefore a welfare improving increase in stock market size obtains when liquidity increases. Finally, economic welfare and growth are often related to the informativeness of stock market prices. This, in turn, is associated to market liquidity rather than size because financial analysts' profit are too small in a thin market. The first purpose of our paper is to clarify both the notion and the determinants of liquidity as well as the link between market liquidity and market size.

Stock market capitalization (turnover) in developed countries outside the US grew from over 3 (.364) in 1983 to over 24 (.85) in 1998 $US millions, while massive privatization plans were in progress (Megginson et al, 2000). This may appear far from surprising. One can reasonably expect that seasoned equity offerings by listed state-owned enterprises (SOE) increase market size. Similarly, the listing of SOE at the time of a privatization increases both the number of listed companies and market capitalization. It is less obvious that privatizations increase market liquidity and yield a multiplicative increase in stock market capitalization. The second purpose of our paper is to propose a methodology in order to shed light on the role of privatization plans in spurring stock market liquidity. Finding a positive correlation between market liquidity and the amount of privatization, while controlling for the other determinants of liquidity would be consistent with the presumption that SIPs help stock market development.

At a closer look, this interpretation is not uncontroversial, because even the "obvious" link between a SIP and the increase in stock market capitaliza-

tion is not so obvious. It may be that stock market development would have occurred independently from SIPs. At the empirical level the US markets grew from 1 (0.4199) to 12 millions $ (1.017) during the same years with barely any SIP. At the conceptual level, one could argue that the demand for equity by pension funds and other institutional investors has risen for exogenous reasons (age structure of US population, financial innovation) making it more attractive to list, and that SIPs simply crowded out the listing of private companies. Hence, we will try to highlight features which are considered to be SIP-specific and are likely to impact on the determinants of market liquidity.[1]

In what follows we deal with the privatization of state-owned companies, emphasizing their effects on stock market development through the increase in and quality of the supply of funds. We do not analyze the effect of some economic events relating to privatization plans, that mainly increase the demand for stocks. These events are the improved performance of privatized companies relative to their own previousone, the reform of social-security systems from pay-as-you-go to funded, and the reduction in public deficits and debt.

This paper is organized as follows. In the next section we summarize the main determinants of stock market liquidity and size in the financial microstructure literature. In Section 3 such determinants are highlighted in a Merton-style model. In Section 4 we discuss how privatization may be expected to affect liquidity. In Section 5 we briefly review the links between stock market development, growth and economic welfare, which may explain why governments care about stock market development when performing SIPs.

[1]Some arithmetic may help. The change in stock market capitalization is equal to: $p\ dq + q\ dp = \frac{div}{r}\ dq + qd\left(\frac{div}{r}\right)$

where p is equal to expected dividend stream which is discounted with the risk-adjusted factor $\frac{1}{r}$ and dq is composed of both the quantity of SIPs and the quantity of private IPOs. Hence SIPs increase stock market development to the extent that $dq_{SIP} > 0$ does not cause a sufficiently large reduction of dq_{IPO},and/or of prices. The fall in prices could in turn be associated with a decrease in profitability and/or in the discount factor. In this paper we focus on the effects of privatization on the discount factor, which is closely associated with liquidity.

2 Notion and determinants of market illiquidity.

There are several notions of market illiquidity, which are summarized for instance in Kyle (1985). However the most widely used in theoretical work are the inverse of depth, i.e. the absolute price variation in response to an infinitesimal amount of "noise trading", and the effective bid-ask spread. The former is related in a simple way to excess returns over the risk free-rate.[2] These two notions are associated with different trading structures, market depth relating to auctions (Grossman and Stiglitz (1980), Kyle (1985)) and the bid-ask spread to dealer markets (Biais, 1993; Calcagno and Lovo (1999), Dennert (1993). Their determinants are otherwise very similar, and we explain them below.

The first one is **order processing costs** that are associated to the trading mechanism, which is in turn related to technology. Recent innovations have made possible internet trading with remarkable savings in such costs.

Another component reflects **non-diversifiable risk** which is borne by speculators and dealers, that is to say by the counterparts of the "noise traders". The former are profit maximizers who buy when the expected future asset value exceeds the current price - taking in due account risk. Dealers also fill excess demand and supply, if they act as market makers. On the contrary, noise traders submit orders for reasons relating to portfolio re-balancing, life-cycle needs, stop-loss strategies etc. Their buy orders are not necessarily associated with an asset that is expected to appreciate, and viceversa. They are ready to pay a premium to other investors in exchange for liquidity provision, because this amounts to taking on more risk.

The higher is the variability of future asset value conditional on available information, the higher is the premium charged by risk averse speculators and by market intermediaries in order to satisfy the liquidity needs of noise traders. Such premium is therefore affected by **publicly available information**, which helps reducing the conditional variability of asset payoff. Risk is priced only if it is non-diversifiable, and its price is proportional to the **riskiness of the market portfolio**, as taught by CAPM. It follows that changes in the composition of the market portfolio translating in improved diversification opportunities increase market depth.

[2] In static models, it is related to the price premium over the risk-neutral (and informationless) valuation of the asset.

A third component of illiquidity has to do with the **likelihood of information trading** (Glosten and Milgrom (1985), Kyle (1985)). The higher is such likelihood, the higher is the premium that the less informed speculators (or dealers) charge to noise trading for participating in the trade. The reason is that they anticipate to lose on trades with the better informed investors, and therefore transfer such losses onto the noise traders whose demand/supply of stocks is assumed to be relatively inelastic. Both analysts and insiders are better informed traders. **Enforcement of insider trading regulation** may reduce the adverse selection component of the spread, provided that the information produced by analysts is not a substitute of the insiders' foreknowledge.

Finally, liquidity is affected by **competition among stock exchange intermediaries**. As the number of dealers increases, the premium charged to liquidity traders falls because each dealer tries to undercut the others (Biais, 1993). If there is asymmetric information in the market, however, this need not be the case because informed speculators better mask their trades by splitting up orders among the intermediaries, who become more exposed to adverse selection losses and charge higher costs to noise traders (Dennert, 1993). In the limit, competition may lead to a market breakdown (Glosten (1989)).

The above mentioned papers consider the number of investors and **risk-sharing opportunities** as exogenously given. In Pagano (1989) liquidity is instead linked to the endogenous **number of investors** who decide to enter the stock market. Having uncorrelated liquidity needs, they could provide insurance to each other against adverse price movements associated to waves of sell orders. These adverse price movements are in turn associated to higher risk bearing by those who buy. However, the number of investors and the consequent liquidity can be lower than optimal in equilibrium because each trader generates a positive externality for other investors by decreasing stock price volatility, which in turn attracts more traders. However, if one investor expects low volume of trade she will abstain from entering the stock market. Thus the market may be trapped in a low liquidity state.

A similar story can be told from a supply- side perspective (Pagano, 1993). Initial public offerings generate an externality because they increase diversification opportunities for market participants. However, IPOs may be lower than optimal because each entrepreneur bears the full listing costs but does not internalize all the diversification benefits. In such cases a reduction in **listing costs** may be liquidity and welfare improving, with a multiplicative

effect on stock market size.

Market participation may be limited not only by coordination problems but by pure informational problems as well, because investors may be willing to trade in the markets of stocks they know about, for example because they are able to evaluate asset risk (Merton (1987)). Home-bias and market segmentation are preminent examples of limited **market participation by foreign investors**.

The larger the number of participants in the market of any given stock, the better is risk sharing and the lower firms' cost of raising capital in the primary market. Indeed, the larger the number of market participants the smaller per capita risk to be borne, since the stock is shared among a larger number of investors. The smaller then the overall risk premium to be paid to for the stock to be absorbed by the market, and consequently the lower firms' cost of raising capital.

3 SIPs' Contribution to Market Liquidity

We shall argue that there are (at least) two possible channels for SIPs affecting market liquidity: *foreign investors' participation*, and *enhanced domestic investors'participation*.

3.1 Foreign Investors' Participation

We shall argue that SIPs, and particularly SIPs of companies whose technology is subject to innovation processes which are internationally developed (like, telecommunications and public utilities), contribute to stock market development by fostering foreign investors participation:

a) in the market of the security backed by the privatized company; and possibly

b) in the markets of other securities (i.e. backed by firms other than the privatized company).

Clearly, if b) occurs then necessarily firms' cost of raising capital decreases. Indeed, b) translates into mitigation of home bias with the direct effect of attaining better sharing of the risk originated by domestic firms. Can b) occur? Successful SIPs will be those that are priced so as to incentivate costly information acquisition, that is are those that indeed make it

incentive compatible for investors to acquire the information needed to evaluate risk and hence use the security in constructing portfolios. Information externalities, like the serendipity effect emphasized by Subrahmaniam and Titman (1999), or more simply the fact that firms belonging to any given country are subject to common risk factors, will induce market participation according to both a) and b). Clearly, the lower the cost of information acquisition, the more likely that this occurs. This should then be particularly true for telecommunications and public utilities and more generally for companies whose technology is subject to internationally developed innovation processes and as such (at least, partly) known by the international business community. Basically, for these companies, the a priori unknown element is country risk and the knowledge of this facilitates participation in the markets of other securities (i.e. backed by firms other than the privatized company) – i.e. cannel b).

But even if the effect of SIPs is to foster foreign investors participation only in the market of the security backed by the privatized company, there will be a reduction in the cost of raising capital also of those firms whose securities are used only by domestic investors (domestically owned companies). We develop this argument below. This result follows because foreign participation in the market of the security backed by the privatized company, reduces the per capita risk to be borne by domestic investors, the demand for risky assets backed by firms whose investors' base is domestic then shifts upwards, the price of these securities increases and hence the cost of raising capital falls. If this result is true empirically, one should observe a positive correlation between the stock price of domestically owned firms and that of privatized companies around events that foster foreign investors' participation (e.g. a formerly State-owned company entering an international stock index, or being marketed abroad).

Consider a simple one-period economy where there are two (risky) assets. Asset i, $i = 1, 2$, pays off $\widetilde{V}_i$ per unit at the end of the period; $\widetilde{V}_i$ is stochastically distributed:

$$\widetilde{V}_i \backsim N\left(\mu_i, \sigma_i^2\right)$$

The quantity of asset i is Q_i, and the price per unit of asset i is denoted with p_i.

Market participation for asset 1 is exclusively domestic, that for asset 2 is both domestic and foreign. In Merton's language (Merton (1987)), foreign

investors only know about asset 2, whereas domestic investors know about both assets and hence use both assets in the construction of their portfolios.

The number of domestic investors is M . Each of these has an expected utility function over net payoffs of the form:

$$u(y) = -e^{-\gamma y}$$

and composes his portfolio so as to maximize expected utility at the end of the period. Investors can freely borrow and lend at the riskless rate, and the gross riskless rate is one.

Given our assumptions about utility function, distributions of assets' payoffs and no borrowing-lending restrictions, the domestic investor's optimization problem is:

$$\underset{q_1,q_2}{Max} \left\{ \left[\mu_1 q_1 + \mu_2 q_2 - \frac{\gamma}{2} \left(q_1^2 \sigma_1^2 + q_2^2 \sigma_2^2 + 2\sigma_{12} q_1 q_2 \right) \right] - p_1 q_1 - p_2 q_2 \right\}$$

By the first order condition:

$$q_1 = \frac{1}{\gamma \sigma_1^2} \left(\mu_1 - p_1 \right) - \frac{\sigma_{12}}{\sigma_1^2} q_2 \tag{1}$$

Market equilibrium for asset 2 implies that:

$$M q_2 = Q_2 - Q_2^f$$

where Q_2^f is aggregate quantity of asset 2 held by foreign investors. And therefore:

$$q_2 = \frac{Q_2 - Q_2^f}{M} \tag{2}$$

Substituting (2) into (1) , gives individual demand for asset 1 at equilibrium:

$$q_1 = \frac{1}{\gamma \sigma_1^2} \left(\mu_1 - p_1 \right) - \frac{\sigma_{12}}{\sigma_1^2} \left(\frac{Q_2 - Q_2^f}{M} \right)$$

and hence, aggregate demand for asset 1 at equilibrium:

$$M q_1 \equiv \frac{M}{\gamma \sigma_1^2} \left(\mu_1 - p_1 \right) - \frac{\sigma_{12}}{\sigma_1^2} \left(Q_2 - Q_2^f \right) \tag{3}$$

If $\sigma_{12} > 0$, i.e. assets' payoffs are positively correlated, then as foreign investors' participation in the market for asset 2 increases, that is as Q_2^f increases, aggregate demand for asset 1 shifts upwards (by (3)). Market clearing for asset 1, that is:

$$\frac{M}{\gamma\sigma_1^2}(\mu_1 - p_1) - \frac{\sigma_{12}}{\sigma_1^2}\left(Q_2 - Q_2^f\right) = Q_1$$

implies that:

$$p_1 = \left(\mu_1 - Q_1\frac{\gamma\sigma_1^2}{M}\right) - \frac{\gamma\sigma_{12}}{M}\left(Q_2 - Q_2^f\right) \tag{4}$$

and therefore:

$$\frac{\partial p_1}{\partial Q_2^f} > 0$$

Thus, foreign investors' participation in the market for asset 2 leads to an increase in the price of asset 1, the cost of raising capital by firms that back asset 1 decreases accordingly.

That an increase in foreign investors' participation in the market for asset 2 leads to an increase in the price of asset 2 can easily be seen by the same logic above:

By the first order condition:

$$q_2 = \frac{1}{\gamma\sigma_2^2}(\mu_2 - p_2) - \frac{\sigma_{12}}{\sigma_2^2}q_1 \tag{5}$$

Market equilibrium for asset 1 implies that:

$$q_1 = \frac{Q_1}{M} \tag{6}$$

Substituting (6) into (5), gives individual domestic investors' demand for asset 2 at equilibrium:

$$q_2 = \frac{1}{\gamma\sigma_2^2}(\mu_2 - p_2) - \frac{\sigma_{12}}{\sigma_2^2}\left(\frac{Q_1}{M}\right)$$

Aggregate demand for asset 2 at equilibrium is then:

$$Mq_2 + Q_2^f \equiv \left[\frac{M}{\gamma\sigma_2^2}(\mu_2 - p_2) - \frac{\sigma_{12}}{\sigma_2^2}Q_1\right] + Q_2^f \tag{7}$$

Market clearing for asset 2, that is:

$$\left[\frac{M}{\gamma\sigma_2^2}(\mu_2 - p_2) - \frac{\sigma_{12}}{\sigma_2^2}Q_1\right] + Q_2^f = Q_2$$

implies that:

$$p_2 = \left(\mu_2 - \frac{\gamma\sigma_2^2}{M}\left(Q_2 - Q_2^f\right)\right) - \frac{\gamma\sigma_{12}}{M}Q_1 \tag{8}$$

and therefore:

$$\frac{\partial p_2}{\partial Q_2^f} > 0$$

Let asset 2 be the (formerly) State-owned company. No privatization amounts to a trading-restriction on asset 2: domestic investors are the ultimate holders of the State-owned firm and since they cannot trade claims on it, foreign participation is necessarily absent, that is $Q_2^f = 0$. It then follows by (4) that the price of asset 1 attains its minimum value under no-privatization of the State-owned firm. Privatization eliminates such trading restriction, it leads to an increase in the price of asset 1 and hence a fall in firms' cost of capital. These are larger the larger is foreign investors' participation (by (4)). Clearly, the higher foreign investors' participation the higher is also the market price for asset 2 (the privatized company) and hence the State's revenue from privatization (by (8)). Whether this revenue is perceived as wealth by domestic investors is irrelevant, given the assumed agents' preferences.

Proposition 1 *Privatizations that lead to an increase in foreign investors' participation lower firms' cost of capital, even if foreign participation is limited to the privatized companies.*

The simple economy sketched above abstracts from needs to trade at interim dates. More realistically, there will be need to (re)trade at interim dates for liquidity (hedging) reasons, then by the same argument in Pagano (1989), the liquidity risk associated to any given asset will be lower the larger is the number of market participants in that particular asset. Simply stated: σ_i^2 is lower, the larger the number of participants in the market for asset i; σ_{ij} is lower, the higher is the number of participants in the market for either one of the assets i, j, $i \neq j$. Thus, both σ_2^2 and σ_{12} are lower, the higher is foreign participation in the market for asset 2. It then follows directly by

(8) that the result that the higher is foreign investors' participation in the market for asset 2, the higher is the price at which the formerly State-owned asset 2 is privatized, strenghtens. With regard to asset 1, using (4) , we have that:

i) In the *asset 2 State-owned regime*,

the price of asset 1 is p_1:

$$p_1 = \left(\mu_1 - Q_1 \frac{\gamma \sigma_1^2}{M}\right) - \frac{\gamma \sigma_{12}}{M} Q_2 \tag{9}$$

ii) In the *privatization regime cum foreign participation limited to the market of asset* 2,

the price of asset 1 is $p_1^{'}$:

$$p_1^{'} = \left(\mu_1 - Q_1 \frac{\gamma \sigma_1^2}{M}\right) - \frac{\gamma \sigma_{12}^{'}}{M} \left(Q_2 - Q_2^f\right) \tag{10}$$

where

$$Q_2^f > 0 \text{ and } \sigma_{12}^{'} < \sigma_{12}$$

which implies:

$$p_1^{'} > p_1 \tag{11}$$

Thus Proposition 1 holds true, with interim-date (liquidity) trading,.

3.2 Enhanced Domestic Investors' Participation

The benefit to an investor from market participation is higher the larger the variety of assets that can be traded. If market participation is costly, an investor will choose to participate if benefits exceed costs. Then, the larger the variety of assets that can be traded, the higher the number of market participants, the higher the equilibrium assets' prices and the lower is firms' cost of capital.

When the company is State-owned, domestic investors are the ultimate holders of the firm, its risk is ultimately borne entirely by them, but it cannot be traded. By contrast, when the firm is privatized, such claims can be traded, the risk allocation is determined by value-maximizing choices and the benefits of (costly) market participation increase. Privatization will then enhance market participation, whenever this is costly, at least for a subset of agents. We develop this argument below.

Consider a simple one-period economy where there are M atomistic investors, each has an expected utility function over net payoffs of the form:

$$u(y) = -e^{-\gamma y}$$

and composes his portfolio so as to maximize expected utility at the end of the period. Investors can freely borrow and lend at the riskless rate, and the gross riskless rate is one.

However, investors differ for their cost of participating to market. Type 1 agents have no cost, type 2 agents face a fixed cost c; αM agents are of type 2, $(1-\alpha)M$ are of type 1.

There are two (risky) assets $i = 1, 2$. Asset i pays off $\widetilde{V}_i$ per unit at the end of the period; $\widetilde{V}_i$ is stochastically distributed:

$$\widetilde{V}_i \backsim N\left(\mu_i, \sigma_i^2\right)$$

The quantity of asset i is Q_i, and the price per unit of asset i is denoted with p_i. Asset 2 is a State-owned firm, investors are the ultimate holders of asset 2, which is perceived as evenly owned in quantity $\overline{q}_2$:

$$\overline{q}_2 = \frac{Q_2}{M}$$

Asset 1 is originally owned by a type 1 agent, which implies that there will be trading (at least) of asset 1.

Given our assumptions about utility function, distributions of assets' payoffs and no borrowing-lending restrictions, if an agent chooses market participation, then he will solve the following problem:

$$\underset{q_1}{Max} \left\{ \left[\mu_1 q_1 + \mu_2 \overline{q}_2 - \frac{\gamma}{2} Var \right] - p_1 q_1 \right\}$$

$$Var \equiv \left(q_1^2 \sigma_1^2 + \overline{q}_2^2 \sigma_2^2 + 2\sigma_{12} q_1 \overline{q}_2 \right)$$

By the first order conditions:

$$q_1 = \frac{1}{\gamma \sigma_1^2} \left(\mu_1 - p_1 \right) - \frac{1}{\sigma_1^2} \overline{q}_2 \sigma_{12} \tag{12}$$

Type 1 agents will always choose to participate. Suppose that β type 2 agents choose to participate, then the aggregate demand for asset 1 will be Q_1^d :

$$Q_1^d = \left[(1-\alpha) + \beta\alpha \right] M q_1 \tag{13}$$

and the (market clearing) price of asset 1 will be p_1^β :

$$p_1^\beta = \mu_1 - \gamma\left(\sigma_1^2 q_1^\beta + \overline{q}_2\sigma_{12}\right) \tag{14}$$

where

$$q_1^\beta \equiv \frac{Q_1}{[(1-\alpha)+\beta\alpha]\,M} \tag{15}$$

Clearly, p_1^β is increasing in β, that is the larger market participation, the higher the price of (treadable) asset 1.

Given that β type 2 agents participate, the payoff that a (atomistic) type 2 agent rationally expects to obtain by market participation is $EU_{|mp}^\beta$:

$$EU_{|mp}^\beta = \mu_1 q_1^\beta + \mu_2\overline{q}_2 - \frac{\gamma}{2}\left[\left(q_1^\beta\right)^2\sigma_1^2 + \overline{q}_2^2\sigma_2^2 + 2q_1^\beta\overline{q}_2\sigma_{12}\right] - p_1^\beta q_1^\beta - c \tag{16}$$

If a type 2 agent does not participate, then his expected payoff is $EU_{|np}$:

$$EU_{|np} = \mu_2\overline{q}_2 - \frac{\gamma}{2}\overline{q}_2^2\sigma_2^2$$

Assuming an internal solution for β, this is given by β_s that solves:

$$EU_{|mp}^\beta = EU_{|np}$$

that is using $(14)-(15)$, for $\beta=\beta_s$:

$$\gamma\frac{1}{2}\sigma_1^2\left[\frac{Q_1}{[(1-\alpha)+\beta_s\alpha]\,M}\right]^2 \equiv c \qquad . \tag{17}$$

Suppose that the formerly State-owned firm is privatized, asset 2 is now treadable. Then, an agent that chooses market partcipation will optimally set its demand for assets 1 and 2 to q_1, q_2 :

$$q_1 = \frac{1}{\gamma\sigma_1^2}(\mu_1 - p_1) - \frac{1}{\sigma_1^2}q_2\sigma_{12} \tag{18}$$
$$q_2 = \frac{1}{\gamma\sigma_2^2}(\mu_2 - p_2) - \frac{1}{\sigma_2^2}q_1\sigma_{12}$$

Type 1 agents will always choose to participate. Suppose that β type 2 agents choose to participate, then the aggregate demand for asset $i=1,2$ will be Q_i^d :

$$Q_i^d = [(1-\alpha)+\beta\alpha]\,Mq_i \qquad , i=1,2 \tag{19}$$

The (market clearing) price for asset 1 will be p_1^β :

$$p_1^\beta = \mu_1 - \gamma\left(\sigma_1^2 q_1^\beta + \sigma_{12} q_2^\beta\right) \tag{20}$$

and for asset 2, p_2^β :

$$p_2^\beta = \mu_2 - \gamma\left(\sigma_2^2 q_2^\beta + \sigma_{12} q_1^\beta\right) \tag{21}$$

where:

$$q_1^\beta \equiv \frac{Q_1}{[(1-\alpha)+\beta\alpha]\,M} \tag{22}$$

$$q_2^\beta \equiv \frac{Q_2}{[(1-\alpha)+\beta\alpha]\,M} \tag{23}$$

Clearly, p_i^β is increasing in β, that is the larger market participation, the higher the price of asset $i = 1, 2$.

Given that β type 2 agents participate, the payoff that a (atomistic) type 2 agent rationally expects to obtain by market participation is $EU_{|mp}^\beta$:

$$EU_{|mp}^\beta = \mu_1 q_1^\beta + \mu_2 q_2^\beta + p_2^\beta \overline{q}_2 - \frac{\gamma}{2}\left[\left(q_1^\beta\right)^2 \sigma_1^2 + \left(q_2^\beta\right)^2 \sigma_2^2 + 2 q_1^\beta q_2^\beta \sigma_{12}\right] - p_1^\beta q_1^\beta - p_2^\beta q_2^\beta - c \tag{24}$$

where $p_2^\beta \overline{q}_2$ is State's revenue from privatization accruing to an individual agent. If a type 2 agent does not participate, then his expected payoff is $EU_{|np}$:

$$EU_{|np} = p_2^\beta \overline{q}_2$$

Assuming an internal solution for β, this is given by β_p that solves:

$$EU_{|mp}^\beta = EU_{|np}$$

that is using $(20) - (23)$,

$$\gamma \frac{1}{2}\sigma_1^2 \left[\frac{Q_1}{[(1-\alpha)+\beta\alpha]\,M}\right]^2 + q_2^\beta \gamma \left[\frac{1}{2}\sigma_2^2 q_2^\beta + q_1^\beta \sigma_{12}\right] = c \qquad . \tag{25}$$

If

$$\frac{1}{2}\sigma_2^2 \frac{Q_2}{[(1-\alpha)+\beta_s\alpha]\,M} + \frac{Q_1}{[(1-\alpha)+\beta_s\alpha]\,M}\sigma_{12} > 0$$

which is certainly true if $\sigma_{12} \geq 0$, then the solution to (25) is β_p that satisfies:

$$\beta_p > \beta_s$$

which implies that privatization fosters domestic investors' participation.

Proposition 2 *Let market participation be costly. Then privatizations lower firm cost of capital by fostering domestic investors' market participation*

If there is need for interim-dates liquidity trading, then the conclusion above will be reinforced (by the same argument in Section 3.1 above).

4 Do SIPs contribute to stock market development?

Privatization plans may affect the determinants of market liquidity highlighted above. However, private IPOs or private seasoned equity offerings may have a similar effect. In order to claim that market development was spurred by SIPs, we must identify features which are SIP-specific. The following SIP-specific features a should priori increase market liquidity and market size by affecting their determinants:

SIP of telecommunications and public utilities,because of improved diversification opportunities: state-owned companies are often natural monopolies, hence large firms belonging to specific sectors (public utilities, telecommunications). The listing of privately-held companies in these industries would not have been relevant in most countries, because there were too few.

The mean value of SIPs in the telecommunication and computer industry (utilities) in 1977-1997 has been 2,380 (913) millions of dollars (Jones et al., 1999). Their privatisation may imply that investors' diversification opportunities improve, leading to a lower market price for risk. This may be true if diversification opportunities abroad are not exploited due to the home bias. The positive impact of privatization occurring in such industries should be discernible on other companies' liquidity, but possibly for those which operate in the same sector – because their beta increases. Moreover, *initial SIPs should have a larger effect than subsequent seasoned equity offerings*

because of the reduced need for diversification. Improved diversification opportunities could in turn prompt the listing of new companies, as in Pagano (1993).

SIP that use marketing techniques aimed at increasing the number of local investors, because of improved risk-sharing opportunities: some privatisation programs have been aimed at attracting a large number of investors through underpricing and fixed-price offers plus rationing allocation mechanism (Jones at al., 1999). Indeed it has been claimed that fixed-price offer method generates demand cascades that increase participation in the offer (Benveniste and Busaba, 1997). This goal is hard to explain for private IPOs, whereas it is possible to rationalize it in the case of privatizations as an attempt to please the median voters for political purposes (Biais and Perotti, 2000). This aim appears to have been fulfilled in that almost two-thirds of the 54 non-US firms with over 500.000 shareholders are privatized companies. Moreover, SIP companies have a far larger number of stockholders than similar companies in the same country (Megginson and Boutchova, 2000). This should trigger the entry of other investors in the stock market, which would in turn increase the supply of equity capital and market depth -according to Pagano (1989). We should therefore expect market liquidity (and market size) to be positively related to the number of subscribers and/or to the use of fixed price offers instead of, or along with, book-building.

SIP of telecommunications and public utilities, and of those which are marketed abroad because of increased participation by foreign investors. As suggested by the model, this can be captured not only by looking at market liquidity, but by observing the co-movements in the prices of those securities whose payoff is positively correlated with that of the privatized companies.

5 Market development, growth and welfare.

Good-will governments may be interested in stock market development because of its link with welfare and economic growth. As far as welfare is concerned, models by Pagano (1989, 1993) which were already mentioned in section 1 point to welfare gains that may be achieved through improved risk-sharing and market liquidity. As far as the link between growth and

financial market development is concerned, several theories are summarized by Levine (1997). Below we focus on the link between stock market liquidity and corporate performance, which should in turn be positively correlated with growth.

One of the tenets of such literature is that more liquid stock markets improve on the incentives for information acquisition by financial analysts. Their private signals are in turn aggregated and partially mirrored in stock prices - as explained in the early work by Grossman and Stiglitz (1980) and Hellwig (1980). This may positively affect corporate performance and growth because it makes possible to devise managerial incentive schemes which are stock-based (Holmstrom and Tirole, 1993). Clearly, for this link to matter it is necessary that internal control systems –which do not require stock market liquidity– be less efficient than stock market based ones. This may be the case in innovative sectors, where the valuation of investment projects is more difficult. Here the information-aggregation role performed by the stock market may be especially useful in order to summarize different signals and opinions (Allen and Gale (1995)).

Stock market liquidity may however be associated with a worsening of managerial monitoring (Bhide, 1993). This may be the case, for instance, if market liquidity is achieved through regulation that inhibits large shareholdings and the diffusion of that soft information which is usually necessary to evaluate managerial actions. Small shareholdings reduce the owner's incentive to bear the cost of managerial monitoring, and the absence of soft information reduces its benefits. A small shareholder may temporarily increase its holdings before firing bad managers, and this may provide him with sufficient incentives for monitoring (Maug, 1998). But conditions ensuring this are far from general (Repullo, 2000).

Empirical studies address the link between corporate performance and managerial turnover. One result is that internal control schemes seem to work, while take-over based ones need not work (Franks and Mayer, 1996). However there is to our knowledge no evidence on the role of market liquidity on managerial incentive schemes. Macro-econometric analysis study the link between stock market development and growth, without touching on the issue of managerial monitoring. Results here are sharper in that it is shown that the initial level of stock market liquidity is a predictor of economic growth and capital accumulation, while initial capitalization is not a robust predictor -its significance being attached to a few outliers and to the omission of liquidity in the regression (Levine and Zervos, (1998)).

6 Concluding comments.

This note summarizes the determinants of market liquidity. These are order processing costs, the riskiness of the market portfolio,

publicly available information, the likelihood of information trading, competition among stock exchange intermediaries, and risk sharing opportunities which is affected by foreign and local market participation.

SIP may arguably be responsible for stock market development if some of their specific features are found to be correlated with stock market development. Our discussion identifies such features with some industries (telecommunication and utilities) which were under-represented in the privatizing countries' market portfolio and with marketing procedures aimed at broadening local and foreign market participation.

The remaining challenge is to devise a methodology for empirically isolating the effect of privatization plans. In a time series analysis, this task seems difficult because the econometrician should control for changes in the other determinants of market liquidity and size. For instance, both insider trading and public disclosure regulation affect the likelihood of information trading. Changes in stock market microstructure (which may in turn be prompted by technological innovation or competition policies) affect order processing costs. Such changes were common to Eu countries in the 90s, where a large proportion of SIPs took place. In a cross-section of privatizing and non-privatizing countries, the task seems easier. It is in fact possible to look at the impact of both SIP's industry, the method through which privatization was implemented, and the relative number of privatization IPOs while controlling for country dummies.

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