ELSEVIER

Journal of Public Economics 88 (2003) 305–332

JOURNAL OF PUBLIC ECONOMICS

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Privatisation around the world: evidence from panel data

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Received 1 April 1998; received in revised form 30 July 2002; accepted 30 July 2002

Abstract

Why do countries privatise? This paper presents new evidence from a panel of 34 countries over the 1977–1999 period. The empirical analysis shows that privatisation takes place typically in wealthy democracies, encumbered by high public debt, but endowed with deep and liquid stock markets. Budget and 'market' constraints matter, but legal institutions are also important. Indeed, the extent of privatisation in terms of revenues and stakes sold appears more limited in civil law countries, where shareholders are poorly protected, banks powerful, and capital markets less developed.

JEL classification: L33; D72; G15; H6; K22

Keywords: Privatisation; Public finance; Political economy; Law and finance; Capital markets

1. Introduction

Privatisation, defined as the transfer of ownership rights of State-owned enterprise (SOE) to the private sector, is a major trend all over the world. The process began in the late 1970s, with the Thatcher government in Great Britain, and spread across countries and continents to become a distinguishing feature of *fin de siècle* capitalism. Privatisations are now common to most countries and occur across geographical regions and sectors. From

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0047-2727/$ - see front matter
doi:10.1016/S0047-2727(02)00161-5

1977 to 1999, 2459 deals in 121 countries worth approximately US$1110 bn were reported. Global SOE value added decreased on average from 9 to 6% of GDP in the 1978–1991 period (World Bank, 1995). Privatisation also had a tremendous impact on financial markets: by the middle of 2000 privatised SOEs boasted a market capitalisation worth US$3.31trn (Megginson and Netter, 2001).

The empirical literature has provided systematic evidence that privately-owned companies outperform SOEs, and that privatisation enhances the financial and operating performance of firms (Dewenter and Malatesta, 2001; D'Souza and Megginson, 2000). Despite the large welfare gains that could stem from privatisation, few governments have completely transferred ownership and control of SOEs to the private sector. In the reported public offerings between 1977 and 1999, the majority of stock was sold in only 30% of the 617 companies being considered, and it never happened in 11 out of 76 countries. This rough evidence indicates that control is still very much in State hands and that partial or incomplete sales are a common feature of privatisation processes.

Why do governments privatise? Why do some countries accomplish large scale privatisation programmes, and others never privatise at all? Moreover, how do governments privatise? Why do some governments privatise big stakes in SOEs, while others stick to partial privatisation?

This paper provides some answers to these important questions, implementing a two-stage empirical analysis on a panel of 34 developed and less developed economies over the 1977–1999 period. At the first stage, we try to explain why some governments privatise, and others do not. At the second stage, we estimate the extent of privatisation in terms of the economic value of the assets transferred to the private sector, and of the percentages of capital sold in SOEs.

Our main results can be summarised as follows. The first stage of the empirical analysis shows that, as theory predicts, privatisation is associated with high levels of public debt, a well-functioning domestic stock market, and a right-wing majority in office. First, fiscal imbalances trigger privatisation, as the windfall revenue can be used to square public finances. Second, incumbent governments take advantage of hot markets to float SOEs. Indeed, a liquid stock market allows divesting governments to obtain the full market value of the company sold, and to generate more revenue from the sales. Third, right-wing governments resort to privatisation in order to diffuse 'popular capitalism', achieving the political objective of increasing the support for market oriented platforms.

The first stage identifies possible reasons why some countries do *not* privatise. Less established democracies with weak political systems appear barely able to set SOE divestiture in motion. The soundness of political institutions is a key component of sovereign risk, which in turn is a priced factor. Therefore privatisation becomes less feasible in less democratic settings, as governments are forced to implement highly discounted fixed-price offerings. Furthermore, privatisation seems less likely to occur in German civil law countries, such as Austria, Germany, Japan, South Korea, Switzerland, and Taiwan. Interestingly, all these countries have bank-dominated financial systems. Banks may have a vested interest in financing SOE with soft budget constraints, and possibly may obstruct privatisation to preserve the status quo.

Privatising and non-privatising countries emerge as two sharply distinct groups, whose differences hinge upon the economic, political, and institutional environments where

governments operate. But once the privatisation decision is taken, why does the extent of privatisation vary so much across countries?

The second stage of the empirical analysis shows the value of the shares privatised relative to GDP—our first proxy for the size of one country's privatisation—to be affected by domestic stock market development. A deep and liquid market allows the absorption of big issues, so that larger SOEs (and larger chunks of capital of these SOEs) can be more easily privatised. Furthermore, by producing information, market liquidity facilitates monitoring, increases the market value of the company, and allows the divesting shareholder to raise more proceeds from the sales.

Clearly, revenues are useful in providing a first measure of the economic impact of privatisation. Nevertheless, by focusing only on revenues one of the key question in privatisation remains unexplained: Did ownership change hands? To address this question, it is only natural to look at the percentage of capital sold to private investors—our second proxy for the extent of one country's privatisation. Now, legal institutions play a role. Indeed, the empirical analysis shows that the transfer of ownership (and possibly control) appears more limited, and therefore privatisation more partial, in French civil law countries as opposed to common law countries. The law and finance literature has shown that the French civil law origin is associated with poor minority shareholder protection. Legal protection matters also in the context of privatisation, as government should care about the class of newly created shareholders being expropriated by the managers of privatised SOEs. As a consequence, where the law affords weak protection to shareholders, governments are more reluctant to relinquish control, and privatisation remains partial.

From the 1980s onwards, privatisation has inspired an extensive empirical literature, and has now become an established field of research (see Megginson and Netter, 2001, for a comprehensive survey). However, to our knowledge our paper is the first multi-national study dealing with the determinants of privatisation using panel data analysis over a long period of time. Few empirical papers have dealt with the issue using cross-sectional data. Bortolotti et al. (2001) provides first evidence that privatisation is affected by the political majority, budget deficits, and legal institutions. Jones et al. (1999) study underpricing in 137 privatised companies in 34 countries and find evidence that it is more frequent where governments need to gain domestic political support. Megginson et al. (2000) study the choice of a private placement versus flotation on public equity markets in 1992 privatisations in 92 countries, finding that the frequency of share offerings is positively related to the size of the firm.

The paper is organised as follows: Section 2 states the theoretical hypotheses being tested; Section 3 describes the data; Section 4 presents the empirical methodology and the results of the econometric analysis. Section 5 concludes.

2. Determinants of privatisation

Which factors explain privatisation across all countries? This section describes the theories that we assess. The possible determinants of privatisation we focus on are classified into four groups: (i) political preferences; (ii) hard budget constraints; (iii) legal origin; (iv) stock market liquidity.

2.1. Political preferences

It is often argued that privatisation has a political dimension. Conservative parties are believed to be more prone to privatise the economy than socialist or Christian-democratic parties. Indeed, large scale privatisation programmes have been often associated with the leadership of 'right-wing' market-oriented politicians. And the Thatcher's government in UK is the typical example.

But why should a right-wing government privatise? A rationale for the choice may be a forward-looking behaviour of market oriented politicians aiming at gaining future support from the constituencies of shareholders of newly privatised firms.

Biais and Perotti (2002) formalise this intuition in a bi-partisan model of privatisation where two parties cannot commit to a platform before election. In this context, the right-wing party maximises the utility of the rich, the left the utility of the poor, and each party needs the vote of the median class to win the elections. They show that by allocating a substantial amount of shares of privatised companies to the middle class, the right makes the median voter averse to the redistribution policies of the left, and more prone to vote with the right at future elections. A large scale privatisation program may therefore represent a strategy for switching to forms of 'popular capitalism' by creating a constituency of voters interested in the maximisation of the value of their financial assets. Importantly, as the propensity to buy shares is increasing in wealth, strategic underpricing might be necessary to ensure the participation of the middle class when income inequality is high.

Another important dimension in the 'political economy' of privatisation is the government's *credibility*, or ability to marshal the support of private investors. This ability is related to many factors, such as reputation of the government, the presence of restraints on policy reversals and on the implementation of economic policies, etc. Credibility is considered crucial for the financial success of privatisation, since it could affect an investor's willingness to pay (Kikeri et al., 1992). A credible government should therefore be associated with more sales and more privatisation revenue.

Credibility may also affect the size of the stakes privatised. Perotti (1995) provides a theory of partial privatisation based on strategic commitment where, the structure of the offer conveys information on the willingness of governments to bear residual risk. Partial privatisations therefore commit governments not to shift policy in the future. The testable implication of this theory is that a credible government does not need to signal commitment and will be able to sell larger stakes in privatised firms.

Right-wing governments are typically associated with enhanced commitment to market oriented platforms and credibility. Then, the political theories of privatisation yield the following prediction:

H1. *Ceteris paribus, a right-wing government is more likely to privatise, and it should be associated with higher privatisation revenue, and higher percentages of stock sold.*

2.2. Budgetary conditions

When a government is in financial distress, the pressure to square public finance provides an incentive to speed up privatisation and restructuring (Roland, 2000; La Porta

et al., 1999). Privatisation, indeed, has been often recommended as a policy of structural adjustment and stabilisation in developed and less developed economies.

Privatisation contributes directly to balance public finances. First, if inefficient State-owned enterprises are no longer financed by the government after privatisation, subsidies and transfers are cut, with a reduction of expenditures, and an improvement in the primary deficit. Second, privatisation revenues are typically allocated to the reduction of public outstanding debt, generating lower interest payments. Third, public sector debt instruments (such as debt-equity swaps) have been accepted in payment for shares of privatised companies, especially in heavily indebted countries like Mexico, and the Philippines. In this way, foreign debt is directly cancelled. Fourth, privatisation proceeds are sometimes used to finance current expenditure, although this policy does not consider the nonrecurring capital nature of the revenue (Guislain, 1997).

Privatisation could also have an *indirect* effect on public finance. A sustained privatisation program provides a credible signal of policy change, which contributes to reduction of political risk over time (Perotti and Van Oijen, 2001). Indeed, enhanced credibility improves the credit rating for government bonds, generating lower interest payments, and an easier access to capital markets to finance budget deficits.[1]

A government in financial distress has more incentives to sell. In this context, we should also observe more revenues since a financially distressed government will first sell more profitable companies. We can therefore state the following empirical implication:

H2. *Ceteris paribus, a financial distressed government should be more likely to privatise, and should be associated with a higher privatisation revenue, and higher percentages of stock sold.*

2.3. Legal origins

It is a well documented fact that civil law countries—particularly within the French civil law tradition—have a larger SOE sector with respect to common law countries. The average of SOE value-added and SOE investment as a proportion of GDP for common law countries is roughly 11%, in French and German civil law countries it is 15 and 12%, respectively.[2] The State is typically an influential blockholder in French civil law countries. Furthermore, interventionist French civil law countries exhibit a relatively low level of government performance so they are presumably running SOEs quite poorly (La Porta et al., 1999, 2001).

A government in a French civil law country has more SOEs to sell, and owns big stakes in unprofitable companies. In principle, the French civil law origin should be associated with large scale privatisation.

[1] Clearly, in order to establish the net effect of privatisation on public finances one has to consider also the opportunity cost of a reduction of the cash flow rights in SOEs by the government. Indeed, the transfer of ownership entails the loss of the future income stream generated by the company, which could be used to finance the budget. If future dividends are appropriately discounted on privatisation prices, privatisation could theoretically be neutral on public finances. But budgetary shortfalls typically induce risk aversion, so that a certain windfall privatisation revenue is often preferred to an uncertain dividend stream.

[2] These figures refer to the sample of 49 countries in La Porta et al. (1998). Both variables are referred to the period 1978–1991 and are taken from World Bank (1995).

However, a large size of government might be an equilibrium outcome. Politicians in French civil law systems are unwilling to relinquish control in SOEs, which is a powerful instrument of redistribution policy. Interestingly, constitutional provisions that restrain the scope of the private sector, granting the State's monopoly in the provision of strategic services, are typical in French civil law countries.[3] According to this theory, we would therefore expect a lower quantity of privatisations, and lower stakes sold in French civil law countries *in spite of* their big SOE sector.

Different legal traditions are also associated with radically different patterns of investor protection and corporate governance around the world. Common law countries afford extensive legal protection to shareholders and creditors; at the polar opposite, French civil law countries protect both classes of investors much less. The legal protection of investors also affects corporate governance: widespread ownership is positively correlated with investors' protection so that French civil law countries exhibit a higher ownership concentration and less developed capital markets. Access to external funds—debt or equity—becomes more difficult the weaker the legal protection a country affords to corporate investors (La Porta et al., 1997, 1998).

Investor protection could be an important determinant of a country's privatisations. The market value of a company and consequently its privatisation proceeds should be lower where legal protection is poor since there will be a lower demand for privatised equity by minority shareholders. In this context, governments are reluctant to sell big stakes since they know that investors will discount the risk being expropriated by the managers of privatised firms. As a consequence, privatisation remains sporadic and partial.

To summarise, the role of French civil law on privatisation can be summarised as follows:

H3. *Ceteris paribus, as opposed to common law countries, French civil law countries should be less likely to privatise, and should be associated with lower privatisation revenue, and lower percentages of stock sold.*

The German civil law tradition could also be associated with a different pattern of privatisation. First, countries belonging to this group are interventionist, having a relatively large SOE sector, but display a quite high government performance (La Porta et al., 1999). If

[3] According to the 1946 French Constitution, "all property and enterprises of which the running has, or acquires, the character of a national public service or of an actual monopoly are to become public property" (Graham and Prosser, 1991, p. 76). Obviously, this provision does not imply the total prohibition of asset disposals by a French government willing to privatise. Nevertheless, it would face more difficulties in implementing fundamental changes. The Italian Constitution (art. 43) also grants special rights to the State in strategic sectors: "for purpose of general utility the law may reserve in the first instance or transfer, by means of expropriation and payment of compensation, to the State, to public bodies, or to labor or consumer communities, certain undertakings or categories of undertakings operating essential public services, sources of power, or exercising monopolies and invested primarily with a character of general interest" (art. 43). The Portuguese Constitution declared irreversible the 1974 nationalisation, and it had to be amended twice in 1982 and 1989 to allow for privatisations. Outside Europe, The Mexican and the Brazilian constitutions also grant monopoly rights to the State and have been amended in 1990 and 1995, respectively. Similar provisions can be found in Bolivia and Indonesia. Moreover, the constitutions of Benin, Morocco, Senegal and Togo require the parliamentary approval of privatisation law. Conversely, United Kingdom, Australia, Malaysia, and New Zealand (which are all common law countries), grant governments the power to privatise without the intervention of the legislature (Guislain, 1997).

one infers the efficiency of SOEs from the general performance of the State, German civil law countries possibly have fewer incentives to privatise since they are not forced to sell inefficient firms. Second, German civil law countries give creditors solid protection (especially secured creditors), though not shareholders (La Porta et al., 1998). This differential in terms of legal protection could explain why in those countries—with the exception of Japan—equity markets are on average very small as compared to debt markets, and banks powerful. The role of powerful incumbent banks in the privatisation process has not been theoretically investigated. One could claim that banks are fearful of stock market development in the aftermath of privatisation because stock markets reduce their business. More simply, one could claim that incumbent banks have a vested interest in financing SOEs with soft budget constraints and, consequently, they will thwart privatisation.

To summarise, German civil law countries could be associated with a lower quantity of privatisation and lower stakes sold since they are not forced to sell inefficient SOEs and since powerful banks oppose State sell-offs.

H4. *Ceteris paribus, as opposed to common law countries, German civil law countries should be less likely to privatise, and should be associated with lower privatisation revenue, and lower percentages of stock sold.*

2.4. Stock market liquidity

The legal origin dummies developed may be good exogenous proxies for the size of a country's capital markets. But an important element of financial development is still missing in our analysis: market liquidity. Liquidity is crucial because it facilitates diversification (Pagano, 1993; Levine, 1997), information aggregation (Grossman, 1976), monitoring of managers (Hölmstrom and Tirole, 1993; Jensen and Meckling, 1976) and regulation of firms (Faure-Grimaud, 1999).

Clearly, if a liquid stock market is available when privatisation sales occur, it will favour the absorption of big issues, increasing the likelihood of privatisation of large State monopolies. But stock market liquidity is also a natural candidate for the explanation of the financial success of privatisation in terms of proceeds. First, investors require a discount for shares traded in an illiquid market. Second, by facilitating information aggregation, a liquid market allows fuller extraction of company's market value from private investors. A higher stock market liquidity should be therefore associated with higher privatisation revenues.

Furthermore, the ability of a liquid market to monitor managers through informative prices and the threat of takeover should make governments less reluctant to relinquish control since the shareholders face less risk of expropriation. This observation has a straightforward implication in terms of privatised stock: governments operating in economies with liquid markets should sell higher stakes.[4]

[4] It is worth noting that financial market development—and obviously liquidity—is endogenous to privatisation. Unlike private owners which are typically affected by co-ordination problems, a privatising government as the *single* owner of several companies might internalise the externalities stemming from the listing decision, and try to increase the liquidity of the home market through a sequence of well designed issues (Pagano, 1993). We will face the issue of simultaneity in the empirical analysis.

H5. *Ceteris paribus, countries with more liquid (domestic) stock markets should be more likely to privatise, should be associated with a higher privatisation revenue, and higher percentages of stock sold.*

The next sections will describe how we bring these hypotheses to the data.

3. Data

To implement the empirical analysis, we have assembled panel data set, referred to a broad cross-section of countries—developed and developing—for the 1977–1999 period. We have chosen 1977 as initial year because our source (*Privatisation International)* reports the sale of British Petroleum (BP) which occurred in June 1977 as the first privatisation.[5]

The rules for sampling are as follows. We started from the list of 49 countries studied by La Porta et al. (1998), which identifies countries with some non-financial firms with no government ownership traded on their stock exchanges in 1993. The selection of countries is suitable for our purposes: first, we are particularly interested in studying the role of financial markets in shaping privatisation processes; second, legal origin indicators are available in the literature only for this list of countries.

We then identified a minimum set of variables that could be used to test the hypotheses set forth in Section 2. We collected these data for the 1977–1999 period only from official centralised sources.[6] The variables and sources are described in Table 1. These sample rules provide all the relevant data for each observation, which in turn allows us to perform the empirical analysis by using exactly the same number of observations even when different variables are included as regressors.

The countries in the sample cover all geographical areas, with the sole exception of socialist or 'transition' economies. The main reason for this exclusion is that privatisation in transition economies is a unique phenomenon. Even if the governments of the former socialist countries shared many of the general objectives of privatisation, initial conditions were radically different. In centrally planned economies, the private sector barely existed and had to be created out from scratch. Furthermore, privatisation occurred often in the absence of established financial markets and suitable legal institutions, which are critical elements of our analysis. By the same token, comparable information on financial development and legal protection is not available for those countries. Not surprisingly, privatisation in transition economies is becoming a separate field in theoretical and empirical research (Roland, 2000).

3.1. Privatisation data and variables

Privatisation data are obtained from *Privatisation International* (from 1998 part of *IFR-Platinum Database* of Thomson Financial) that is the most comprehensive source of

[5] However, BP was not the first historically. The first privatisation in modern times is considered the sale of Volkswagen by the Adenauer government in 1961 (see also Megginson and Netter, 2001).

[6] Countries use different methodologies and definitions in the production of official statistics. Therefore data collected from disparate national source are hardly comparable. In our empirical analysis, the series we use come only from centralised sources displaying data for all the countries (see Table 1).

historical data at the transaction level.[7] Our source reports privatisation transactions worth more than US$500 000. Sample selection bias therefore becomes the issue.

As far as Italy is concerned, official sources report 592 sales worth US$65.2 bn during the period July 1992–December 1997 (see Ministero del Tesoro). For the same period, our source reports only 49 major deals. In fact, the revenues from those deals amount to US$60.1 bn, approximately 92.1% of the total revenues raised by the whole population of Italian privatisations. As to Mexico, López-de-Silanes reports 361 non-financial privatisations during the period 1983–1992 with revenue worth 6.6% of 1992 GDP (US$22.1 bn approximately). For the same period, our source reports only 30 major deals with revenues worth US$21.7 bn, approximately 98.2% of the total value. Unfortunately, we are unable to further analyse the coverage of our data set due to lack of information. However, these two examples suggest that it is representative of the population of major deals. By the same token, it is clear that our source is not suitable for the statistical analysis of small scale operations.

During the period under observation, 2459 major operations were reported (905 public offers—henceforth PO—and 1554 private sales—henceforth PS) in 121 countries, generating more than US$1.1 trn in revenues. Again sample selection bias within the *Privatisation International* data bank should be limited, since the US$831.8 bn in revenues raised by the 34 countries in our sample account approximately for 75% of total revenues for the 1977–1999 period.

A first step in our analysis is to find a quantitative indicator about the volume of State assets sold by a country in a given year. In this direction, we construct a variable given by the *total gross revenues from privatisation sales (in US$ millions) in country i in year t,* and scale it by GDP (in US$ millions) to allow for cross-country comparisons. We define this variable *REV/GDP*. The numerator of this ratio corresponds to the value of shares of SOEs privatised in a country in a given year. As the numerator and the denominator are flow variables, there is no need to deflating.

Revenues are useful in providing a first measure of the willingness of governments to privatise and of the economic impact of one country's privatisation. Nevertheless, by focusing only on revenues some key questions remain unexplained. To what extent did the ownership of SOEs change? Furthermore, did privatising governments relinquish control?

To address these questions, it is only natural to look at the stakes sold by privatising governments.

At this stage, a crucial distinction has to be made between PO and PS. PS involve smaller companies often privatised fully and generally under private control after privatisation. For the whole sample, the average estimated value of a company—given by the ratio of revenues to the percentage of capital sold, and then multiplied by 100—privatised by PO is US$4.5 bn, whereas by PS it is US$0.57 bn. The average stake sold by PO is 26%, whereas by PS it is 41%. POs typically involve larger companies, with the consequence that substantial revenues can be raised even through small partial sales. The simple mean therefore overestimates the average amount of stock privatised in a country

[7] This source is the most widely used in the empirical analysis of privatisation (see Jones et al., 1999; Megginson and Netter, 2001).

Table 1
Description of the variables

Variable	Definition	Source
CAP	Stock market capitalisation to Gross Domestic Product in country *i* in year *t*. Stock market capitalisation in year *t* is calculated as the average between the end-of-year market capitalisation deflated by the end-of-year Consumer Price Index in year *t* and *t* − 1. Stock market capitalisation refers to a country's main stock exchange.	Beck et al. (1999), updated using data from IFC, Emerging Stock Markets Factbook, and FIBV.
CENTER	Dummy variable taking the value 1 when the incumbent executive in country *i* in year *t* was supported by 'centrist' parties, and 0 otherwise. This label include parties which are in the centre of the political spectrum without officially adhering to free market values, Christian-democratic parties and wide coalitional governments without a clearly discernible orientation.	Banks et al. (1997), Wilfried Derksen's Electoral Web Sites (www.agora.stm.it/elections), Zarate's World Political Leaders 1945–2001 (www.terra.es/personal2/monolith), Library of Congress Country Studies (http://lcweb2.loc.gov/frd/cs/cshome.html)
COMMON LAW	Dummy variable taking value 1 for common law countries, and 0 otherwise.	La Porta et al. (1998))
DEALS	Number of privatisations transactions in country *i* in year *t*. The variable includes *Public Offers* (PO) and *Private Sales* (PS).	Privatisation International Database, IFR Thomson Database
DEBT	Total debt as a percentage of Gross Domestic Product of country *i* in year *t*. Total debt is expressed as the whole stock of direct, government, fixed term contractual obligations to others outstanding at a particular date. It includes domestic debt (such as debt held by monetary authorities, deposit money banks, nonfinancial public enterprises, and households) and foreign debt (such as debt to international development institutions and foreign governments).	International Financial Statistics
ELECTION	Dummy variable taking the value 1 on the year of a country's elections, and zero otherwise. In presidential systems, presidential elections are considered. In parliamentary systems, general elections are considered.	Banks et al. (1997), Wilfried Derksen's Electoral Web Sites (www.agora.stm.it/elections), Persson and Tabellini (2001))
FRENCH LAW	Dummy variable taking value 1 for French civil law countries, and 0 otherwise.	La Porta et al. (1998))
GDP PER CAPITA	Ratio of Gross Domestic Product in constant 1996 US Dollars to population in country *i* in year *t*. Total population counts all residents regardless of legal status or citizenship.	World Development Indicators, World Bank, International Financial Statistics
GERMAN LAW	Dummy variable taking value 1 for German civil law countries, and 0 otherwise.	La Porta et al. (1998))
GROWTH	Annual percentage growth rate of Gross Domestic Product at market prices based on constant local currency in country *i* in year *t*. Aggregates are based on constant 1995 US dollars.	World Development Indicators, and http://www.worldbank.org

Table 1 (*continued*)

Variable	Definition	Source
LEFT WING	Dummy variable taking the value 1 when the incumbent executive in country *i* in year *t* was supported by 'left-wing parties'. parties, and 0 otherwise. Left-wing parties include labour, socialist, social-democratic, and communist parties.	*Banks et al. (1997), Wilfried Derksen's Electoral Web Sites (www.agora.stm.it/elections), Zarate's World Political Leaders 1945–2001 (www.terra.es/personal2/monolith), Library of Congress Country Studies (http://lcweb2.loc.gov/frd/cs/cshome.html)*
NONDEM	Dummy variable taking the value 1 when the incumbent executive in country *i* in year *t* privatisation was dictatorial, military, or authoritarian.	*Banks et al. (1997), Wilfried Derksen's Electoral Web Sites (www.agora.stm.it/elections), Zarate's World Political Leaders 1945–2001 (www.terra.es/personal2/monolith), Library of Congress Country Studies (http://lcweb2.loc.gov/frd/cs/cshome.html)*
PO/DEALS	Privatisations by *Public Offers* to total privatisations (PO and PS) in country *i* in year *t*. It is a missing variable in country-years where no privatisation is reported.	*Privatisation International Database, IFR Thomson Database*
REV/GDP	Total revenues from privatisation to Gross Domestic Product in country *i* in year *t*. Total revenues are revenues in current US dollars from total privatisation deals (*Public Offers* and *Private Sales*). Gross Domestic Product is expressed in current US dollars.	*Privatisation International Database, IFR Thomson Database, World Development Indicators*
RIGHT WING	Dummy variable taking the value 1 when the incumbent executive in country *i* in year *t* was supported by 'democratic-conservative parties', and 0 otherwise. Democratic conservative parties are defined as parties adhering to traditional values in combination with free-market ideology and law-and-order positions.	*Banks et al. (1997), Wilfried Derksen's Electoral Web Sites (www.agora.stm.it/elections), Zarate's World Political Leaders 1945–2001 (www.terra.es/personal2/monolith), Library of Congress Country Studies (http://lcweb2.loc.gov/frd/cs/cshome.html)*
SCAND LAW	Dummy variable taking value 1 for Scandinavian civil law countries, and 0 otherwise.	*La Porta et al. (1998)*)
STOCK	Weighted average percentage of capital privatised by Public Offer (PO) and Private Sale (PS) in country *i* in year *t*. The weights are given by the ratios between the revenues from privatisations by PO and PO in year *t*, and total revenues, respectively. The percentage of capital refers to each privatisation deal.	*Privatisation International Database, IFR Thomson Database*
TURNOVER	Stock market total value traded to total market capitalisation in a country in year *t*. Total market value in year *t* is deflated by the Consumer Price Index in year *t*. Market capitalisation in year *t* is calculated as the average between the end-of-year market capitalisation deflated by the end-of-year Consumer Price Index in year *t* and $t-1$. Trading value and market capitalisation refer to a country's main stock exchange.	*IFC Emerging Stock Markets Factbook 1999, Federation International des Bourse des Valeurs (FIBV)*

that has more frequently sold through PS than PO but raised more revenues by PO than by PS.

To correct this bias, we have constructed *a weighted average percentage of capital sold over all firms,* where the weights are given by the ratios between the revenues from privatisation, by PO and PS, and total revenues in country *i* in year *t*. We define this variable *STOCK*.

An example would clarify the working of this weighting procedure. In 1999, a country like Italy has privatised 14 companies (six by PO and eight by PS) generating US$26 586 ml in revenues. The average stake sold by PO is 37%, while the one by PS is 68%. The simple mean of privatised stock is 55%. Given that 97% of proceeds were generated by PO, the weighted average is 39.5%. In this way, the average privatised stock is closer to the value that, on average, has generated the largest proportion of revenues.

REV/GDP and STOCK will be the only privatisation variables used as dependent variables in our empirical analysis. However, the previous paragraph suggests that it is important to control for the privatisation method. Indeed, PO typically involve larger companies, with shares issued in a sequence of seasoned offerings. In contrast, PS are used to divest control, often allocating large blocks to strategic (often foreign) investors. Furthermore, PO and PS often differ by the pricing method; the first are often highly discounted fixed price offerings; the second are typically private equity placements, often implemented through an auction. We measure the privatisation method by use of *the ratio of the number of PO to the total number of privatisation deals in country i in year t.* We define this variable *PO/DEALS*.

3.2. Explanatory variables

3.2.1. Political dummy variables

To test the political theories described in Section 2, we need data about the partisan dimension of privatisation. In particular, we want to identify the political orientation of privatising governments over time.

In this direction, we have retrieved the political history of the 49 countries in the La Porta et al. (1998) sample from Banks et al., 1997 edition of the *Political Handbook of the World*. This source reports election dates, dates of appointment of the cabinets, and a description of political systems around the world up to 1997. We updated this information for the years 1998–1999 by use of Internet sources listed in Table 1.

We then used Wilfried Derksen's *Electoral Web Sites*[8] and classification system to label incumbent governments, considering the platform and ideological orientation of the supporting parties. Four possible categories are identified: (i) democratic conservative (right wing); (ii) centrist and Christian-democratic; (iii) democratic left-wing; (iv) non-democratic.

Democratic conservative governments are defined as governments supported by parties adhering to free-market ideology and law-and-order positions. Democratic left-wing

[8] This is considered the standard source for this type of information, and has already been used by Beck et al. (1999).

parties include labour, socialist, social-democratic, and communist parties. The category 'centrist' includes governments supported by coalitions which cannot be clearly labelled in any of the above two ways, like broad multi-party coalitional cabinets, non-party transitional cabinets, 'national unity' governments, but also governments supported by parties which are in the centre of the political spectrum without explicitly adhering to free market values or without a clearly discernible orientation (i.e., Christian-democratic, nationalistic, rural, religious or ethnic parties). As for highly factionalised ruling parties, they are classified considering the dominant faction in the government, when clearly discernible (i.e., the Mexican Partido Revolucionario Institutional (PRI) or the Indian Congress Party). The label 'non-democratic' is applied to countries under authoritarian rule, as dictatorial, military, or one-party regimes, where political competition is absent or extremely limited.

When ideological orientation of the government remained unclear (due to frequent party changes and merges in countries such as Turkey, Peru, Pakistan, South Korea), we referred to the description of the political settings and institutions by the Federal Research Division of the Library of Congress of the United States. This source allowed us to classify also the most controversial cases.

In order to identify correctly the political preferences of the incumbent governments, we distinguish presidential and parliamentary systems. In the former, we considered the political orientation of the president's party and his cabinet; in the latter, the political orientation of the parliamentary majority supporting the cabinet. By the same token, in order to identify political switches, we consider presidential elections in presidential systems, and general elections—or simple changes of parliamentary majorities—in parliamentary systems. Determining whether political systems are presidential or not depends on answering a number of questions: following Persson and Tabellini (2001), we choose to check first if the executive depends to a parliamentary majority, second if President is elected by direct popular vote or with a de facto similar way of choice (like in US system) and he forms and leads the cabinet appointing and dismissing ministers (including the Prime Minister, if this office is present), and third (in those few cases where the political system is still uncertain to classify) if the President is the most important decision maker, holding the core of the executive power. We considered presidential ballots *and* parliamentary majorities only in France, a presidential country which is customarily considered parliamentary in case of 'cohabitation'. 'Cohabitation' occurs when the President loses parliamentary majority support and must abandon the reality of power to the prime minister if ever a party other than his own has a majority in the National Assembly (Aron, 1982).

We have to attribute a political label to each country-year. When we observed a change in government's political orientation after elections or (in parliamentary regimes) during the same legislature, we matched the political data with the dates of privatisation sales. We attributed the political label to the government implementing the majority of the sales in the year. For example, a political switch from centrist to right-wing majority occurs in Italy on May 1994: five deals out of nine were implemented by the newly elected government in 1994, so we attached the label 'right-wing' to that year. When a tie occurred, we used the (current) dollar amount of revenues to discriminate. For example, in France after the 1997 elections in June, the newly elected left-wing government implemented the same

number of sales (2) of the former right-wing government. The left-wing government raised 93% of total revenues of the year, so we attached the left-wing label to France 1997.

This methodology allows us to attach unambiguously one of the political dummies (i.e., RIGHT WING, CENTER, LEFT WING, NON DEM) to each country-year.

Theoretically, political cycles shape privatisation processes. Therefore, it is important to control also for election years. Indeed, the pace of privatisation could slow down around elections. First, elections introduce uncertainty about the identity of winning governments. And the incumbent government may avoid leaving a windfall privatisation revenue to the opposition. Second, a newly elected government needs time to implement privatisation, so it is less likely to observe privatisation just in the aftermath of elections.

An interesting case of privatisation strongly shaped by the electoral cycle is Colombia. As a pure presidential system, government has a 4-year fixed tenure. Since its beginnings in 1991, and for three different presidential administrations, the Colombian privatisation process halts during the first year of each new administration (1995, 1999), and boasts a peak of revenues during the last year of each presidential tenure (1994, 1997). As for OECD countries, Ireland is another clear example of privatisation process shaped by political cycles. The Irish process is strongly partisan (with right-wing governments obtaining 81.7% of total revenues), and it also shows regular breaks with a total interruption of sales during electoral periods and the first year of a new government (1990, 1992, 1994, 1997). Similarly, in Australia electoral dates are associated with slow down in privatisation. After its start in 1989, the Australian privatisation process stopped in the electoral year 1990. The process resumed the following year, but the frequency of sales is again lower in the electoral year. Indeed, in the electoral year 1996 only seven deals were implemented, dwarfed by the 14 operations implemented in both 1995 and in 1997. Only small scale operations are reported in the electoral year 1998.

We have therefore constructed a dummy variable, ELECTION, taking the value one in the relevant election years, and zero otherwise. We considered only nation-wide general election for the lower house for parliamentary systems, or presidential elections in presidential systems. Presidential *and* parliamentary elections are considered only in France. In case of electoral systems with a second round of balloting (i.e., France, Peru), we considered the latter electoral date.

3.2.2. Public finance

To measure the current outlook of public finances in a country in a given year we take the value of total (domestic and foreign) debt as a percentage of GDP, and define this variable DEBT.

Some purposely chosen facts demonstrate the role of debt in triggering privatisation, both in developed and in developing economies.

In Europe, the convergence criteria established by Maastricht Treaty in 1992 foresaw a debt target not exceeding of 60% of GDP. The ratification of the Treaty induced several European countries to launch a program of macroeconomic stabilisation which included a privatisation package. For example, in 1992 Italy was verging on financial collapse, with a level of debt close to 105% of GDP, which became 116% in 1994. After some scattered sales in the 1980s, the privatisation process picked up speed just from 1992 onwards. In

8 years, privatisation brought to the Treasury revenues US$101 bn, that were allocated to funds for the amortisation of public debt. During the 1990s, public finances improved substantially: budget deficits were reduced from 10% of GDP in 1992 to 1.9% in 1999. Similarly, Germany experienced a serious deterioration in state finances in 1995, with public debt rising from 29 to 36% of GDP. Interestingly, the privatisation process resumed in 1996 with the first tranche of Deutsche Telekom, yielding US$13 bn revenues. In the last part of the 1990s, privatisation sales totalled US$61 bn, and in 1999, the debt-to-GDP ratio was back to 19%, as in 1982.

Fiscal distress was behind privatisation in several Latin American countries, traditionally hampered by high public and (especially) foreign debt. Mexico, for instance, experienced a debt crisis in 1982 that prevented it from normal borrowing on world capital markets for about 7 years. In 1987 the debt GDP ratio was roughly around 69%. In 1988, the newly elected President Salinas launched a macroeconomic stabilisation policy which included privatisation. The debt ratio declined steadily, with the budget deficit turning into a surplus in 1992–1993, before the new debt crisis that occurred in 1994.

Some recent facts in the Far East are also worth noticing, where substantial waves of privatisation coincided with budgetary shortfalls. Malaysia entered the 1990s encumbered with debt: the debt ratio was 79%, 20% of which held by foreigners. During the decade, they embarked in privatisation, with a sequence of issues on national monopolies and transports. In 1998, the debt ratio was 39%, and budget deficit was 1.7% of GDP. In 1999, privatisation halted. In Korea the debt-to-GDP ratio rose from 10 to 15% in the 1997–1998; in the following years, some important sales in electricity and telecommunication occurred, yielding US$7 bn.

3.2.3. Legal origin dummies

We test the effect of the legal origin by using the dummies developed by La Porta et al. (1998). The dummy COMMON LAW takes the value one in countries belonging to the common law. The dummies FRENCH LAW, GERMAN LAW and SCAND LAW COMMON LAW take the value one in countries belonging to countries belonging to the French, German, and Scandinavian civil law, respectively.

3.2.4. Stock market liquidity

We use two measures of a country's financial development: the ratio of stock market capitalisation to GDP in a country in year *t*, and the turnover ratio, given by the stock market total value traded to market capitalisation in a country in year *t*. We define these variables CAP and TURNOVER, respectively.

The variable CAP is a measure of the relative size of the domestic stock markets; the turnover ratio is one of the most widely accepted measures of stock market liquidity, as it is given by the percentage of outstanding shares which are effectively traded (Amihud, 2000).

Both variables are ratios of stock and flow variables. The stock variable (i.e., market capitalisation) is measured at the end of period, while the flow variables (i.e., GDP and the stock market total value traded) are defined relative to a period. To deflate appropriately these variables, we divide the end-of-year market capitalisation by end-

of-year CPI, and deflate the GDP and the total value traded by the annual CPI. Then, we compute the average of the real stock market capitalisation in year t and $t-1$, and divide the average by real GDP measured in year t, which yields the variable CAP. We divide instead the real value of traded shares measured in year t by the average of the real stock market capitalisation in year t and $t-1$ to obtain the variable TURNOVER (Beck et al., 1999).

A large and liquid stock market indeed facilitates divestiture, allowing governments to maximise revenues. The case of privatisation of Nippon Telegraph & Telephone (NTT)—the Japanese telecommunication monopoly—is interesting in that respect. NTT went public on October 1986. The Japanese government sold 12% of stock, yielding $US15 bn. During the 1987, the stock market boomed, with 30% increase in capitalisation. The government took advantage of a hot market by issuing a second tranche of same size in November 1997, which boasted revenues worth $US40 bn. The secondary offering of NTT is still one of the world's largest share issue in history, with shares priced at ¥ 2 550 000 (Megginson and Boutchkova, 2000). Japan's 70% decline in stock market value in the 1989–1998 period probably explains the slowing down of privatisation in the 1990s, which resumed in 1999 with two NTT sales as Japan rescued from the financial crisis.

3.2.5. Control variables

Among the possible determinants of privatisation, we include two macroeconomic variables: GDP per capita (in constant dollars 1996) and annual growth rates of GDP. Both variables refer to country i in year t, and are labelled GDP and GROWTH, respectively. The first variable allows us to test the hypothesis that privatisation is driven by economic development, with wealthy and mature countries experiencing the roll-back of the State from economic activity after a stage when it played a crucial role in capital accumulation and investment in infrastructure. The second variables allow us to control for the business cycle. High growth rates in GDP are typically associated with a booming economy and high fiscal revenue. In this context, budget constraints are less binding, and there might be less incentives to privatise.

A key control variable is missing in our analysis: the initial size of the state-owned sector. Therefore, our empirical model assumes relatively equal sized state sectors across countries as a starting point. We are aware that this assumption is difficult to accept. Indeed, it is likely that our model does not work well for countries with extremely large or small SOE sectors (such as the US, or most transition economies before privatisation). However, comprehensive data about the size of the SOE sector pre-privatisation are not available for the majority of countries included in our sample, so that a panel data analysis of privatisation with a proper account of initial conditions in terms of governments' ownership is still unfeasible.

3.3. Data description

Table 2 presents the aggregate data on privatisation processes. Countries are ranked by GDP per capita and classified into two broad categories (developed and less developed countries) using the median value of the ranking variable to split the sample.

Table 2
Privatisation across countries[a]

Country	Deals	Revenues	Rev/GDP	Stock	PO/Deals
Switzerland	2	5734.052	0.02268	74.95000	0.50000
Norway	12	3106.571	0.02199	56.06943	0.79167
Japan	14	189 400.139	0.04437	34.32778	1
Sweden	21	14 898.401	0.06775	48.01722	0.64444
Germany	75	71 576.558	0.03541	53.80227	0.35014
Finland	26	10 387.738	0.08479	22.49022	0.83333
France	67	81 524.477	0.05952	26.58321	0.84109
Canada	57	21 079.210	0.03546	60.13323	0.47397
Austria	40	10 081.478	0.04967	33.19907	0.68333
The Netherlands	28	15 482.922	0.04143	36.99554	0.37500
Belgium	11	5963.538	0.02499	42.78714	0.08333
Australia	108	70 596.051	0.18651	70.79184	0.37500
United Kingdom	169	153 394.000	0.11497	71.39784	0.48815
Italy	80	105 936.681	0.09484	33.79306	0.64462
Singapore	22	6507.614	0.07887	23.22259	1
New Zealand	34	12 077.033	0.23188	78.10296	0.24861
Spain	55	59 421.927	0.10881	34.52101	0.68773
Developed countries avg.	48.29	49 245.200	0.07670	47.12849	0.58944
Israel	52	7421.008	0.07712	31.18976	0.59303
South Korea	17	14 690.547	0.03717	22.43911	0.89881
Uruguay	2	19.908	0.00101	75.50000	0
Mexico	41	29 487.942	0.06392	56.91530	0.13788
South Africa	13	3496.831	0.02746	64.12599	0.36667
Chile	16	2622.630	0.03798	37.18750	0.25000
Malaysia	24	7821.708	0.10790	49.12484	0.43290
Turkey	60	3228.023	0.01764	65.61105	0.16429
Colombia	10	5850.749	0.06799	69.46000	0.20000
Thailand	12	2061.313	0.01713	32.20139	0.91667
Zimbabwe	5	190.056	0.03423	56.66667	1
Philippines	14	2166.028	0.02960	38.28922	0.50000
Indonesia	14	5223.897	0.03815	26.93213	0.71429
Nigeria	19	37.974	0.00090	47.83698	1
Sri Lanka	0	0	0.00000	0	
Pakistan	12	1453.027	0.02498	41.58111	0.33333
India	24	5536.303	0.01240	21.92303	0.76786
Less developed countries avg.	19.71	5371.055	0.03503	46.0615	0.51723
Test of means (t-statistic)	2.58**	3.18***	2.63**	0.17	0.69

[a] This tale reports the aggregate figures on privatisation in 34 countries for the 1977–1999 period. Countries are ranked by the average GDP per capita in the 1976–1999 and are classified as 'developed' and 'less developed' using the median value of the variable to split the sample. Deals is the total number of privatisations. Revenues is total revenues (US$ml 1996) from total privatisations. Rev/GDP is the ratio of total revenues cumulated in the period to 1999 GDP (in US$ml 1996). Stock is the average of the positive values of the yearly weighed average of privatised stock. PO/Deals is the ratio of the number of privatisations by Public Offer to the total number of privatisations. ***, **, * denote statistical significance at the 1, 5, and 10%, respectively.

Table 3
Univariate tests: privatising versus non-privatising countries[a]

Explanatory variable	DEALS > 0	DEALS = 0	Difference	*t*-Statistics
CAP	0.5012	0.2707	0.2305	6.2072***
COMMON LAW	0.4405	0.3947	0.0458	1.1136
DEBT	56.549	44.9799	11.569	3.4580***
ELECTION	0.2421	0.2374	0.0047	0.1312
FRENCH LAW	0.3532	0.3501	0.0030	0.0760
GERMAN LAW	0.3532	0.1602	0.1929	5.3294***
SCAND LAW	0.0873	0.0950	− 0.0076	− 0.3197
GDP PER CAPITA	14 662.34	10 822.46	3839.88	4.5644***
GROWTH	3.5339	3.4186	0.1153	0.3994
NONDEM	0.0476	0.1899	− 0.1423	− 5.6309***
RIGHT WING	0.3968	0.2730	0.1238	3.1511**
TURNOVER	0.5019	0.3345	0.1673	4.7545***

[a] This table presents the test of statistical significance of the differences in means of the independent variables. It reports the differences between the average values of the explanatory variables taken in country *i* in year *t* when at least a privatisation occurred (DEALS > 0) and when no privatisation occurred (DEALS = 0).

As to the number of privatisation deals, the developed countries' average is 48.29, while the corresponding average for less developed countries is 19.71. The difference in means is significant at the 5% level. The stage of economic development seems to matter, but a more exhaustive picture emerges by looking at revenues.

Now, the average total revenues for developed countries are around US$49.2 bn, and only US$5.3 bn for less wealthy economies, with highly statistically significant differences in means. However, the extent of privatisation could be determined by the size of the economy. In Table 2 we report the cumulated total revenues in the 1977–1999 period (expressed in 1996 US$ml) suitably scaled by 1999 GDP (also expressed in 1996 US$ml).

The means for developed and less developed countries are substantially different. Expressed as a percentage of GDP, the average privatised assets in developed countries are worth twice the value reported for less developed countries, with a statistically significant difference in means.

Privatisation revenues and deals are crucial measures to gauge the extent of divestiture, but equally important are the percentages of capital which is privatised. Table 2 provides some statistics at the country level also about this important facet of privatisation.

Table 2 is obviously unsatisfactory since it provides only some preliminary information about the role of economic development in privatisation. Tables 3 and 4 provide a more detailed descriptive analysis based on univariate tests where the main explanatory factors are used as ranking variables for our privatisation measures.

First, we try to identify systematic differences between privatising and non-privatising countries, comparing the averages of our explanatory variables in country-years when privatisation occurred, and when it did not occur (Table 3). Second, we try to establish the existence of some correlation between the extent of privatisation measured in terms of revenues and stakes sold and the explanatory variables (Table 4).

Table 4
Univariate tests: privatisation revenues and the percentage of stock sold

Variables	REV/GDP (top 25%)	REV/GDP (bottom 25%)	Difference	*t*-Statistics
Panel A				
CAP	0.6287	0.3807	0.2480	2.9910***
COMMON LAW	0.5079	0.4444	0.0635	0.7093
DEBT	57.767	56.134	1.6330	0.2334
ELECTION	0.2063	0.2063	0	0
FRENCH LAW	0.2857	0.3968	− 0.1111	− 1.314
GDP PER CAPITA	14 866.98	12 363.81	2503.17	1.5183
GERMAN LAW	0.1270	0.0952	0.0317	0.5631
GROWTH	3.7051	3.2001	0.5050	0.8896
NONDEM	0.0159	0.0952	− 0.0794	− 1.9587*
PO/DEALS	0.5135	0.5558	− 0.0424	− 0.5533
RIGHT WING	0.4603	0.4444	0.0159	0.1776
SCAND LAW	0.0794	0.0635	0.0159	0.3433
TURNOVER	0.5775	0.4016	0.1759	2.2865**
Panel B				
CAP	0.6991	0.3972	0.3019	3.0379***
COMMON LAW	0.6136	0.3103	0.3033	3.1503***
DEBT	46.242	58.387	− 12.145	− 1.9028*
ELECTION	0.2045	0.3103	− 0.1058	− 1.2185
FRENCH LAW	0.25	0.4655	− 0.2155	− 2.307**
GDP PER CAPITA	14 955.26	14 418.86	536.40	0.2828
GERMAN LAW	0.0454	0.1207	− 0.0752	− 1.4042
GROWTH	3.0046	3.6703	− 0.6656	− 1.2016
NONDEM	0	0.0517	− 0.0517	− 1.7633*
PO/DEALS	0.2355	0.8244	− 0.5889	− 9.1138***
RIGHT WING	0.5454	0.3276	0.2179	2.2201**
SCAND LAW	0.0909	0.1034	− 0.0125	− 0.2105
TURNOVER	0.4214	0.4744	− 0.0530	− 0.8285

This table presents the test of significance of the differences in means of the explanatory variables. Panels A and B report the statistical significance of the differences between the average values of the explanatory variables in the top and bottom quartile of the distribution of the positive values of the variable REV/GDP and STOCK, respectively. ***, **, * denote statistical significance at the 1, 5, and 10%, respectively.

Overall, the preliminary results suggest that our determinants may have some explanatory power, indicating the need for thorough econometric testing.

4. Econometric analysis

We perform a two-stage empirical analysis. In the first stage, we try to identify the determinants of the government's choice on whether or not to privatise; in the second stage, we try to explain what determines the quantity of privatisation in terms of revenues and the size of the stakes sold. It is appropriate to use the same set of explanatory variables, as the theories set forth in Section 2 apply to both stages.

4.1. The testing strategy

At the first stage, we estimate the probability that privatisation occurs in country i in year t. The dependent variable is a binary choice variable y_{it} which takes the value 1 when privatisation is observed in country i at time t and 0 otherwise. Following Baltagi (1995), we assume that governments privatise when their 'utility' is above a certain unobservable threshold y^*_{it}, which can be described as follows:

$$y_{it} = 1 \quad \text{if } y^*_{it} > 0 \quad i = 1, \ldots N$$

$$y_{it} = 0 \quad \text{if } y^*_{it} \leq 0 \quad t = 1, \ldots, T$$

where

$$y^*_{it} = x_{it}\beta + u_{it}, \tag{1.1}$$

$$u_{it} = \mu_i + \upsilon_{it}, \tag{1.2}$$

x_{it} is the vector of explanatory variables, N the number of countries, T the number of years, μ_i is a country-specific time-invariant effect.

Denote p_{it} the probability of a privatisation taking place in country i at time t, then

$$E(y_{it} \mid x_{it}) = p_{it}$$

This probability is modelled as a function of some explanatory variables

$$p_{it} = \Pr[y_{it} = 1 \mid x_{it}] = \Pr[y^*_{it} > 0 \mid x_{it}] = \Pr[u_{it} > -x^*_{it}\beta]$$

$$= E(y_{it} \mid x_{it}) = F(x'_{it}\beta)$$

and can be estimated by using a normal cumulative distribution function to constrain the probability between 0 and 1, which under the assumption of normality for the disturbance u_{it} yields the probit model.

A potential problem with this regression is that the fixed-effect μ_i might be correlated with the explanatory variables x_{it} thus biasing the estimate of β. It is known that the presence of fixed-effects complicates matters significantly in non-linear models. Sufficient statistics conditioning on which fixed-effects are swept out of the likelihood exist only in special cases; the inclusion of individual dummies does not solve the problem since due to the non-linearity of the model the estimate of β remains inconsistent unless the time dimension T goes to infinity (Hsiao, 1986; Baltagi, 1995). In order to test for the correlation between individual fixed effects and explanatory variables we run a pooled probit model with country indicators. Since the time dimension in our panel is not negligible, we feel that even if biased, the resulting estimates are an acceptable starting point. Besides we also run a random-effects probit model, under the assumption that $\mu_i \sim IID(0, \sigma^2_\mu)$ and $\upsilon_{it} \sim IID(0, \sigma^2_\upsilon)$.

When legal origin indicators (COMMON, FRENCH, GERMAN, SCAND LAW) are included as regressors, we cannot run the pooled model as they are perfectly collinear with the country effects. In this case, we will present only the results of the random effects model. In this models, these dummies allows us also to account partially for the time invariant cross-country heterogeneity.

At the second stage, we estimate the revenues raised by governments (REV/GDP) and the percentage of privatised stock (STOCK) in country i at time t, when privatisation occurred, controlling for country heterogeneity by conventional fixed and random-effects panel models.

The general model we referred to can be written as follows:

$$z_{it} = x_{it}' \beta + \mu_i + \upsilon_{it}$$

where z_{it} is the privatisation dependent variable (i.e., REV/GDP or STOCK). The fixed-effects specification assumes that country-specific effects μ_i are fixed. The estimator (also called the within estimator) is obtained, under the hypothesis of non-correlation between the υ_{it} and the independent variables, by the OLS estimation of the following equation:

$$(z_{it} - \bar{z}_i) = (x_{it} - \bar{x}_i)\beta + (\upsilon_{it} - \upsilon_i)$$

The hypothesis of fixed country-specific effects causes a loss of degrees of freedom that may be reduced by using a random-effects model, which assume that $\mu_i \sim IID(0, \sigma_\mu^2)$ and $\upsilon_{it} \sim IID(0, \sigma_\upsilon^2)$, μ_i are independent from the υ_{it} and both are uncorrelated from the independent variables.

The random effect model has the form

$$(z_{it} - \theta\bar{z}_i) = (1 - \theta)\alpha + (x_{it} - \theta\bar{x}_i)\beta + [(1 - \theta)\mu_i + (\upsilon_{it} - \theta v_i]$$

where θ is a function of σ_μ^2 and σ_υ^2.

The random and the fixed effects models allow for specific effects. In order to assess the consistency of the random effects, we have performed a Hausman (1978) specification test, under the null of non-systematic differences in coefficients. If they do not statistically differ (i.e., the test is not significant at the conventional levels), the random-effects model is more efficient. Clearly, the test is performed only on the coefficients of the time-varying variables included in both models.

We are aware that our second stage estimations may be affected by a potential sample selection problem. Indeed, the unobservables entering the revenues/privatised stock equation at time t might be correlated with the privatisation choice. Given this possible bias, we simply admit that we are estimating conditional expectations, and suggest the reader some caution in the causal interpretation of our reported coefficients.[9]

[9] As a partial solution, one could claim that the fixed effect estimation may correct the sample selection bias due to the correlation between the *time-invariant* unobservables in the two equations. However, room would still be left for bias stemming from the correlation between *time-varying* unobservables.

4.2. Endogeneity

Conceptually, some explanatory variables are endogenous to privatisation. In particular, privatisation is known to affect directly and indirectly public finances and financial market development. In many countries, privatisation revenues allowed governments to balance the budget, and to boost domestic stock markets, both in terms of capitalisation, and maybe more importantly, in terms of liquidity.

We address the issue of simultaneity by using the *lagged* debt-to-GDP ratio (DEBT), the stock market capitalisation to GDP (CAP), and the turnover ratio (TURNOVER) as explanatory variables. Clearly, lagging such variables provides only a partial solution to the problem since the lagged variable is predetermined but not strictly exogenous. However, it is known that as T becomes large, the bias that we introduce becomes negligible (see Baltagi, 1995). Since the longitudinal size of our panel is relatively large (23 years), we believe the resulting bias of second-order relevance.

4.3. Results

We perform the first stage estimation using the probit models. Overall, the results in Table 5 appear robust: the sign of the coefficients and the statistical significance of several variables of interests are maintained in the pooled models with country effects and in random effects model.[10]

The results of probit analysis confirm most of the results of the univariate analysis in Table 3. Privatisation is more likely when a country has developed financial markets, high levels of foreign debt, and high per capita income.

The role of financial development is particularly striking: the coefficients of the lagged capitalisation (CAP) and the lagged turnover ratio (TURNOVER) are always positive and statistically significant at the 1% level. The theoretical prediction about the role of market liquidity in privatisation (H5) is largely confirmed in our data. Privatisation waves are associated with high market liquidity. Governments take advantage of hot markets, supplying shares of privatised companies when there is excess demand, which in turn allows it to fetch a better price.

High levels of sovereign debt induce governments to privatise, confirming the role of public finance in SOE divestiture stated in the hypothesis H2. The coefficient of the lagged value of debt-to-GDP (DEBT) ratio is always significant in several, especially so in random effects models. Privatising governments are typically encumbered by debt. And windfall privatisation revenues are allocated to improve (directly and indirectly) fiscal conditions.

Furthermore, economic development matters: the probability of privatisation is higher in wealthy economies with high levels of per capita GDP. The econometric analysis is fully consistent with the descriptive analysis, and suggests that privatisation characterises a

[10] Notice that 25 observations are dropped in the pooled model for a technical reason: for three countries, the model predicts failure or success perfectly (i.e., in the first case, no privatisation is reported in each country years; in the second, a privatisation is reported in all country years, so that a probability cannot be estimated). And this slight difference in the sample size is partly responsible of the difference in the coefficients of the pooled and random effects models.

Table 5
Probit equation for probability of privatisation[a]

Explanatory variables	Pooled model (1)	Random effects (2)	Random effects (3)
CONSTANT		− 2.2135***	− 2.2023***
		(0.3165)	(0.3588)
GDP PER CAPITA	0.00009***	0.00005***	0.00006***
	(0.00002)	(0.00001)	(0.00002)
GROWTH	0.0323	0.0322	0.0305
	(0.0215)	(0.0209)	(0.0208)
RIGHT WING	0.3014	0.2823*	0.3199*
	(0.1861)	(0.1684)	(0.1715)
NONDEM	− 0.7177**	− 0.5977**	− 0.6214**
	(0.3416)	(0.2804)	(0.3152)
ELECTION	− 0.0865	− 0.0865	− 0.0950
	(0.1512)	(0.1459)	(0.1459)
DEBT $(t-1)$	0.0058**	0.0060***	0.0053***
	(0.0023)	(0.0016)	(0.0018)
CAP $(t-1)$	1.7433***	1.6011***	1.4583***
	(0.3221)	(0.2822)	(0.2647)
TURNOVER $(t-1)$	1.0546***	0.9517***	1.0607***
	(0.2561)	(0.2097)	(0.2215)
FRENCH LAW			0.3988
			(0.3536)
GERMAN LAW			− 1.5086**
			(0.72206)
SCAND LAW			− 0.7156
			(0.5667)
LogLikelihood	− 256.98	− 315.01	− 310.96
Nobs:	564	589	589

[a] This table reports the estimated coefficients and associated standard errors (in parenthesis) of probit estimation. The dependent variable is an indicator taking the value one when a privatisation deal (DEALS > 0) is observed in country i in year t. The suffix $(t-1)$ indicates that the variable is lagged of 1 year. Eq. (1) reports the estimated coefficients of a pooled model with country indicators (the coefficients of the individual country effects are not reported). Eqs. (2) and (3) report the estimated coefficients of a model under the assumption of normality of the individual effects. ***, **, * denote statistical significance at the 1, 5, and 10%, respectively.

more advanced stage of economic development. Interestingly, privatisation does not seem instead related to the business cycle, measured by growth rates of GDP.

As to the political dimension of privatisation, the coefficient of the dummy RIGHT WING is positive and statistically significant at the 10% level, although it loses some significance in the pooled model (Eq. (1) in Table 5). A theoretical prediction of the Biais and Perotti (2002) model is partly confirmed in our data: privatisation is indeed more likely to be implemented by right-wing governments, maybe to increase the support for market-oriented platforms in future elections.

Sound political institutions are key in privatisation: privatisation tends to be absent if democratic political institutions are not in place. Importantly, these results survive when we control for spurious correlation by use of per capita GDP. Indeed, the dummy NONDEM is always statistically significant at 5% level. There are good reasons why a

lower frequency of privatisation is observed in less established democracies. Indeed, political accountability is a typical component of country risk. And if investors are wary of being expropriated, the shares of SOE issued by non democratic governments will be heavily discounted. In turn, this reduces the feasibility of the privatisation program.[11]

Finally, legal origin, and more precisely, the German civil law tradition negatively affects the probability of privatisation. German Law countries such as Austria, Germany, Japan, South Korea, Switzerland, and Taiwan seem particularly reluctant to privatise as opposed to common law countries, which we use as the benchmark. German law is associated with a relatively efficient SOE sector, and with strong banks. The first factor lowers the incentives to privatise; the second reduces the feasibility of a privatisation program, as entrenched financial intermediaries have an interest in financing a relatively profitable SOE sector.

We now turn to the second stage of the estimation, where we try to estimate the quantity of privatisation in terms of revenues as a fraction of GDP (REV/GDP) and stakes sold (STOCK). Results are shown in Tables 6 and 7. As to the choice of explanatory variables, we use the same specification of the probit model, adding only the variable which allows us to control for the privatisation method (PO/DEALS), which clearly could not be used in the first stage.

As compared with the probit models, the explanatory power of our variables is more limited. However, in Table 6 we single out two factors which seem to affect the quantity of privatisation in terms of revenues: the privatisation method and market liquidity. Curiously, lower revenues are associated with the government's choice of privatisation on public equity markets. Conversely, selling shares by private equity placement pays off more in terms of proceeds. The coefficient of the PO/DEALS variable is always negative and significant across specifications. This evidence is partly surprising as larger companies are typically sold through public offers. However, it is largely documented that share issue privatisations (i.e., PO) are strongly underpriced, and often more than their private sector counterparts (Dewenter and Malatesta, 1997). Furthermore, large companies are often sold piecemeal in several seasoned offers, so that only a fraction of equity is sold (Jones et al., 1999). On the contrary, PS are typically block auctions for the majority of stock, so that control rights and the associated benefits are also transferred at privatisation, raising revenues.

As to market liquidity, the coefficient of the lagged turnover ratio (i.e., the stock market total value of trades to capitalisation) is positive and significant at the 5% level in the fixed effect model. By combining the evidence stemming from the two stages of the analysis, we can conclude that liquidity not only makes privatisation feasible, but raises the proceeds. The political dummies RIGHT WING and NONDEM and the legal origin dummies displays consistent signs with the probit estimates but are never significant.

Besides revenues, the second stage of the estimation involves the econometric analysis of the percentages of capital sold. As Table 7 shows, three factors appear particularly relevant in that respect: the privatisation method, legal origin, and the proximity of elections.

[11] When both political dummies RIGHT and NONDEM are included, the dummies CENTER and LEFT are the 'benchmark'. This specification is suitable to test the political theories of privatisation in democratic settings, but not to isolate the effect of the absence of democratic political institutions on privatisation. In this direction, we have performed a sensitivity test by including only the political dummy NONDEM, obtaining very similar results.

Table 6
Panel data estimations: privatisation revenues[a]

Explanatory variables	Fixed effects (1)	Random effects (2)	Random effects (3)
Constant	0.0061	0.0037	0.0062*
	(0.0056)	(0.0030)	(0.0036)
GDP PER CAPITA	− 1.03e-07	4.84e-08	1.09e-07
	(2.87e-07)	(1.01e-07)	(1.23e-07)
GROWTH	0.00035	0.00025	0.0002
	(0.0003)	(0.00025)	(0.00025)
RIGHT WING	0.0026	0.0018	0.0015
	(0.0017)	(0.0015)	(0.0016)
NONDEM	− 0.0039	− 0.0027	− 0.0025
	(0.0056)	(0.0039)	(0.0040)
ELECTION	− 0.0006	− 0.0005	− 0.0003
	(0.0015)	(0.0015)	(0.0015)
DEBT $(t-1)$	0.00003	0.00002	0.00001
	(0.00005)	(0.00003)	(0.00003)
CAP $(t-1)$	− 0.0021	0.0011	0.00001
	(0.0028)	(0.0018)	(0.0019)
TURNOVER $(t-1)$	0.0049**	0.0024	0.0032
	(0.0023)	(0.0019)	(0.0020)
PO/DEALS	− 0.0045**	− 0.0031*	− 0.0034*
	(0.0021)	(0.0018)	(0.0018)
FRENCH LAW			− 0.0034
			(0.0026)
GERMAN LAW			− 0.0050
			(0.0040)
SCAND LAW			− 0.0035
			(0.0045)
Nobs	251	251	251
Tests			
F	1.85*		
χ^2		10.86	10.13

[a] This table reports the estimated coefficients and associated standard errors (in parenthesis) of panel data estimation. The dependent variable is given by the ratio of total revenues form privatisation to Gross Domestic Product in country i in year t. The suffix $(t-1)$ indicates that the variable is lagged of 1 year. The fixed effects (within) model assumes that each cross-section unit has its own intercept; the random effects model assumes that intercepts are drawn from a normal distribution. F tests the null of joint significance of the parameters in the fixed effects models. Hausman χ^2 test the null of non systematic differences in the coefficients of the fixed and random effects model. ***, **, * denote statistical significance at the 1, 5, and 10%, respectively.

First, PO involve the privatisation of smaller stakes. The ratio of PO to total privatisation sales (PO/DEALS) is negatively related to the average percentages of capital sold, with coefficients statistically significant at the 1% level. This result suggests that when estimating the percentages of capital it is important to control for the government's choice of selling SOEs in public or private capital markets.

Second, full privatisation seems particularly difficult to implement in civil law countries. The French law dummy yields the strongest results, with a negative and highly significant

Table 7
Panel data estimations: the percentage of stock sold[a]

Explanatory variables	Fixed effects (1)	Random effects (2)	Random effects (3)
Constant	61.364***	57.959***	67.573***
	(12.008)	(6.7895)	(7.774)
GDP PER CAPITA	− 0.0002	0.00019	0.00031
	(0.0006)	(0.0002)	(0.0003)
GROWTH	0.8174	0.1671	0.04798
	(0.6164)	(0.5674)	(0.5643)
RIGHT WING	4.6127	5.1380	4.3776
	(3.6547)	(3.2951)	(3.3240)
NONDEM	− 7.5871	3.4094	4.6899
	(12.7522)	(9.2002)	(8.9807)
ELECTION	− 6.2159**	− 6.1857**	− 5.5535*
	(3.1273)	(3.0890)	(3.0969)
DEBT$(t-1)$	− 0.0438	− 0.0478	− 0.0891
	(0.1042)	(0.0612)	(0.0622)
CAP$(t-1)$	6.1404	6.9179*	3.9046
	(5.8177)	(3.9461)	(4.0939)
TURNOVER$(t-1)$	2.4250	0.1134	2.3677
	(4.8276)	(4.1329)	(4.2858)
PO/DEALS	− 32.854***	− 33.413***	− 34.981***
	(4.3664)	(3.8324)	(3.8828)
FRENCH LAW			− 13.144**
			(5.7481)
GERMAN LAW			− 15.5233*
			(8.6421)
SCAND LAW			− 4.9240
			(9.7625)
Nobs	234	234	234
Tests			
F	8.99***		
χ^2		13.89	13.53

[a] This table reports the estimated coefficients and associated standard errors (in parenthesis) of panel data estimation. The dependent variable is given by the weighted average of privatised stock in country i in year t. The suffix $(t-1)$ indicates that the variable is lagged of 1 year. The fixed effects (within) model assumes that each cross-section unit has its own intercept; the random effects model assumes that intercepts are drawn from a normal distribution. F tests the null of joint significance of the parameters in the fixed effects models. Hausman χ^2 test the null of non systematic differences in the coefficients of the fixed and random effects model. ***, **, * denote statistical significance at the 1, 5, and 10%, respectively.

coefficient. We have learned from the law and finance literature that the French civil law is a proxy for a extensive government ownership, and weak legal protection of investor. Our results suggest that French civil law governments appear reluctant to privatise in spite of their large stakes in the SOE sector, maybe to keep political interference in firms. Government ownership and legal protection of investors are probably jointly determined, as minority shareholders do not need protection if they barely exist. However, poor legal protection affects the incentives of privatising governments. When suitable legal institu-

tions are not in place and enforced, governments may opt for partial privatisations, discounting the risk of entrenchment or expropriation by management that minority shareholders will face. The same negative and statistically significant relation is found with the German civil law countries, confirming the role of strong banks in ousting SOE divestiture that we have identified in the first stage of the analysis.

Finally, elections seem to make governments more reluctant to sell. The dummy ELECTION, which is attached to each electoral year in the countries of our sample, is negatively and significantly related to the percentages of stock sold. On the one hand, incumbent governments are maybe wary to relinquish a substantial privatisation revenue to the opposition in case of electoral defeat. On the other hand, they do not halt the privatisation process completely, as there is also some chance of being in office to manage the allocation of privatisation proceeds.

5. Conclusions

This paper has tried to explore empirically the reasons why governments privatise, and to assess the size and extent of privatisation processes around the world.

We identify market, budget and institutional constraints affecting privatisation. First, privatisation appears to be facilitated by a well-functioning financial system. Deep and liquid domestic equity markets allow the privatisation of large State-owned enterprises, and to extract the full market value of the company sold. Second, privatisation seems triggered by high levels of sovereign debt, as revenues can be allocated to square the budget. Third, privatisation requires suitable political and legal institutions to be set in motion. Indeed, assets can be credibly transferred from the State to the private sector only if the law provides adequate protection to private investment.

Acknowledgements

We thank the anonymous referees and especially the editor (Roger Gordon) for his suggestions and advice. We thank also Eric Berglöf, Bruno Biais, Carlo Carraro, George Clark, Claude d'Aspremont, Francesco Giavazzi, William Megginson, Giovanna Nicodano, Marco Pagano, Enrico Perotti, Gérard Roland, Alessandro Sembenelli, Carlo Scarpa, Mary Shirley, Andrei Shleifer, Guido Tabellini, Serena Vitalini, and Luigi Zingales for their useful comments. We owe a debt of gratitude to Enrico Rettore for key insight in the design of the testing strategy. Luca Sala, Luca Farinola, and Laura Poddi provided excellent research assistance. We are solely responsible for remaining errors.

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