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FROM STATE TO MARKET REVISITED: A REASSESSMENT OF THE EMPIRICAL EVIDENCE ON THE EFFICIENCY OF PUBLIC (AND PRIVATELY-OWNED) ENTERPRISES

by

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ABSTRACT: *For several decades public enterprises have been criticized for their poor economic performance. Many economists take it as 'conventional wisdom' that publicly owned enterprises are inefficient by their very nature. This seemed to be proved by what is probably the most cited survey worldwide, that written by Megginson and Netter (2001). They claim: 'Research now supports the proposition that privately owned firms are more efficient and more profitable than otherwise-comparable state-owned firms' (p. 380). We argue that profits are not a reasonable performance measure for public enterprises. However, our main focus is to present a much more comprehensive review of the empirical evidence, including more recent research than was provided by Megginson and Netter. The evidence indicates that these authors were biased in their selection of empirical studies and their conclusion as well. Firstly, the true picture is much more differentiated than Megginson and Netter suggest. Secondly, with regard to productivity and production cost, there is no support for the claim that private enterprises have better performance ceteris paribus than public enterprises.*

Keywords: Public enterprises, publicly provided goods, efficiency, privatization, firm performance.
JEL classification: D24, H42, L25, L32.

1 Introduction

In the economic literature, as well as in public debates, the economic performance of public enterprises is most often regarded as inferior to that of private enterprise. This assumption, strongly supported not only by certain political parties but also by international organizations like the World Bank and the International Monetary Fund (IMF), was surely one of the main drivers of privatization campaigns worldwide. Another motivation for privatization is special interest – privatization can generate large amounts of wealth for some people or create large (privately held) shareholder value (see e.g. Parker 2003, 96) even while the majority of society loses out (see e.g. Stiglitz 2008, XI).

The objective of this contribution is to question the popular belief, occasionally termed as the 'conventional wisdom', of the superiority of private enterprises. A

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substantial foundation of this belief is some empirical works or surveys of empirical works from the past several decades of accrued research. Clearly, the most referenced of these is a survey by Megginson and Netter (2001) entitled 'From state to market: a survey of empirical studies on privatization'. In what follows we try to present, as far as possible, a compilation of empirical results on this topic including more extensive and particularly more recent evidence. In doing so, we will see that the empirical evidence on this issue is today very differentiated.

Because there is an almost unmanageable amount of single studies on this issue, a comprehensive first-hand examination of the international literature is beyond the scope of this paper (and beyond the resources of the author as well). Instead, we will focus on the results of surveys. We present the fundamental results of these surveys, cite the core conclusions of the authors and provide a discussion.

Another limitation imposed on this study is the existing literature's emphasis on developed or industrialized countries ('the western world'). The western world exhibits (relatively) well designed institutions, relatively less corruption and nepotism, and fair political competition for votes. Therefore we can expect the existence of effective market and regulatory mechanisms (Bradburd 1996).[1] Under these circumstances it is safely assumed that private firms are less able to exploit monopoly power and are more efficient than in countries lacking these characteristics. For this reason, the results presented here may not apply to less developed countries or transition economies.

Strictly speaking, drawing comparisons between public enterprises and private enterprises necessarily entails some simplification. First of all the distinction between public and private enterprise often may not be clear-cut. There are mixed enterprises with different balances between the public and private shares. Often enterprises with more than a 50% public share are attributed to the public sector and enterprises with a private proportion of more than 50% are designated as private. However, this boundary between public and private is arbitrary. Furthermore, some firms considered to be private in one economy may in fact be owned by foreign governments. Irrespective of the cut-off between public and private enterprises both groups of enterprises are heterogeneous also in terms of their other characteristics. Public enterprises may be state owned or municipal owned and can take on different legal and organizational forms. Private enterprises could be public corporations with either widespread or concentrated ownership (this, for example, is the focus of the widely known book by Berle and Means, 1932), or they may belong to a single entrepreneur. So, when we speak about public enterprises or private enterprises, we are speaking in both cases of enterprises that can have quite different forms of ownership, and varied legal and organizational structures.

This paper is organized as follows. Section 2 provides a short presentation of possible reasons for a systematic difference between public and private enterprises. Section 3 addresses the question of proper measures for efficiency. Section 4 presents the results of 19 surveys on the relative performance/efficiency of public and private enterprises as well as the evidence from two meta-analyses. A final discussion is provided in section 5.

1 For differences between developed and developing countries see e.g. Parker and Kirkpatrick (2005) or Boubakri et al. (2005).

2 Factors determining differences in performance (theoretical models)

If we presume a difference exists in the economic performance of public versus private enterprises then there must be some mechanism(s) behind this difference. While many theories have been posited on this matter, due to space limitations I will shortly present (only) a few selected theoretical approaches used to explain possible economic performance differences.[2]

The widely advocated property rights approach (Alchian 1965) provides the theoretical (and perhaps ideological) basis for most of the early empirical work. According to this approach, variations in the separation and attenuation of property rights explain differences in performance. Since property rights in public enterprises are most often distributed worse than in private enterprises, we can expect there to almost always be inferior incentives in public enterprises. Inferior incentives in turn imply inferior efficiency too. More recent theoretical work goes beyond this (over-)simplistic paradigm and is based on more formal analysis.

Another class of theoretical models employs principal-agent theory (see for example Shapiro and Willig 1989; Pint 1991; de Fraja 1993). There is also a category of models that picks up on the idea of incomplete contracts (see e.g. Laffont and Tirole 1991; Schmidt 1996a,b; Hart et al. 1997). The results of all of these models depend on their assumptions and parameter values. With any given assumption, there is a set of 'critical' parameter values that determines whether public or private ownership is advantageous. To put it differently: Under some circumstances private ownership is favourable and under other conditions public ownership is advantageous.

The aforementioned models and approaches rely on the assumption that individuals behave as homo economicus (economic man). This neglects phenomena like intrinsic (see e.g. Frey 1997) or public service motivation (see e.g. Houston 2000; Wright 2001). Despite the difficulties faced when integrating any departures from economic man into mathematical analysis, we would expect that intrinsic motivation, for example, is critical for a better understanding of the (relative) efficiency of public and private enterprise. Thus, it could explain a significant part of the difference (if any) in their performance.

In summary, the results of current theoretical analyses are ambiguous. Current theory provides no reason to believe with any certainty that private enterprises in general perform better than public enterprises or vice versa.

3 Proper performance measures for public enterprises

Before comparing public and private enterprise we have to consider what constitutes reasonable measures of economic performance. A useful starting point for these considerations is to consider first the purpose of public enterprises. In this context we should distinguish between the (so-called) welfare approach and the public choice approach.

2 For more comprehensive overviews of theoretical models on the issue see e.g. Villalonga (2000); Cavaliere and Scabrosetti (2008).

According to the welfare approach, the economic rationale for public enterprises is (static or dynamic) market failure (see e.g. Rees 1984). Against this background, public enterprises are seen as a means to counter market failure, most notably in cases of natural monopolies or negative externalities. Without market failure there is no reason to have public enterprises. In other words: Comparisons between publicly and privately-owned enterprises are only relevant in market failure conditions.

Market failure is only a necessary and not a sufficient condition for the existence of public enterprises. An alternative institutional arrangement is regulated private firms. So (necessarily in cases of market failure) it is reasonable to look at the social costs and benefits of private and public enterprises, or their welfare effects. Usually, we measure social costs and benefits in terms of consumer surplus and producer surplus or as the sum of both these measures, the so-called social surplus (synonymous to 'total surplus'). Therefore, welfare measures are (theoretically) adequate indicators of the performance of private and public enterprises in general. However, measuring welfare effects is rife with difficulties and requires data that are often not available.

For this reason the comparison of public and private enterprises mostly rests, in our context, upon management accounting or financial accounting data. Financial accounting essentially provides data on profit, debt, and equity. Management accounting delivers information about costs, revenues, and outputs. If we assume that public enterprises are welfare orientated, they will probably not pursue the goal of profit maximizing. This is because profit maximizing behaviour is contradictory to welfare maximization in environments with less or no competition.[3] Welfare maximization requires marginal cost pricing (as a first best solution) or average cost pricing or Ramsey pricing (as second best solutions) and does not leave profits above opportunity costs. This is a sufficient reason not to use profits or other related financial data in order to compare public and private enterprises. Otherwise, we would be comparing 'apples and oranges'.

In contrast, productive efficiency (synonymous to 'productivity' or 'technical efficiency') and cost efficiency (synonymous to 'internal efficiency') are, together with output price efficiency, not only consistent with welfare maximization but also necessary conditions for achieving maximum welfare.[4] Hence, meaningful analysis of the (relative)

3 It is in standard theory well known, that a profit maximizing firm which has notable influence upon price – as in (natural) monopoly or monopolistic competition – will set a profit maximizing price or output respectively. That is where marginal revenue equals marginal costs. The profit maximizing price (output) is above (below) marginal costs (output level at marginal costs). So profit maximizing will reduce welfare or induce a so called 'deadweight loss'.

4 Productive efficiency means that a given level of outputs is produced with a minimum amount of inputs, or with a given level of inputs the maximum quantities of outputs are produced. Cost efficiency denotes that given quantities of outputs are produced with minimum costs. Necessary conditions for cost efficiency are a) productive efficiency and b) that the technical rate of substitution of every pair of inputs is equal to the ratio of the corresponding input prices (for a mathematical representation see e.g. Varian 1992: 49–53). The latter condition is often called 'allocative efficiency'. Price efficiency means that the output prices are equal to marginal costs ('first best') or to average costs or Ramsey prices ('second best'). The second best solution is considered in natural monopolies. Welfare on a specific market, measured by social surplus, is maximal if the firms are operating cost efficient and are setting first best or second best prices, respectively. Setting first or second best prices is often indicated as 'allocative efficiency', too. This is the reason to be more precise. We should call allocative efficient input prices 'input price efficiency' and

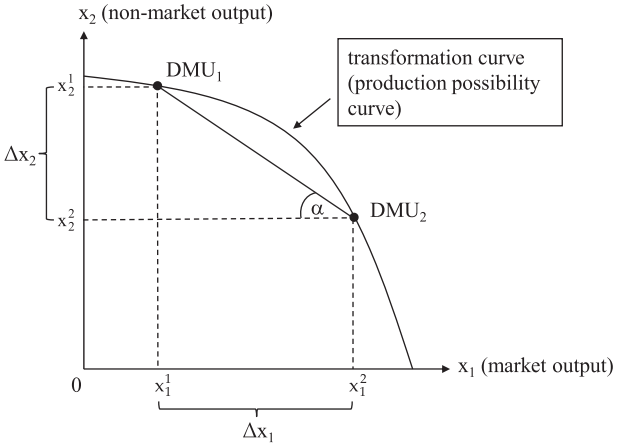

Figure 1 – Market versus non-market goods on the production possibility curve.

performance of public and private enterprises on the firm level can only be based on productivity and cost measures.

On a market level we have to consider the social surplus, which depends on the cost efficiency of the firms and their price setting behaviour. A public enterprise showing less productivity and/or higher production costs than a private firm may, nonetheless, induce a higher social surplus. If this is the case, then, broadly speaking, the welfare loss caused by the cost inefficient behaviour of the public enterprise is compensated for by a welfare gain due to a higher level of output price efficiency.[5]

The public choice approach provides the political rationale for public enterprises. In this connection public enterprise could be treated as an instrument for the pursuit of political goals. Politicians may simply be acting as 'rent-seekers', or they may be dissatisfied with market outcomes and use public enterprises as a device for their political agenda. From this point of view public enterprises can act on a macroeconomic level to correct income distribution, employment rates, investment levels, the provision of capacity, and so on. Such goals or outcomes could be classified as 'socio-economic' or 'non-market output'. Thus, public enterprises provide several market and non-market outputs or goods. Therefore, it is reasonable to assess the performance of public enterprises not only against the market output but against the achievement of policy objectives as well (see e.g. Perelman and Thiry 1989; Pestieau 1989; Backhaus 1994).

If we consider public enterprises as multi-product firms providing market and non-market outputs or outcomes, then we obtain the usual representation of a transformation or production possibility curve. Figure 1 presents a hypothetical transformation curve (or 'efficiency frontier') in a two-output case. This curve indicates all efficient bundles of market outputs (x_1) and non-market outputs (x_2), given a specific input level. Let

allocative efficient output prices 'output price efficiency'. So, we get the following relationship: Productive efficiency is a necessary condition for cost efficiency. Cost efficiency together with (output) price efficiency is a necessary condition for the maximum social surplus on a specific market.

5 For a detailed analysis of welfare effects of price setting behaviour in different market regimes see Ceriani and Florio (2011).

us assume that there are two decision making units (DMUs). Both DMUs are on the efficiency frontier. DMU_1 (maybe called 'public enterprise') provides more of the non-market and less of the market output, whereas DMU_2 (maybe called 'private enterprise') produces less of the non-market and more of the market output. Both DMUs are efficient from a two-dimensional perspective. However, from a pure market output perspective, DMU_1 seems to be inefficient. In contrast, from a pure non-market view DMU_2 appears to be inefficient.

Comparing DMU_1 and DMU_2, Δx_1 (the difference between x_1^2 and x_1^1) reflects the opportunity costs (in units of market goods) of producing Δx_2 non-market goods, while Δx_2 (the difference between x_2^1 and x_2^2) indicates the opportunity costs (in units of non-market goods) of producing Δx_1 market goods. The ratio $\Delta x_2/\Delta x_1 = \tan \alpha$ corresponds to the incremental rate of substitution between market and non-market goods. This rate approximately shows how many units of the non-market good could be gained giving up one unit of the market good.

The shown trade-off between market and non-market goods affects productivity and cost measures as well as the aforementioned market output. If a public enterprise for political reasons employs more workers than necessary (this is the non-market good) to produce a given level of market goods it will appear to be technically inefficient in relation to the amount of the market good. At the same its production is too labor intensive compared to the cost efficiency conditions if considering the market good only. From this point of view the public enterprise shows less cost efficiency than the private counterpart, too.[6] Less productivity and less cost efficiency will necessarily result in smaller profits. That means under same conditions (demand or price of the market good) a 'two-product public enterprise' would also show less profit than a 'single-product private enterprise'. In summary we have to expect every market related performance measure to be negatively affected by non-market output.

Ignoring the question of whether or not the concept of socio-economic output is useful, we still have, just like with the welfare measures, a measurement problem. In some cases it might be possible to contract out non-market output, see for example the so-called 'universal service obligations'. In such cases contracting out may show market values, meaning here the market costs of non-market goods.[7] However, under most conditions it is very difficult to obtain meaningful data about non-market output. So, if we analyse the performance of public and private enterprises solely with market data, it is important to keep in mind that there could be a 'second dimension' of non-market goods that is probably produced exclusively by public enterprises. There is no reason to assume that private, profit maximizing firms would be apt to provide a non-market output without financial compensation because the production of costly non-market goods contradicts profit maximization.

Consequently, we should ideally look at both market and non-market goods. Unfortunately, empirically this is not easily done in most cases. If considering market goods and using market data, then we should use productivity, cost efficiency, or welfare

6 But, as mentioned in Footnote 3 there is no trade-off between cost efficiency and output price efficiency (on the market).

7 This is only seemingly a contradiction. There exists indeed no market, until the government call for tenders.

indicators (consumer's and producer's surpluses). Profits, sales, and financial rates are rather useless in our context.

The majority of the subsequently examined empirical studies are, to at least some extent and often a great extent, far from meeting the aforementioned theoretical needs. Only a minority of the existing empirical studies even come close to meeting these standards. Many of the analyses concentrate on profits, sales, various financial ratios, and so on. Nevertheless, these studies are part of the literature and are influencing the discussion.

4 Empirical results to date

In the last decades a nearly unmanageable number of studies have appeared on the topic of interest to this paper. For this reason some limitations must be imposed on this review.

(a) First of all, we will only examine surveys considering two or more industries.[8]
(b) Secondly, we focus on surveys with empirical studies predominantly of the western world.[9]
(c) Additionally, only surveys containing at least some studies using cost and productivity measures are included.
(d) Lastly, contracting out and competitive tendering is beyond the scope of this paper and thus, not considered (on this topic see e.g. Hodge 2000).[10]

These constraints left us with exactly 16 surveys of the literature in a quantitative, schedular form. Beyond these, there are many small qualitative, non-schedular reviews of empirical studies. We will present only three early released qualitative format surveys. This is because later surveys in this format are small and give us no significant additional information compared to the more extensive quantitative surveys. In addition to the surveys we found two relevant recent meta-regressions, whose results are also reported here.

The studies summarized in the surveys differ regarding some of their major characteristics.

8 There is a substantial amount of surveys examining only a single sector like water distribution (see e.g. Walter et al. 2009) or the port sector (see e.g. Vasigh and Howard 2012). It could be noticed that both of these exemplary surveys find no clear difference in performance between public and private enterprises.

9 There is a huge amount of recent studies concerning developing and less developed economies in East and South Asia, Africa, and South and Middle America. There are also many studies using data from transition economies in Europe. Furthermore, there are several surveys with a focus on these parts of the world (see e.g. Djankov and Murell 2002; Megginson and Sutter 2006; Estrin et al. 2009) providing mixed evidence.

10 Contracting out would compare production cost of public ownership with prices or payments of the public sector to private enterprises (including profits) and not with the cost of private enterprises. Our topic, instead, is a comparative analysis of production and cost efficiency.

(a) Most (predominantly the older studies) use ordinary least squares, but others (the more recent studies) use frontier approaches.
(b) Most studies are cross-sectional; only a minority use time-series or panel data.
(c) One study focus on only two industries; other studies consider miscellaneous industries.
(d) The majority of studies use several performance measures. Only one survey article is limited to a single measure of performance.

The surveys, more or less, had access to the same population of stand-alone studies. Especially the samples of the older surveys overlap rather strongly. In total, the surveys reviewed here include approximately 250 different studies.

In what follows we first review three early qualitative surveys.[11] Subsequently, we discuss the quantitative surveys. Lastly we present the findings of the meta-regressions. For clarity the surveys and meta-regressions are numbered consecutively.

4.1 Qualitative review articles

(1) Bennett and Johnson (1980) review about 20 US studies released from 1965 to 1978 which addressed a range of different industries such as electricity supply, refuse collection, health care and hospitals.[12] The authors conclude: '[. . .] the private sector would have appeared even more efficient than the public sector. [. . .] The private sector-production of public services offers an excellent opportunity for tax reduction without sacrifice of services . . . ' (Bennett and Johnson 1980, 393).

(2) De Alessi (1980) summarizes the results of 28 studies published from 1965 to 1979.[13] Most of the studies again used US data and addressed several different sectors. De Allessi concludes: 'The evidence regarding the consequences of government ownership is rich and varied' (De Alessi 1980, 41). He asserts that public enterprises often charged lower prices, had higher costs, favoured voters to non-voters or more politically active groups to less active groups, and so on. 'Although some of the results must be regarded as tentative pending more rigorous tests, the evidence is overwhelming. Differences in the structures of rights to use resources affect behaviour systematically and predictably' (De Alessi 1980, 42).

(3) Millward and Parker (1983) depict, in non-schedular form, 31 studies of the UK, USA, Canada, Switzerland, and Indonesia that also cover several different sectors.[14] The date of publication ranges from 1965 to 1980. The authors state '[. . .] that there is no systematic evidence that public enterprises are less cost effective than private

11 In subsequent years there appeared a multiplicity of small and very small ('mini') qualitative surveys in textbooks that are impossible to present here completely. These include, for example, Vickers and Yarrow (1988, 39–43), Bös (1991, 50–52), Galal et al. (1994, 11–15), Foreman-Peck and Millward (1994, 320–325), Aharoni (2000, 57–62), Florio (2004, 114–136), Bortolotti and Milella (2008, 55–60).
12 This overview is an extension of Bennett and Johnson (1979). All studies in Bennett and Johnson (1979) are included in Bennett and Johnson (1980).
13 Many of the studies cited here are included in De Alessi (1974).
14 This summary is an extended version of Millward (1982).

firms' (Millward and Parker 1983, 258). It should be highlighted that, for the most part, Millward and Parker considered the same studies as De Alessi (1980) and Bennett and Johnson (1980).[15]

4.2 Quantitative review articles

In an early and quite extensive survey (4) Borcherding et al. (1982) summarize the results of 52 publications that appeared from 1965 to 1981. The survey spans 19 different industries in North America, (Western) Europe, and Australia. Most articles found that private firms had superior economic performance. Only three studies (6%) found that public enterprises performed better while six contributions (12%) came to neutral results (see Table 1). Borcherding, Pommerehne, and Schneider explain the neutral cases with reference to competition. They state: 'To sum up the results so far: The literature seems to indicate that (a) private production is cheaper than production in publicly owned and managed firms, and (b) given sufficient competition between public and private producers (and no discriminative regulations and subsidies), the differences in unit cost turn out to be insignificant' (Borcherding et al. 1982, 136). In addition, referring to the public choice approach, the authors point out that simple comparisons using the usual performance measures are misleading because they do not control for political goals (non-market output) and transaction costs. 'To conclude our paper: Government 'waste' is after all a sick consideration, neglecting those sizeable costs of contracting, monitoring and controlling which may arise when private production is preferred over the public one. Also some part of the 'waste' is the result of the political process of redistribution, where public production is used as an efficient means for selecting and discriminating' (Borcherding et al. 1982, 146).

(5) Boyd (1986) provides an overview of 17 papers written from 1970 to 1980. Most of these contributions examine garbage collection and electricity provision. Four papers found private enterprises to be more efficient than public enterprises. Four other studies found no difference. One author found either no difference or a superiority of public enterprise, depending on which efficiency indicator is used. Public enterprises were claimed to be more efficient than private enterprises in eight of the studies. 'The unbiased observer may well agree with Millward, who concludes from his review of empirical studies of the property rights hypothesis that these studies do not provide general grounds for believing managerial efficiency to be less in public firms' (Boyd 1986, 192).

(6) Domberger and Piggott (1986) extracted 13 studies from Borcherding et al. (1982) and from Millward (1982) that showed no superiority of private firms.[16] Domberger and Piggott verified the existence of competition in six of the cases. They concluded: 'This strongly suggests that opening up a market to competition is crucial in

15 With the exception of two surveys, Domberger and Piggott (1986) plus Megginson and Netter (2001), the results of the quantitative surveys are summarized in Table 1. Domberger and Piggott (1986) have especially selected studies showing no difference in performance between public and private enterprises. So it makes no sense to integrate this survey into a table showing differences between public and private enterprises. The latter survey – critized here – presents predominantly improper efficiency measures and a very arbitrary selection of studies.

16 This paper is published also in Bishop et al. (1994).

Table 1 – The relative economic performance of publicly-owned and private-owned enterprises in different quantitative surveys

No.	Authors	No. of studies	Period of publication	Countries	Industries	Economic performance measures	Private enterprise superior		Neutral		Public enterprise superior	
							Total	in%	Total	in%	Total	in%
(4)	Borcherding, Pommerehne, and Schneider (1982)	52	1965–1981	North America, Australia, Europe	several	several	43	82.69	6	11.54	3	5.77
(5)	Boyd (1986)*	17	1970–1980	North America, Australia, Europe	serveral	several	5	29.41	4.5	26.47	7.5	44.12
(7)	Yarrow (1986)*	28	1971–1984	North America, Australia, Europe	several	several	17	60.71	4.5	16.07	6.5	23.21
(8)	Boardman and Vining (1989)	55	1965–1986	North America, Australia, Europe	several	several	33	60.00	16	29.09	6	10.91
(9)	Pommerehne (1990)	105	1965–1989	North America, Australia, Europe	several	several	55	52.38	42	40.00	8	7.62
(10)	Vining and Boardman (1992)	95	1965–1989	worldwide, notably North America and Europe	several	several	68	71.58	20	21.05	7	7.37
(11)	Pestieau and Tulkens (1993)**	14	1985–1993	notably developed countries	several	production efficiency	5	35.71	6	42.86	3	21.43

(*Continued*)

Table 1 – Continued

No.	Authors	No. of studies	Period of publication	Countries	Industries	Economic performance measures	Private enterprise superior		Neutral		Public enterprise superior	
							Total	in%	Total	in%	Total	in%
(12)	Martin and Parker (1997)	63	1968–1995	worldwide, most not. developed countries	several	several	35	55.56	17	26.98	11	17.46
(13)	Shirley and Walsh (2000)	52	1971–1999	worldwide	several	several	32	61.54	15	28.85	5	9.62
	industrialized countries only	28	1971–1999	industrialized countries	several	several	12	42.86	11	39.29	5	17.86
(14)	Villalonga (2000)	153	1965–1997	worldwide, notably developed countries	several	several	104	67.97	35	22.88	14	9.15
	frontier-analysis only	20	1982–1997	notably developed countries	several	production and cost efficiency	9	45.00	5	25.00	6	30.00
(16)	Willner (2001)	68	1965–1998	worldwide, most notably developed countries	several	production and cost efficiency	21	30.88	26	38.24	21	30.88
(17)	Parker (2006)***	21	1991–2003	Great Britain	several	several	6	28.57	14	66.67	1	4.76
(18)	Bel and Warner (2008)	35	1965–2007	worldwide, most notably developed countries	solid waste and water services	production and cost efficiency	8	22.86	21	60.00	6	17.14
(19)	Arcas and Bachiller (2010)	28	1992–2007	worldwide	several	several	16	57.14	12	42.86	-	-
	industrialized countries only	16	1992–2007	industrialized countries	several	several	8	50.00	8	50.00	-	-

*In both Boyd (1986) and Yarrow (1986) one study is pro-public ownership concerning one indicator and neutral concerning another measure. Therefore, we count these studies as 50 percent neutral and 50 percent pro-public enterprise.
**Studies comparing private and public enterprises.
***Studies comparing pre privatization to post privatization.

promoting improved economic performance. It provides tentative support for the belief [. . .] that in at least some cases liberalization without ownership transfer will generate substantial improvements in productive efficiency' (Domberger and Piggott 1986, 152). Furthermore, the authors presented 12 studies conducted from 1971 to 1985 which analyzed the efficiency of the two largest Australian airlines, one which was in private hands and the other which was public. Both Australian airlines performed worse than comparable North American airlines. In some cases the private Australian airline performed better than the state airline. However, in the majority of cases no difference between the two Australian airlines was found. 'Privatization through asset sale can in some circumstances be worthwhile, yielding a reduction in resource waste in the overall economy. This assessment is consistent with, but not overwhelmingly supported by, the international comparisons of private and public sector performance. [. . .] Where public enterprises operate in highly protected or regulated environment, deregulation or liberalization of the market may generate a substantial improvement in public sector performance, without ownership transfer. This assessment is strongly supported by the international evidence' (Domberger and Piggott 1986, 159).

Turning to the next survey, (7) Yarrow (1986) presented an overview of 28 studies published from 1971 to 1984 with data from the western world, primary from the USA. Numerous different industries were covered in the study, including airlines, ferries, insurance, medicine, and water. This sample largely overlaps with the preceding studies. Yarrow stated that 17 contributions showed the superiority of private production, six studies showed that public production is better (lower cost and prices, better quality), four studies were neutral, and one study had a mixed finding of pro/neutral on public ownership. 'Where product markets are less monopolized, the comparative performance studies suggest a more favourable verdict on private enterprise, implying that incentive failures associated with government monitoring are empirically significant. . . . Nevertheless, taken as a whole, the results do point a presumption in favour of private ownership, provided that other market failures are insignificant or can be adequately corrected by means of alternative policy instruments' (Yarrow 1986, 375).

(8) Boardman and Vining (1989) compiled 55 studies which were released from 1965 to 1986. All data are from developed economies. Several sectors were analysed and distinct measures of performance were used. The selected firms fulfilled at least one of the following conditions: (a) the firm had a natural monopoly, (b) there was a regulated monopoly, or (c) prices were not set by competitive forces (this was not only the case in (a) and (b) but also in health services). Six studies (11%) showed a superiority of public enterprises. Sixteen (29%) studies revealed no significant differences and the result of 33 (60%) investigations found private firms have better economic performance. Boardman and Vining concluded: 'A review [. . .] suggests an 'edge' for the private sector, but the results vary considerably across sectors. In sectors where there is some evidence of superior public efficiency (electricity and water), there is limited competition or the private firms are highly regulated' (Boardman and Vining 1989, 5).

The review of (9) Pommerehne (1990) incorporates 105 single studies taken from seven sectors and published from 1965 to 1989. The overlap between this data and the data of the preceding surveys is not so strong as the overlap within the earlier surveys. The geographic scope of the studies is North America, Europe, and Australia. Several economic performance indicators such as productivity, costs, profitability, and operating revenues were applied. Fifty-five (52%) of the studies revealed a better economic

performance by private enterprises. Forty-two (40%) were not able to find any statistical difference and eight (8%) contributions showed that public enterprises are better performers. Broadly, Pommerehne concluded that it is not possible to say that private enterprises are generally preferable to public production. Efficiency is fostered by competition and this holds for public and private enterprises. Without regulation Pommerehne expected the private sector to perform better. In the absence of competition, but with regulation, Pommerehne believed that public enterprises could attain a better, or at least no worse, performance than private enterprises (see Pommerehne 1990, 45).

In a more recent publication (10) Vining and Boardman (1992) extended their earlier work (see Boardman and Vining 1989). Vining and Boardman (1992) compiled a total of 95 studies. In contrast to the article from 1989 the population of studies is much more heterogeneous, as it comprises also enterprises in non-regulated, competitive environments. Still, nearly all studies focused on firms in industrialized countries. Unsurprisingly, after this alteration the pendulum moves in favour of private enterprises. Now seven studies (7% of the total) favourably view public enterprises, 20 publications are neutral, and 68 contributions (72%) come to the conclusion that private firms are superior to public enterprises. 'Ownership does matter and there is strong evidence of superior PC [Private corporate] performance. This evidence is stronger than the previous literature suggests' (Vining and Boardman 1992, 218).

(11) Pestieau and Tulkens (1993) collected 19 papers that focused on productive efficiency and were published from 1985 to 1993. These comparative studies look at very different branches of industry, ranging from airlines to the sugar industry. Some of them examine less developed countries. Only 14 of the studies sought to compare the productive efficiency of private and public firms. Five of these favoured private firms, the results of six were undetermined, and three favoured public firms. 'On the basis of the work existing to date it appears that firm's performance is quite independent of ownership, for a given competitive and regulatory setting. In particular, there is no clear-cut performance differential between public enterprises and privately owned regulated firms. One also observes that introducing competition increases performance regardless of ownership. Furthermore, the effect of deregulation, especially when it is only partial, appears to be rather ambiguous' (Pestieau and Tulkens 1993, 319).

(12) Martin and Parker (1997) gathered 64 single studies that spanned the globe in their scope. In most cases these examined industrialized countries and distinct industries. The studies appeared between 1968 and 1995. Thirty-five (56%) of these studies suggest a better performance by private firms. Seventeen (27%) papers find no verifiable differences between public and private enterprises. Eleven (17%) contributions give the advantage to public enterprises.[17] Martin and Parker conclude that there is no difference in regulated sectors: '[. . .] the balance of evidence may be interpreted as favouring private ownership but only in competitive markets' (Martin and Parker 1997, 82). 'On balance it seems that neither private nor public sector production is inherently or necessarily more efficient. In particular, where private sector firms remain state-regulated or protected from competition efficiency may suffer' (Martin and Parker 1997, 93).

17 This calculation is based on only 63 studies because, in our opinion, one study is un-interpretable.

Based on some preceding surveys that were complemented with several studies not previously included, (13) Shirley and Walsh (2000) constructed a synopsis of 52 studies. Most (35) of the studies in this data set use information from industrialized countries. Different sectors are examined and different measures of performance are employed. In the full data set 32 studies (62%) show private enterprises to be more efficient. Fifteen (29%) papers find no difference. Five studies (10%) conclude there is a better performance by public enterprises. If we examine industrialized countries exclusively, we see only 43 percent (12 studies) from a total of 28 studies indicate private firms have superior performance, 11 (39%) studies do not find any difference, and five studies (18%) suggest public enterprises are superior. Looking exclusively at markets with full competition, from a subsample of 16 studies 11 (69%) of them demonstrate a better performance by private enterprise, while in five cases (31%) no difference is evident. Quite different from these results, in the 16 cases without competition only six (38%) reveal private firms to be superior. In this subset five (31%) neutral results and five (31%) results in favour of public enterprise are obtained. Shirley and Walsh summarize: 'This body of empirical literature indicates that private or privatized ownership is superior to public ownership in a variety of situations. The balance of studies show that firm performance improves after privatization. Private firms perform better in all market structures, although the relative ambiguity of this result in monopolies suggests that private ownership and competition are complements' (Shirley and Walsh 2000, 51).

In what is probably the most comprehensive published survey (14) Villalonga (2000) presents 153 studies conducted from 1965 to 1997 of numerous countries worldwide. Nearly all studies are derived from earlier surveys.[18] Twenty of these studies apply the concept of efficiency frontiers. From the total sample 104 studies (68%) provide evidence for a better performance by private enterprises. A further 35 (23%) contributions find no difference between the public and private sector while 14 (9%) publications indicate a preference for public enterprises. If we focus on the more recently published efficiency frontier studies on their own we see private firms are favoured in 9 (45%) cases, neutral results are obtained in five (25%) cases, and an inferior performance by private enterprises is found in six (30%) cases. Villalonga comments on her findings as follows: '[. . .] although a simple count of results would give a considerable edge to a private ownership [. . .], the cumulative evidence is not wholly conclusive. Two factors play a significant role in explaining the diversity of results within these tables: the market structure of each of the industries (and countries) to which the firms studied belong, and the way their efficiency is measured' (Villalonga 2000, 46). 'Still, after accounting for these two factors, the evidence about which form of ownership is associated with a higher level of efficiency remains mixed' (Villalonga 2000, 50).

(15) Megginson and Netter (2001) are the authors of what is possibly the most frequently cited paper in our context. They initially consider 10 very heterogeneous and arbitrarily selected publications released from 1989 to 2001 and which use cross-section

18 This survey contains almost all but not all studies specified in De Alessi (1980), Millward (1982), Millward and Parker (1983), Boyd (1986), Domberger and Piggott (1986), Yarrow (1986), Boardman and Vining (1989), Vining and Boardman (1992), Perelman and Pestiau (1993), and Martin and Parker (1997). Not included are about 20 works cited in Pommerehne (1990) and Shirley and Walsh (2000). Moreover numerous publications mentioned in subsequent surveys (see e.g. Willner 2001) are not included.

data from cases across the world. One of these studies compares government financed and privately funded expeditions to the Arctic from 1819–1909. Megginson and Netter conclude on this basis: 'Research now supports the proposition that privately owned firms are more efficient and more profitable than otherwise-comparable state-owned firms' (Megginson and Netter 2001, 380). Moreover, Megginson and Netter present the results of a total of 22 articles using longitudinal data in non-transition economies, not only from developed economies but also from Latin America and other developing countries.[19] These papers differ in how they compare performance changes resulting from privatization and were published in the period from 1994 to 2001. Very diverse performance indicators are used, such as profit, sales, and capital spending. Most of these studies support privatization, though some provide mixed or conflicting results. However, our reading of at least one of the supposedly supporting papers is contradictory to the interpretation of Megginson and Netter. The authors construe insignificant regression coefficients as evidence of increasing operating efficiency after privatization.[20] Megginson and Netter summarize: 'These 22 studies offer at least limited support for the proposition that privatization is associated with improvements in the operating and financial performance of divested firms' (Megginson and Netter 2001, 356). However, it should be mentioned that many of these studies use – as argued above – irrelevant indicators, including profit, growth rates of the economy, and so on.

(16) Willner (2001) summarizes 68 publications from 1965 until 1998 concerning 14 industries. It is important to note that, with only four exceptions, all included studies came from industrialized countries. A second important characteristic of this survey is that all incorporated studies focus on productive and cost efficiency. Twenty-one (31%) of the studies show private enterprises to be more efficient, 26 (38%) find no differences, and 21 (31%) are in favour of public enterprises. 'With all caveats in mind, these tables are best summarized as suggesting that static cost efficiency alone is a poor criterion for the choice between private and public ownership. [. . .] But it seems that state enterprises tended to be more efficient in the West, with successful examples of public ownership in Scandinavia [. . .] and even the US [. . .], than in the former socialist countries' (Willner 2001, 735).

(17) Parker (2006) provides a survey of 21 time-series studies (which add up to 23 publications) of privatization in Great Britain that were published from 1991 to 2003 and which employ various performance measures.[21] Overall there is no convincing evidence of efficiency or welfare gains from the privatization programme. Productivity rose largely in line with growth rates or trends before privatization. Welfare effects were ambiguous. Consumers gained few advantages, though profits and transfers to shareholders increased, inducing regressive redistribution effects. Many of the results indicate that competition is more important than ownership. 'Ownership change on its own does not appear to have a significant effect in terms of improving economic performance where there is market dominance, especially in terms of welfare gains to consumers. Management in monopolies may seek an 'easy life' whether in the private or public sectors; while in private-sector monopolies management can meet investors' expectations of profits by

19 Moreover, the authors present six studies from transition economies and studies concerning the returns to investors. Both topics are beyond the scope of this paper.

20 This holds for Verbrugge et al. (2000).

21 This contribution is an extended version of Parker (2003).

simply raising prices' (Parker 2006, 389). However, there is another effect that should not be disregarded. 'At the same time, however, it would be wrong to dismiss the benefits of privatization in the UK. Without privatization it is probable that competition would not have been permitted or would have proved more difficult to produce, for example in electricity and gas supplies, and regulatory systems would have remained highly politicized. In other words, increased competition and improved state regulation of utilities may be a direct product of the privatization process' (Parker 2006, 389).

(18) Bel and Warner (2008) summarize 35 studies from the solid waste collection and water distribution sector.[22] All waste sector studies come from the western world. The water sector studies are derived mostly from the western world. Furthermore, Bel and Warner considered results that are based only on cost and production functions. They state: 'Empirical results for waste show the majority of studies find no systematic difference between public production and private production. While a few studies from the 1970s find cost savings with privatization, these results do not persist over time. For water, only three studies found cost savings with privatization' (Bel and Warner 2008, 1341).

The most recent survey to best of our knowledge is written by (19) Arcas and Bachiller (2010). These authors collected 28 studies published from 1992 to 2007. About half of the studies stem from transition and less developed countries. Unlike the compilations of Willner (2001) and Bel and Warner (2008) the set of studies in this survey is very heterogeneous with respect to performance indicators adopted. Performance indicators in the underlying studies are profit, service quality, market valuation, sales, changes in compensation systems for top managers after privatization, and so on. Sixteen papers (57%) indicate a better performance by private firms. The remaining 12 publications (43%) offer, in the words of Arcas and Bachiller, 'conflicting evidence'. Restricting the sample to developed countries, eight of 16 studies (50%) give an advantage to private enterprises while the other eight studies (50%) show no benefit of privately owned firms. 'There are several empirical studies that document the differences in performance between state-owned and private firms and the effect of privatization on the performance of privatized companies. Most of them conclude that private firms are more efficient than privatized companies and that SOEs [state owned enterprises] significantly improve their efficiency after privatization. [. . .] However, the evidence is not conclusive. There is a considerable amount of literature that provides conflicting evidence about the improvements in the performance of privatized firms' (Arcas and Bachiller 2010, 488).

4.3 Meta-regression analyses

The statistical technique of meta-analysis is widely used in the social and medical sciences and seems to have become popular in economics as well (see Bel et al. 2010). A meta-regression tries to find the true value of different regression coefficients estimated in previous analysis.[23] Therefore, only studies using regression analysis could be included. In addition regression results of a sufficient number of regression

22 This paper completes the contribution of Bel and Costas (2006), which concerns only solid waste collection.

23 For a detailed description of the meta-regession analysis see Stanley and Jarrell (1989).

analyses are needed to operate a meta-regression. One strength of this econometric technique is the possibility to explain different results, or regression coefficients of different studies by specific properties of the underlying data (date of the data, the region or state, the sample size and so on), the functional form, and/or the regression techniques.

In our context, (20) Bel et al. (2010) conducted a meta-regression that is worthy of review here. These authors had access to 27 studies of solid waste and water services on a local level with a total of 46 regression equations. All of these studies use the total or average costs of production as the dependent variable and rely on cross-section data. The data for these studies were collected from 1960 to 2005. With only two exceptions the data are from developed economies. Corrected for sample size, the year in which the data were collected, functional form, type of service, geographic area, and longitudinal studies, the authors find no statistical evidence of different costs in the private versus public sector in either the garbage sector or in the water sector. The correction for the year of data collection indicates that older studies are more likely to find cost differences than more recent studies. Additionally, the authors find some indication of publication bias. That means that papers are more likely to be published when significant relationships are found. Results that are not significant are usually of minor interest. In concluding the authors state: '[. . .] our analysis provides empirical evidence that private production of local services is not systematically less costly than that of public production. [. . .] Moreover, we find some evidence of publication bias, which means that papers obtaining significant cost savings are more likely to be published. We also find cost differences to be less likely in more recent studies' (Bel et al. 2010, 572).

(21) Carvalho et al. (2012) also recently published a meta-regression that was based on production or cost estimates from earlier studies. The issues examined in this analysis are economies of scale and scope for water utilities. The sample utilized for the meta-regression consisted of 35 world-spanning studies estimating economies of scale and 13 studies, excluding one from developed countries, estimating economies of scope. The data of the single studies stem form the years 1960 to 2010. The authors find the ownership variable, as well as the vast majority of the other independent variables in the regression model, to be absolutely statistically insignificant. Despite this finding these authors state: 'Although not statistically significant, publicly-owned utilities are more likely to have scale and scope diseconomies than when the ownership is mostly private' (Carvalho et al. 2012, 46). In our view such statements that are obviously based on belief rather than on evidence are highly unscientific. Based on the actual statistical results of this study we have to conclude that ownership has no verifiable influence on scale and scope economies of water utilities.

5 Discussion

At first glance the surveys reported here, as well as the basic studies they rely on, provide (consistent with the patchy theoretical insights) very heterogeneous empirical evidence on the relative economic performance of public and privately owned enterprises. According to these findings the authors come to very different conclusions. However, a closer look at the matter allows the identification of some reasons for the seemingly confusing picture. Once accounted for this can allow us to find some structure in the findings.

First of all, it should be noted that we can find some misinterpretations and mistakes in the literature on the topic. Some authors interpret specific studies as anti-public ownership, while others see the same study as pro or neutral. An example might be Hirsch's (1965) study. Here the neutral conclusion is correct, because the standard error of the ownership-dummy is statistically insignificant. Furthermore, there are simple mistakes in some of the surveys. For instance, de Alessi (1974), Spann (1977), and Bennett and Johnson (1979, 1980) provide only small surveys and include none of their own studies. Nonetheless, in some surveys their work is taken as discrete studies. Thus these studies are counted repeatedly, on the one hand as stand-alone studies and secondly as an echo in different surveys. Another source of 'double counting' is the fact that some authors published the results gained from one data set in two or more journals or anthologies. Some surveys do not account for this situation. Needless to say in some cases it is indeed difficult to classify a study.

Without a revisited analysis of each single paper, which would mean in our context a careful review of hundreds of publications, it is difficult to say to what extent errors and mistakes affect the surveys and their interpretations. At the very least it is obvious that the choice of studies examined (and therefore the possibility of 'sample selection bias') has a profound influence on our perception. Each author compiled a specific data base. The different characteristics of the samples explain a lot of the divergences in empirical results and conclusions. At least five of these characteristics are worthy of note.

A first important factor is the period of observation. Compared to older works more recent studies reveal little, or at least less, difference between public and private enterprises (see e.g. Villalonga 2000; Bel and Warner 2010). This may be an effect due to better data or more sophisticated methods. Bel and Costas (2006) provide another explanation. They raise the hypothesis that the increased threat of privatization forced the managers of public enterprises to introduce management reforms which improved the performance of public enterprises over the years.

A second aspect to consider is the regional provenance of the data. In industrial countries there seems to be less difference than in developing or transition economies. This is shown, for instance, by taking a closer look at the papers of Shirley and Walsh (2000), Willner (2001), and Bel et al. (2010). This possibly results from better institutional frameworks in industrialized countries, as already mentioned in the introduction of this paper.

Third, the degree of competition seems to be meaningful. In a competitive environment the distinctions between public and private enterprise diminish or even disappear. This is the conclusion of several survey authors (Borcherding, Pommerehne, and Schneider 1982; Domberger and Piggott 1986; Pommerehne 1990; Pestieau and Tulkens 1993; Parker 2006). Yet some authors reach the opposite conclusion. They state that private enterprise is preferable in markets with full competition (see Yarrow 1986; Martin and Parker 1997).

A fourth facet, which is interrelated with the region and the third item, is the existence of a workable regulation regime in response to a market failure. There is some evidence that public enterprises may be slightly less efficient without regulation. Under a regulation regime there is no difference between public and private production. This factor is connected in turn with the role of specific assets, transaction costs, and missing or asymmetric information. Several authors find less or no advantage of private ownership

provided that market failure exists (Yarrow 1986; Boardman and Vining 1989; Pommerehne 1990; Pestieau and Tulkens 1993; Martin and Parker 1997; Parker 2006).

A fifth, and in our view very important, consideration is the underlying economic performance indicator (see also Villalonga 2000). Especially with regard to performance measures we can observe, broadly speaking, two distinct branches of literature. On the one side is the 'profit and earnings branch' represented by Boardman and Vining (1989) and Vining and Boardman (1992) respectively, Megginson and Netter (2001), and others. On the other side there is the 'productivity, cost efficiency, welfare branch' represented, for example, by Pestieau and Tulkens (1993), Willner (2001), and Bel and Warner (2008). Using financial performance measures such as profits and sales or related financial ratios increases the likelihood of 'producing' the superiority of private firms. In this context it should be stressed that the 'profit and earnings branch' call financial ratios like sales per employee or sales per asset '(operating) efficiency'. Therefore, their efficiency measure is quite different from the measure used by the 'productivity, cost efficiency, welfare branch'. Employing instead the more adequate indicators 'productive efficiency', 'cost efficiency', and 'welfare', as argued above, in all likelihood leads public enterprises not to lose or even to win the contest.

The choice between private and public enterprises may have secondary non-neglectable effects on quality of services, security of supply, wealth distribution, and/or the non-market output. The empirical evidence from the privatization campaign in Great Britain, for example, seems to show regressive distribution effects (see Florio 2004). Such distributive effects have to be balanced against pure efficiency changes. Since we have to expect that public enterprises are more likely to produce non-market outputs, they should be more efficient from a two-dimensional point of view, holding market output constant.

In a sixth conclusion the adoption of meta-regressions analogous to the work of Bel et al. (2010) on municipal garbage collection and water services seems to be a promising approach for further research. We would expect very similar results for other sectors, meaning that differences in the empirical studies could be largely explained by region, branch, number of observations, time period, and so on.

What then is the message for policy making in developed countries? Counter to the argument of Megginson and Netters (2001), the most cited publication on our topic,[24] research does not support the conclusion that privately owned firms are more efficient than otherwise-comparable state-owned firms. This result might hold using profitability measures, but it does not hold if we use adequate performance indicators for public enterprises like productivity, cost, or welfare. When including the latter measures most of the recent studies find no support for the proposition that private firms perform economically better. Taken as a whole the evidence is much more differentiated than the paper of Megginson and Netter and 'simpleminded' (this expression was used by Stiglitz 2008: XI) economics might suggest.

24 Google Scholar (February 6, 2015) returns 2838 citations for Megginson and Netter (2001), 422 citations for Shirley and Walsh (2000), 287 citations for Villalonga (2000), and 97 citations for Willner (2001). These numbers of citation are absolutely comparable because the publications appeared nearly at the same time.

At present we have to generally expect that no significant microeconomic efficiency gain will be realized by privatization in industrialized countries. The most probable reason for this is the already mostly complete policy of opening up public services to competition. This policy forced managers of public entities to generate efficiency improvements in the last decades. Thus, for efficiency reasons maintaining appropriate levels of competition between different institutional arrangements for delivering public services and not unconsidered or ill-conceived privatization is recommended.

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