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# STATE ENTERPRISES IN THE STEEL SECTOR

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OECD Steel Committee delegates discussed a draft of this report at the Steel Committee meeting on 5-6 March 2018. Delegates agreed to declassify the report on 5 March 2018 following comments that have been reflected in the report. The report is made available on the Steel Committee website: http:/oe.cd/steel and is available on ONE under the reference code: DSTI/SC(2017)10/FINAL.

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# Key findings

This report assesses the extent and implications of the presence of state enterprises in the steel industry. The key results can be summarised as follows:

- Although state enterprises are relatively low in numbers compared to private enterprises, they account for an important share of global crude steel production. In 2016, 22 of the world's 100 largest steelmaking companies were state enterprises. State enterprises represented at least 32% of global crude steel output in 2016.
- Firm-level data suggest that state enterprises in the steel sector are likely to be associated with poorer economic performance and higher levels of indebtedness, compared to private enterprises. The results show that this is particularly relevant for state enterprises located in non-OECD economies. State enterprises are also found to be associated with longer periods of consecutive losses compared to private undertakings.
- Data on steelmaking capacity investments taking place in recent years show that state enterprises have contributed significantly to the increase in global steelmaking capacity. However, financial data show that state enterprises retrieve lower profits for each unit of fixed costs than comparable private counterparts.

# 1. Introduction

In 2016, state enterprises accounted for at least 32% of global crude steel production. While low in numbers, the presence of state enterprises (hereafter SEs) in the steel sector has been cause for concern by industry and policymakers. These concerns were markedly noted by the Steel Committee in 2013 with the inclusion of a SE-specific additional intermediate objective in the Mandate of the Steel Committee.[1]

The presence of state enterprises in global markets has grown in recent years (OECD, 2016[1]). State-enterprises are thought to benefit from forms of preferential treatment that may result in market distortions. There are a number of factors that make the case of the steel sector particularly interesting for the discussion on SEs.

First, steel is a base industry, often regarded as strategic for economic development. As such, the motivations for the presence of SEs in this sector might be higher than for other industrial sectors. Second, steel is a capital intensive sector, where investments in fixed assets are considerable and are to some extent irreversible thus entailing significant sunk costs. Therefore, any preferential treatment given to SEs may result in over-investment or heighten barriers to exit. Third, steel is an intermediate input into a wide range of international supply chains. Therefore, any effects from the presence of SEs in steel may propagate across several sectors (and economies). Fourth, steel is a tradable good and market distortions easily propagate through international trade in steel. Trade frictions have been increasing in the steel sector, amidst important imbalances and market distortions, some of which may result from undue advantages given to SEs.

While there are a number of industry specificities that affect the scope and implications of SE presence in the steel sector, the results from the analysis could, at least, be extended to other capital intensive sectors that produce intermediate but highly tradable goods with important linkages to other upstream and downstream economic activities, such as the mining, chemicals or even electronics sectors.

This report assesses the extent and implications of the presence of SEs in the steel industry, by providing new firm-level evidence on the relationship between state enterprises and economic performance. Particular emphasis is given to the role of SEs in the context of the current steel excess capacity situation, which is one of the root causes of trade disputes and other frictions in the steel sector. The report suggests approaches that may help sustaining competitive neutrality both domestically and at the global level, building on recent work on SEs in the areas of international trade, international investment and corporate governance conducted at the OECD. Delegates are invited to discuss these and other approaches and work towards possible solutions to address the challenges created by the presence of SEs in the steel sector.

The report is organised as follows: Section 2 defines state enterprises and introduces the main issues related to the presence of SEs in the marketplace. Section 3 reports descriptive evidence on the scope of SEs in the steel industry. Section 4 compares the financial performance of state enterprises compared to private enterprises (hereafter PEs) and explores whether debt neutrality conditions hold in the steel sector. Section 5 overviews the relationship between state enterprises and steelmaking capacity developments, while section 6 highlights the key policy issues involving state enterprises and discusses the role of policy for ensuring a level playing field. The annexes contain detailed information on the firm-level data and empirical strategy used, as well as additional tables of results.

# 2. State as entrepreneur: competition and international trade

## 2.1. Defining state influence and state ownership

Defining state enterprises (SEs) is challenging because it involves determining the degree of control the state is able to exercise on a firm. The most common form of state control materialises when the state is, directly or indirectly, the owner of a significant part of the firm. According to the OECD Guidelines on Corporate Governance of State-Owned Enterprises (SOEs), a state enterprise is defined as an entity where the state has significant control of corporate decisions through full or majority ownership, *or* a significant minority of voting shares (OECD, 2015[2]). The use of the "SE" definition in this paper is to some extent broader than that of "SOEs" because it goes beyond the notion of ownership to explicitly include the cases of "control" through minority shares, or other forms of control that can be exercised by the state such as legal stipulations or corporate rules that grant effective influence over the company's decision-making process.

State ownership is not a sufficient condition for determining state control. Understanding how ownership shares relate to voting or decision rights in a company's executive board or other governance bodies is difficult but particularly important. This is for instance the case in which the state owns "golden shares" that confer relatively higher power than their nominal value — these extreme situations should be addressed on a case-by-case basis (OECD, 2016[1]). Even in the absence of state control, regulations or presence in the firm's governance bodies might provide sufficient leeway for the state to influence the decision-making process. The variety of circumstances and lack of transparency about how state control and influence can be exercised renders policy analysis rather complex. Moreover, the complex identification of state ownership and control grants SEs particular protection from the standard legal framework applicable to other companies, such as competition and bankruptcy laws (PWC, 2015[3]).

State ownership can be exercised through different channels, and ownership links are seldom straightforward. For example, direct ownership (when the state directly owns a stake in firms' shares) is different from indirect ownership (ownership links through other entities). Identifying state control is more complicated in the case of indirect ownership because it requires an understanding of the degree of state influence through a mapping of all ownership linkages from the state to the firm, via different entities.

State control can also be exercised at (or through) different government entities. Examples of these entities include governmental agencies whose role is to administer public companies, public financial institutions such as development banks, or other entities and financial vehicles within the public sphere such as sovereign wealth funds. More importantly, these different types of state-ownership structures are characterised by different objectives and incentives structures (Chen, Firth and Xu, 2009[4]), which ultimately lead to different effects upon the marketplace — see Box 1 for an overview of the different types of structures in People's Republic of China (hereafter "China").

**Box 1. Types of state controlling shareholders in China's listed companies**

According to Chen, Firth and Xu (2009[4]), there are three main types of state controlling shareholders in China:

- State asset management bureaus (SAMBs) are shareholding institutions that belong to the central state. They take the form of large asset portfolios, which own state shares and manage state assets. SAMBs do not necessarily have a national dimension, and may be located in provincial cities to better operate their assets.

- State enterprises affiliated to the central government (SOECGs), which are directly controlled by the State-owned Asset Supervision and Administration Commission (SASAC) - the Chinese government asset management institution - may be involved in many industries and may be geographically located across the whole country.

- State enterprises affiliated to local governments (SOELGs) are public entities formally separated from the central government. According the authors, they represent the largest set of controlling shareholders of listed companies in China.

Analysing a sample of Chinese publicly-listed SEs and grouping firms according to the controlling shareholder, Chen, Firth and Xu (2009[4]) find that firms directly affiliated to the central government (SOECGs) perform better than other types of SEs.

Source: (Chen, Firth and Xu, 2009[4])

For the purposes of this paper, a state enterprise is a company that has a significant link to the state. A "significant link" is defined as any ownership link that corresponds to 10% or more of a company's shares.[2] The definition of "state" used in this paper is broad to encompass all levels of government as well as any related entities.[3] This working definition facilitates the empirical analysis without losing sight of the intricacies related to state influence and state control described above.

## 2.2. Motivations for SEs in the steel sector

Governments have various motives for intervening in the steel sector, which is often regarded as strategic, and policy actions are sometimes related to industrial development or defence considerations. As such, SEs are one amongst the different instruments that could be used to pursue these goals.[4]

Investments by steelmaking SEs are often part of national development strategies for the steel industry. Policy objectives might include for instance attaining steelmaking self-sufficiency and promoting import substitution or the development of the steel industry as a stepping block for the industrialisation of the economy. Accordingly, such strategic objectives often result in policies that encourage steelmaking capacity expansions, notably through investments by SEs. SEs may also be used as instruments to reduce steelmaking capacity, in a context of industry restructuring. For example, the British Steel Corporation was formed through the nationalisation of 14 steel companies in the United Kingdom, each with a production capacity of 475 000 tonnes a year or more, with the expectation of rationalising and modernising operations (Beauman, 1996[5]). Once the restructuring process was complete, British Steel was then privatised (OECD, 2012[6]).

Steel is also an important input for defence industries, thus ensuring that these industries can secure domestic sources of steel is also an important consideration for policymakers. In addition, governments also try to attract foreign, technologically advanced steelmakers to partake in joint ventures with local SEs, to force technology transfer and build the knowledge base for the domestic industry.

It is clear that these objectives do not necessarily coincide with value creation and profit maximisation. Therefore, the actions of the state towards steelmaking SEs and the activity of SEs in pursuant of other-than-market objectives may result in considerable distortions in steel markets.[5]

## 2.3. Concerns related to activity of SEs in the steel sector

While there can be non-economic and economic reasons for state ownership, a number of concerns have been raised regarding the extent to which the presence of SEs in the market can potentially result in preferential treatment *vis à vis* private competitors. One concern with the growing role of SEs in the global steel sector relates to the extent to which their investment decisions are market-based and how they are contributing to excess capacity. The competitive advantages enjoyed by SEs may have fostered capacity investments, not necessarily as response to market-based considerations, but rather as the outcome of pre-defined policy goals. Moreover, there are also a number of concerns related to lack of transparency and accountability of SEs, notably when it comes to reporting requirements for these firms in some jurisdictions.

In the context of international steel trade, another concern is whether SEs produce and export steel because they are more efficient or because they receive financial, regulatory or other type of advantages, as well any distortions that may arise as a result. The advantages received by SEs are argued to allow them exporting their products at lower-than-market prices this distorts competition in international steel markets and can lead to trade frictions.

In the steel sector, there are also a number of concerns regarding the activity of SEs in other related sectors. This is the case with SEs operating in upstream sectors that allegedly provide inputs to steel companies at below-market prices and in preferable terms. The same applies to downstream SE companies buying steel products at above-market rates, thus providing support to steel companies. In addition, several concerns relate to the functioning of the financial sector in the presence of SEs.

The insights from the results of the *OECD Business Survey on State Influence on Competition in International Markets* (Kowalski and Perepechay, 2015[7]), illustrate some of these concerns expressed by steel producers (see Box 2).

**Box 2. Concerns about SEs competing in international markets**

The OECD Business Survey on State Influence on Competition in International Markets[6], which was conducted by the OECD Trade and Agriculture Directorate in 2014 sheds the light on the nature, the extent, and the effects of government-granted advantages, which have a bearing on competition in international markets. In parallel, a Database on National Practices and Regulations with Respect to State Enterprises takes stock of the different country-specific regulations, which may have a bearing on the competitive position of state enterprises in international markets. [7]

The results of the business survey demonstrate that a number of concerns that were raised by surveyed firms on the impact of government-granted advantages on the competition in international markets.

Main results from the survey (all sectors):

i. Foreign governments are perceived to grant preferential treatment to respondents' competitors more often than domestic governments;

ii. The ownership status of firms (SE and non-SE) is of relevance and the perceived impact of preferential treatment of enterprises by governments is higher for SEs than for PEs;

iii. Financial and regulatory forms of support seem to concern survey respondents the most;

iv. SEs are used frequently to grant advantages to other firms through lower prices or better accessibility of inputs;

v. Both central and local governments are reported to be granting advantages.

Source: (Kowalski and Perepechay, 2015[7])

## 2.4. SEs and forms of preferential treatment

The existence of state ownership does not necessarily imply the existence of government support, insofar as a number of principles such as competitive neutrality are followed (Box 3 below). Nevertheless, even though state ownership is not necessarily a form of government support, concerns about a lack of transparency and accountability may arise, particularly when ownership is indirect or through complex business links. Moreover, in economies where principles such as competitive neutrality may not be as well established, there may be concerns about possible preferential treatment of state-owned firms.

Preferential treatment of SEs may take a variety of forms including direct and indirect support. The following list overviews forms of preferential treatment to SEs that are relevant in the steel sector, drawing upon recent OECD work on state enterprises (OECD, 2016[1]).

- **Preferential financing from the government or public financial institutions**: SEs may benefit from preferential financial conditions in forms of i) favourable requirements with respect to rate of return of capital or disbursement of dividends; ii) direct financial state support; iii) ease of recapitalisation, equity infusions and credit conditions below market levels; and, iv) provision of state-backed

guarantees. These favourable financial conditions may result in "softer" budget constraints (see Lardy (1998[8]); Scott (2002[9]); and, Warner, Hong and Xu (2004[10])). While preferential financial conditions are likely to affect market conditions in any sector of the economy, the steel industry is particularly vulnerable to unfair financial treatment. In times of weak demand, this support may ultimately lead to additional unnecessary investments in steel capacity, or act as a barrier to the removal of excess capacity. [8]

- Preferential treatment in the form of **grants or direct payments for specific policy purposes** such as improving environmental performance or fostering innovation. This includes situations where SEs disproportionally benefit from certain policy instruments (e.g. R&D grants).
- **Assumption of liabilities by the government and other charges:** SEs may benefit from liability clauses in the form of assumptions of liabilities by the government, debt conversions (including debt-for-equity swaps), exemptions from administrative fees or other charges by governments, which might be inconsistent with the market considerations.
- **Implicit government guarantees and signalling effects**: SEs may receive preferential treatment through indirect or implicit forms of support. Indirect preferential financing refers to implicit or perceived government guarantees that allow to cheaper or easier access to financing.[9] As an example, by being the ultimate owner, the State could be seen as providing a signal to the markets that the company is less likely to fail, thus improving the company's ability to obtain credit. Potential better financial conditions may apply to SEs if, for instance, banks perceive SEs as less risky because of their formal relationship with the state.[10]
- **Implicit government guarantees and signalling effects**: SEs may receive preferential treatment through indirect or implicit forms of support. Indirect preferential financing refers to implicit or perceived government guarantees that allow to cheaper or easier access to financing.[11] As an example, by being the ultimate owner, the State could be seen as providing a signal to the markets that the company is less likely to fail, thus improving the company's ability to obtain credit. Potential better financial conditions may apply to SEs if, for instance, banks perceive SEs as less risky because of their formal relationship with the state.[12]
- Explicit or implicit preferential conditions for the application of **bankruptcy law** are also likely to distort competition between SEs and PEs. The design or the implementation of bankruptcy regulation may create unnecessary barriers to exit, allowing the survival of consistently lossmaking companies and the congestion of resources that could otherwise be used by more productive firms or in other economic activity (Adalet McGowan, Andrews and Millot, 2017[11]).[13]
- **Tax concessions and other tax benefits** such as tax exemptions, reductions, and credits may also play a role in altering the level playing field among SEs and private firms. For instance, SEs may be supported through tax concessions as compensation for their public service obligations. This is likely to affect competition in case commercial and non-commercial activities are not clearly separated and those benefits exceed the cost the SE faces in implementing such public service obligations. The resources gained could be used then to compensate non-public activities, *de facto* distorting market conditions.

- Governments often consider the steel industry as a strategic asset for economic growth and in some cases in the past have entrusted SEs with **monopoly, exclusive rights** for the production and distribution of steel products or preferential access or pricing in government procurement.[14] While any competition implications would be limited to the domestic economy, important distortions could arise if these companies engage in international trade and cross-border investment activity.
- SEs might also benefit from in-kind support. In the steel industry, this may take the form of land usage for the development of new mills, or preferential access to strategic logistic services.

## 2.5. Presence of SEs and competition in domestic markets

Ensuring competitive neutrality means that SEs and PEs compete on a level playing field (Box 3). The notion of competitive neutrality is important for the policy discussion on how the presence of SEs in the marketplace may lead to distortions and which actions governments may undertake so as to maintain fair competition at local and international levels (Capobianco and Christiansen, 2011[12]).

The recently updated OECD *Guidelines on Corporate Governance of SOEs* (hereafter "Guidelines") provide policy recommendations on “how governments should exercise the state ownership function to avoid the pitfalls of both passive ownership and excessive state intervention” (OECD, 2015[2]). The Guidelines recognise the important role played by SEs in the economy, and point out that competitive neutrality can only be achieved if the role of the state in the market is professionalised, i.e. SEs are managed and operationalised as a good practice private undertaking, and if a regime of competition between SEs and private firms, where both coexist, is maintained.

**Box 3. Competitive neutrality**

Recent OECD work analyses the complex relationship between state ownership and competition. According to Capobianco and Christiansen (2011[12]), "competitive neutrality implies that no business entity is advantaged (or disadvantaged) solely because of its ownership". Policy frameworks that guarantee a level playing field should ensure that state presence in the market does not involve an unfair allocation of resources among public and private entities, does not affect market integrity and has incentives to act competitively. To maintain competitive neutrality between public and private undertakings, the following elements should be ensured:

- Streamlining government business in terms of structure and corporate form. This includes the separation of commercial and non-commercial activities, in particular in presence of natural monopolies, so as to ensure that the commercial components of government business are subjected to standard market forces.
- Identifying costs of any given enterprise function and developing appropriate cost allocation mechanisms that promote transparency and disclosure.
- Competitive rates of return. State owned or state controlled firms should attain economic and financial indicators in line with those of private undertakings. This includes similar rates of return on invested capital as well as other profitability indicators.
- Tax, regulatory and debt neutrality. To level the playing field, the same fiscal and regulatory framework should be applied to both public and private undertakings. Sources of financing should also be levelled and no state-owned or controlled firm should enjoy preferential access to finance.
- Accounting for public service obligations. When state enterprises are entitled to perform non-commercial activities, compensation for their public policy function should be transparent and accurately accounted.
- Public procurement. Public tenders should promote competition, transparency and thus avoid any discriminatory practices in favour of public entities

Source: Capobianco and Christiansen (2011[12])

## 2.6. Cross-border activities of SEs

While there are clear motivations for the existence of SEs in the marketplace, their engagement in cross-border activities is not straightforward. Cross-border outward investments are exposed to some degree of risk, mainly due to legal framework uncertainty and cultural divergences. In particular, the legal framework, including company and competition laws, reporting standards, labour and environmental standards, may impede a foreign firm to immediately adapt to the new business environment, with potential negative effects on profits. While these concerns are likely to lower the attractiveness of foreign investments for private firms, SEs may be more prone to invest abroad given their different attitude towards risk. Better access to finance and softened budget constraints could also be considered as important factors influencing SEs' foreign presence, insofar as it mitigates

the risk associated to the exploration of foreign markets. In these cases, advantages granted locally can have cross-border impacts, with important consequences for the international level playing field. The policy challenge is thus to guarantee that adequate legal framework is in place to ensure that SEs operate in a regime of equal treatment at the international level.

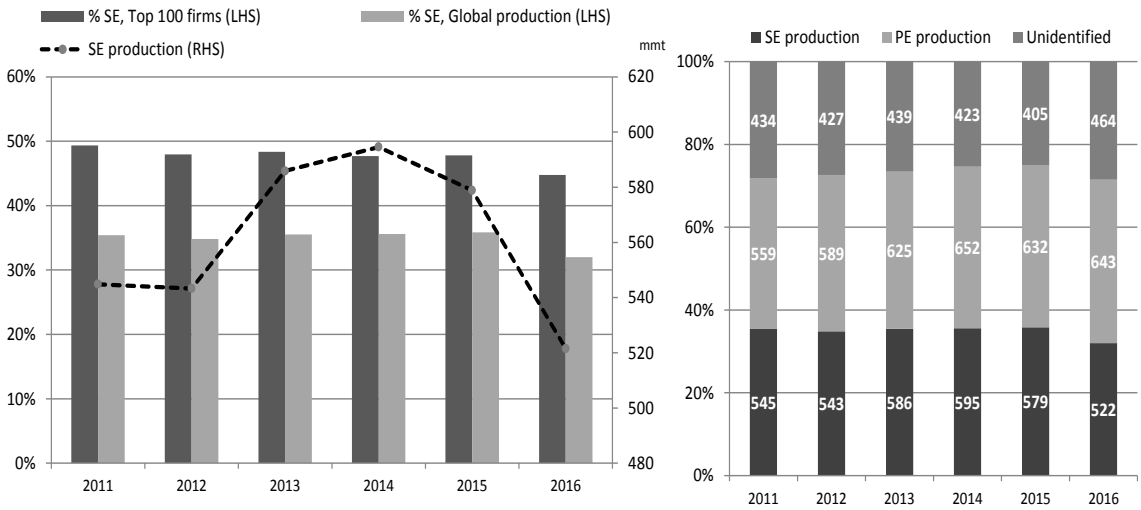
However, cross border activities of SEs are not restricted to foreign investment. Although international trade and investment have common elements, there are remarkable differences between delivering products to foreign markets by means of foreign subsidiaries on the one hand and trade them across the borders on the other hand (Kowalski and Rabaioli, 2017[13]). Trade requirements in the form of product regulation and the compliance with technical standards, for example, may result in barriers to international trade, and state supported firms may benefit from a preferential access to international markets in this context. As the requirements faced by firms engaging in cross-border trade activities do not necessarily coincide with the problems related to their international investments, the policy framework that disciplines SEs' cross-border activities should take in account these differences for better ensuring a level playing field between SEs and PEs at international level.

## 3. The scope of State ownership in the steel sector

While the presence of SE in the worldwide economy is increasing in importance (OECD, 2016[1]), the steel industry remains populated by private firms. In terms of crude steel production, 22 of the world's largest 100 companies were directly or indirectly owned by states in 2016. Although relatively small in numbers, state-enterprises (SEs) represented no less than 32% of global crude steel output in 2016 — and 45% of total crude output amongst the largest 100 steelmaking companies. Private enterprises represented 39.5% of global crude steel output and for the remaining 28.5% of global production it was not possible to identify whether it was produced by SEs or PEs.[15] Figure 1 shows that SEs produced at least 522 mmt of crude steel in 2016. This value is slightly lower than in previous years and in line with the slow decline in the share of global production by SEs.[16]

**Figure 1. SEs in global steel production**

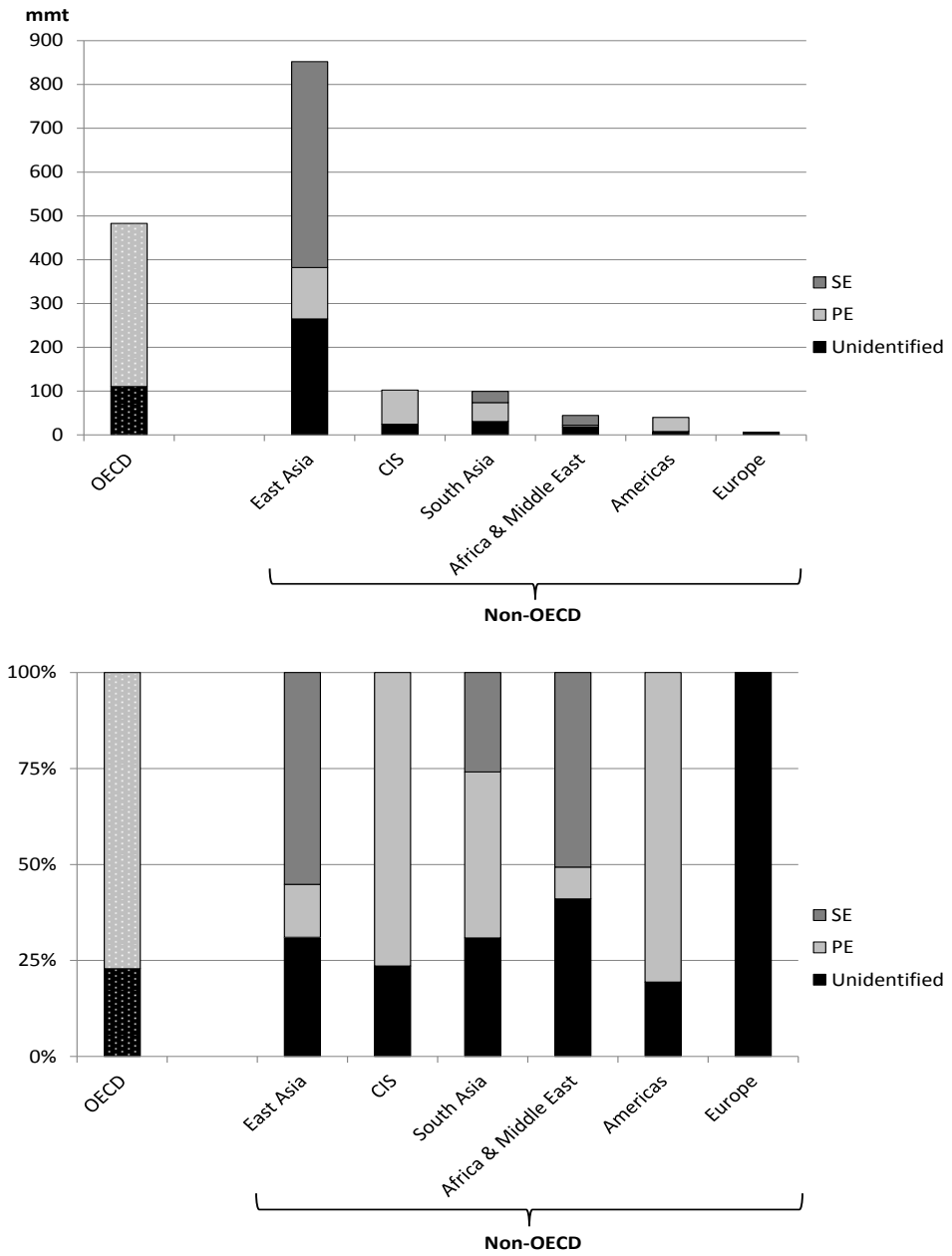
Top 100 companies, 2011-16




*Note*: The output share is calculated as the sum of crude steel production tonnage of all SEs in the top 100 steelmaking companies (see Worldsteel (2017[14])). In panel B, "Unidentified" stands for all the remaining crude steel produced by companies that are not in the list of the 100 largest steelmakers.
*Source*: OECD calculations based on data from the World Steel Association and ORBIS.

**Figure 2. Steel production of SEs and other firms at regional level**

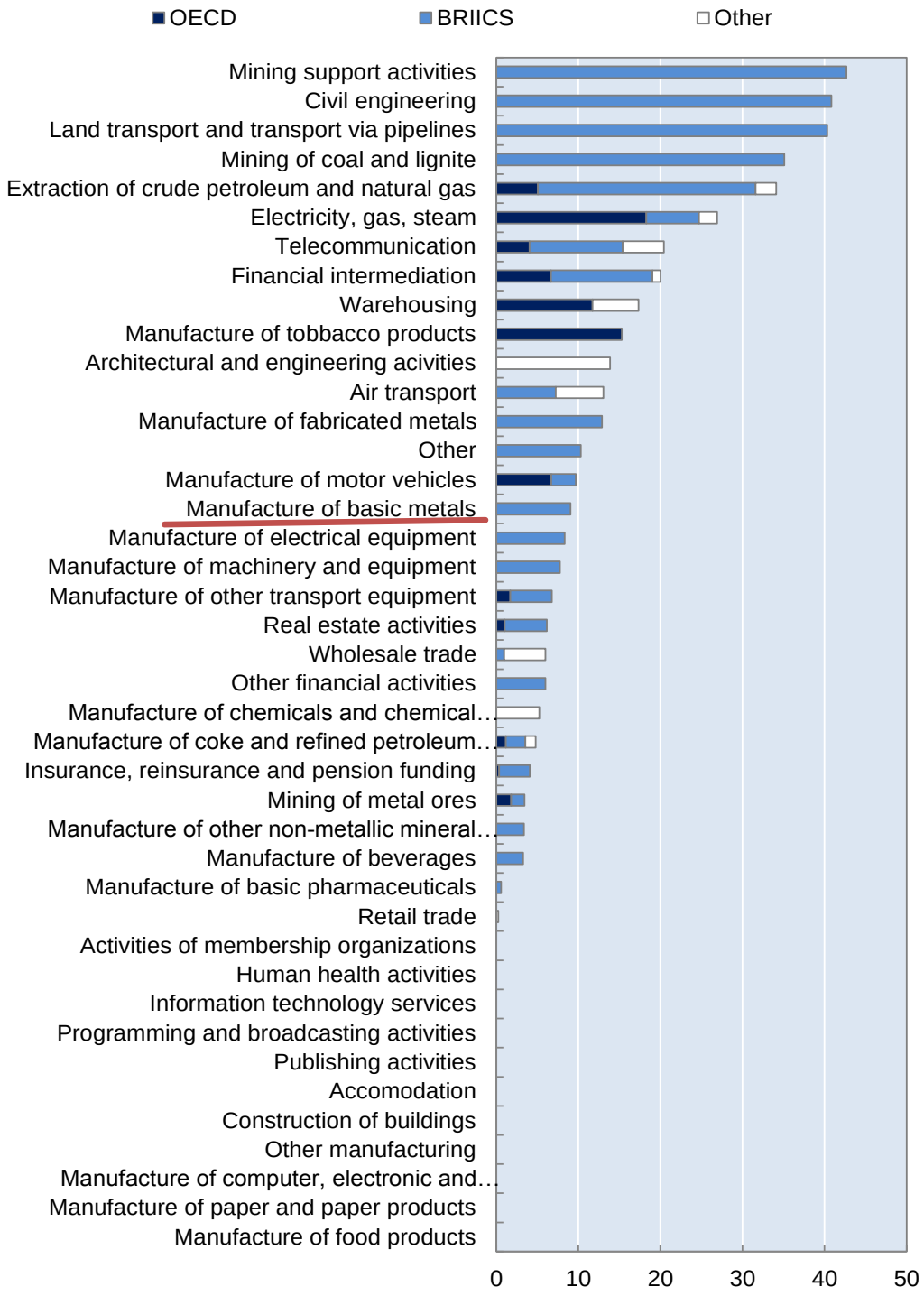
OECD/EU and non-OECD/EU economies[17]




*Note*: The chart at the top represents 2016 steel production figures (mmt) at regional level by ownership type. The column on the left group together the total crude steel production for all OECD/EU economies. Columns on the right side include production data for all non-OECD/EU economies by region. Figures for SEs and PEs refer to crude steelmaking production for the first 100 steelmaking companies (see Worldsteel (2017[14])). "Unidentified" stands for all the remaining crude steel produced by companies that are not in the list of the 100 largest steelmakers. Non-OECD/EU economies are ordered by region according to their crude steel total production. The chart at the bottom indicates the SE, PE and unidentified companies' production as shares of the overall crude steel production in a given region.
*Source*: OECD calculations based on data from the World Steel Association and ORBIS.

**Figure 3. Sectoral SE shares**

Selected sectors




*Source*: Kowalski et al (2013[15])

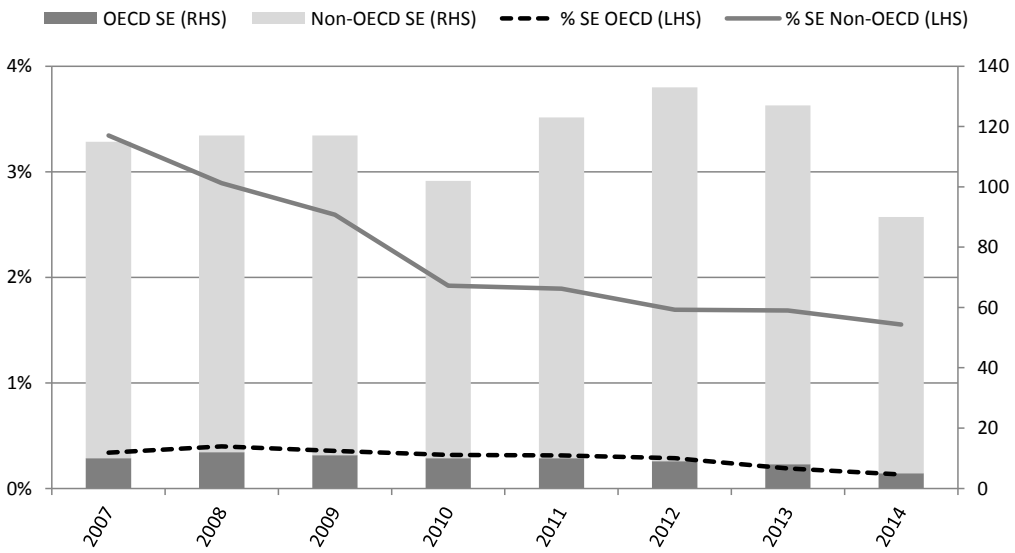
The presence of SEs in the steel industry is rather concentrated in some specific regions. Figure 2 shows that most of the crude steel production among the 100 top steelmakers in the world is concentrated in non-OECD East Asian and South Asian economies, while none is present in OECD/EU economies within this group of companies. [18] It is also interesting to note that about one half of the whole crude steel production in the macro-region composed of African and Middle Eastern economies is by large SEs included in the top 100 steelmaking companies. Interestingly, more than 80% of crude steel production in non-OECD American economies come from private companies, which could reflect the privatisation wave that the industry already went through in the 1990s, in Brazil and elsewhere in South America.

State ownership has declined rapidly until 2000s in the steel sector, mainly due to the process of privatisation in Europe in the mid-1980s and then followed by the privatisation waves experienced by former Soviet Union economies (OECD, 2012[16]). Evidence suggests that the number of SEs in the steel industry is relatively low compared to other sectors. Kowalski et al. (2013[15]) use firm level data combining the Forbes Global 2000 list and firm level ownership data to show that the SOE shares in the manufacture of basic metals is slightly lower than 10%, which is significantly lower than in other sectors such as mining, civil engineering or land transport.

Figure 4 shows that the around 0.9% of companies classified as manufacturers of basic iron and steel around the world were fully or at least partially owned by the state in 2014.[19] Interestingly, steel SEs are concentrated in Non-OECD/EU economies, where they represented about 1.4% of the total number of enterprises operating in the steel sector in 2014, compared to 0.1% in OECD/EU economies.

**Figure 4. Presence of SEs in the steel sector**

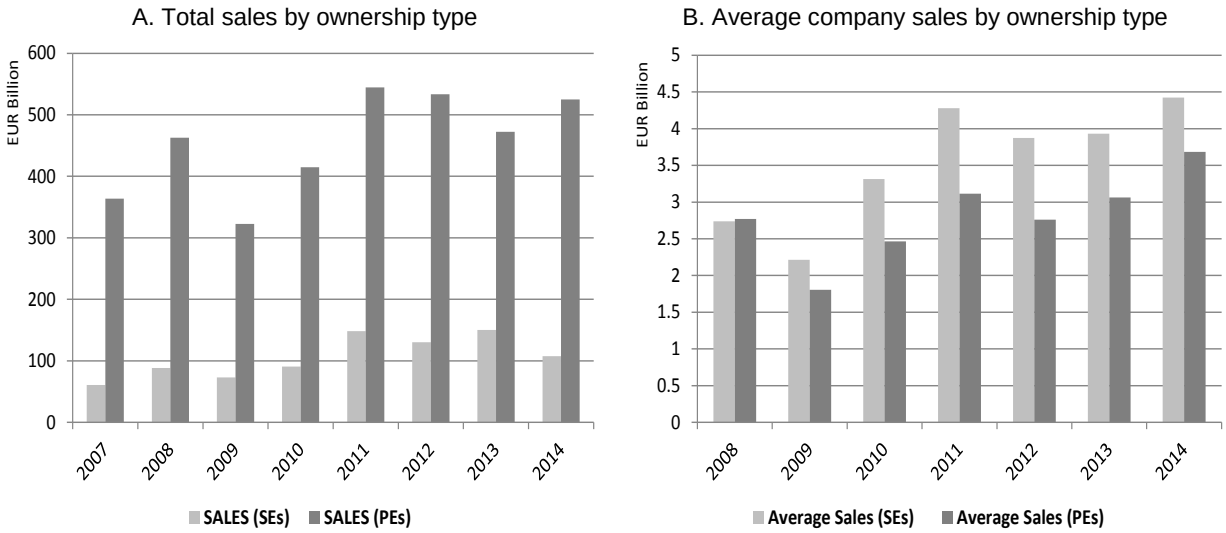
OECD/EU and non-OECD/EU economies.




*Note*: Bars represent the number of SEs in OECD (dark-coloured bar) and non-OECD/EU economies (light-coloured bar) — totals are presented in the right-hand vertical axis. Lines represent the percentage of SEs in the total number of companies in steel sector in OECD/EU and non-OECD/EU economies — percentages are presented in the left-hand vertical axis.
*Source*: OECD calculations based on data from ORBIS.

Even though the number of SEs in the steel sector is small, their presence is important. In fact, while the aggregate turnover of PEs in the steel industry has always been well above the aggregate turnover of SEs, the latter still accounted for 30% of total turnover in 2014 (Figure 5.A). Moreover, data comparing SEs and PEs with the same characteristics (e.g., controlling for the size of the company) shows that SEs are found to sell more than their private counterparts (Figure 5.B). Interestingly, the results suggest that SEs have gradually consolidated their position in the market in recent years.

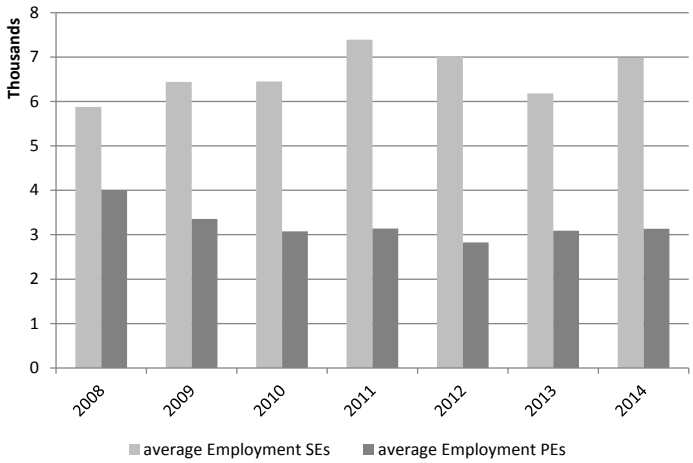
**Figure 5. SEs represent a large share of steel global market**




*Note*: Aggregate sales and average sales by ownership over the period 2001-14. Sales are deflated at 2010 prices. All values are in billion Euros. Panel B compares the average sales of all SEs companies, with the average sales of an equivalent number of PEs with the same characteristics — see Annex C for further detail on how to compare SEs and PEs.
*Source*: OECD calculations based on data from ORBIS.

In terms of employment, SEs in the steel sector account for an important share of total employment in the industry. On average, SEs employed about twice as many people as PEs in the period 2010-14, according to data from ORBIS (Figure 6). The fact that SEs employ more people is particularly relevant because labour force is an important factor shaping the dynamics of productivity and efficiency in the industry. Moreover, labour force is a key consideration to take into account when it comes to industry restructuring because of the social implications that the closure of a steelmaking plant can have in the local communities.

**Figure 6. Average employment in the steel industry**




*Note*: Employment figures are calculated as the average of labour force at the firm level by year and by ownership type. The chart compares the average employment of all SEs companies, with the average employment of an equivalent number of PEs with the same characteristics — see Annex C for further detail on how to compare SEs and PEs.
*Source*: OECD calculations based on data from ORBIS.

# 4. State enterprises and economic performance

As discussed in Section 2. , SEs may benefit from a number of advantages including grants, subsidies or credit at below-market rates. In disentangling whether SEs are associated to preferential treatment, the question that arises is whether there are objective economic measures that may serve as indicators. This section assesses the economic performance of SEs compared to PEs with similar characteristics, with the objective of providing some insights about the economic efficiency of SEs and on whether SEs benefit from potential preferential treatment. Evidence on the underperformance of SEs is provided through the analysis of the evolution of financial indicators as well as an econometric analysis to explore the relationship of SEs and economic performance (Box 4).

**Box 4. Estimating the determinants of financial performance**

The empirical analysis relies on a set of reduced-form linear equations, which include a dummy variable (SE) that identifies those firms that are (fully or partially) owned by the state. The baseline model is as follows:

$$y_{ict} = \beta_1 + \beta_2 SE_i + \beta_3 \mathrm{LEV}_{it-1} + \beta_4 \mathrm{EMP}_{it-1} + \beta_5 IOS_{ct} + \theta_c + \varphi_t + \varepsilon_{ict}$$

where the dependent variables used are alternatively the net profit margin and interest expenses over debt. The model considers the apparent steel use in each firms' corresponding economy in the following year as a control for the investment opportunity set (IOS) — see Hutchinson and Gul (2004[17]). The logarithm of the number of employees (EMP) controls for the size of firms, while the leverage (LEV) at time t-1 accounts for firms' indebtedness. The model further consider country fixed effects to account for country regulations, institutions and other country-specificities ($\theta_c$) as well as time fixed effects to account for the cycle ($\varphi_t$). In the estimation, standard errors are clustered at company level.

Further specifications include geographical dummy variables that divide the sample i) between OECD and non-OECD/EU economies or ii) between BRICS and other economies. Interaction between that geographical indicator and the binary indicator SE is intended to check whether the hypothesised relationship between state enterprises and operating performance/interest expenses is characterised by geographical specificities.

For overcoming the potential indigeneity and sample selection biases, regressions are replicated on a restricted sample of firms sharing similar characteristics in terms of annual turnover, leverage, labour force and the country of origin — see Annex C for details.

## Do SEs perform better than private firms?

State ownership has been associated with low economic performance. According to theories of institutions, the lack of right incentives between government and public managers and support measures provided by the State would suggest that SEs financial

performance is worse than that of PEs. However, empirical literature in this area is relatively scarce (Box 5).

**Box 5. Unpacking state ownership and operational performance**

Academic literature tends to agree on the view that state ownership leads to worse economic performance and lower investment in innovation (Shleifer, 1998[17]). The standard argument is that the public manager has little incentives to behave efficiently because it only gets a fraction of the overall return on its activity. Empirical evidence is nevertheless scarce.

Dewenter and Malatesta (2001[18])study the relationship between state ownership and operational performance by looking at Fortune magazine's largest industrial firms outside the US including privately and state-owned enterprises. Their results suggest that state-owned firms are significantly less profitable than privately owned firms.

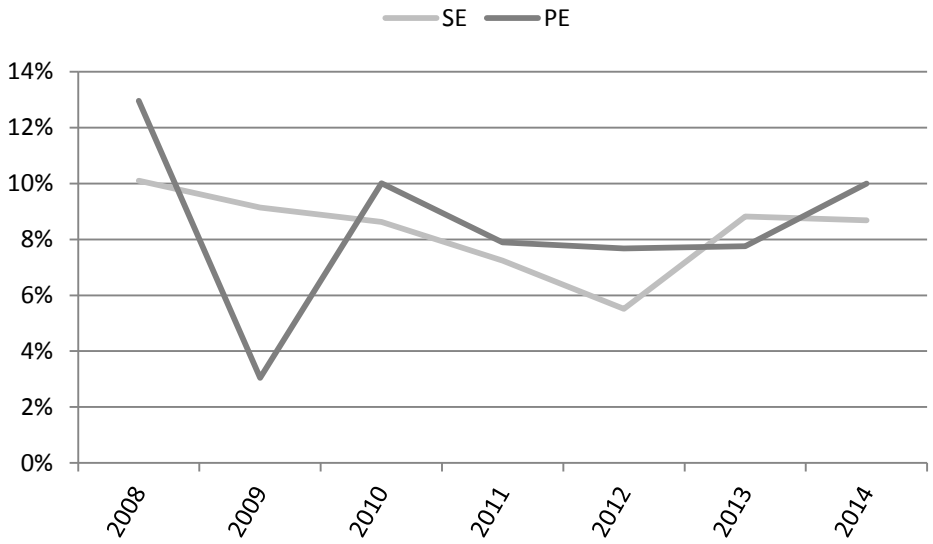
SEs operating performance has been mostly studied in a context of ex-ante, ex-post privatisation and in particular whether firm performance increases when firms become privately owned. Megginson, Nash and Van Randenborgh (1994[19]) report results from a study conducted over 61 state-owned companies from 18 countries that were privatised over the period 1979 –90. They find that privatised firms are more likely to experience an increase in profits and efficiency from before to after privatisation. Boubakri and Cosset (1998[20]) analyse 79 partially or fully privatised firms in 21 developing countries and find significant increases in profitability, operating efficiency in the ex-post privatisation period.

While these studies seem to confirm a negative relationship between state-ownership and performance, Chen, Firth and Xu (2009[4]) argue that institutional setting in which SEs operate play a role in determining firm' profitability. By analysing a sample of publicly listed Chinese companies, the authors find that operating efficiency of SEs varies across the nature of controlling shareholder, and in particular, firms that are controlled by the central government perform better than privately owned firms.

Firm-level data containing information on ownership and financial indicators shows that SEs in the steel sector are characterised by a lower level of profitability (see Annex A for an overview of the data used in this paper). Figure 7 below shows the evolution of operating profitability and indicates that while PEs had lower EBITDA margins than SEs in 2009 and to a lesser extent in 2013, they tend to exhibit better financial performance.

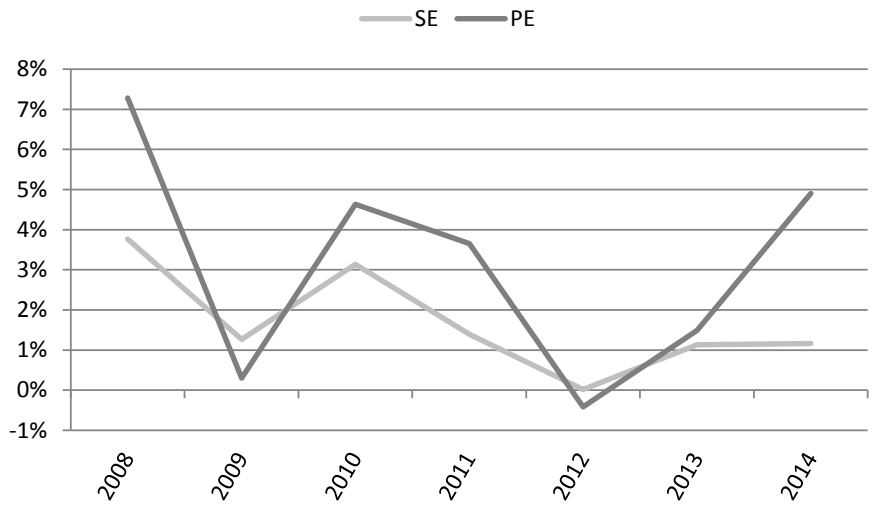
**Figure 7. Average operating profitability by ownership type**

EBITDA/SALES




*Note*: The charts compare the average profitability of all SEs companies, with the average profitability of an equivalent number of PEs with the same characteristics — see Annex C for further detail on how to compare SEs and PEs
*Source*: OECD calculations based on data from ORBIS.

**Figure 8. Profit margins by ownership type**




*Note*: The chart compare the average net profits of all SEs companies, with the average net profits of an equivalent number of PEs with the same characteristics — see Annex C for further detail on how to compare SEs and PEs
*Source*: OECD calculations based on data from ORBIS.

Net profits take into account all expenses, including tax, interest, depreciation and amortisation. Figure 8 shows that the average net profit margin of companies has been

increasing recently for both SEs and PEs, but were broadly and significantly larger for PEs since 2008, with the exceptions of 2009 and 2012.

In order to isolate the specific effect of SEs from other aspects influencing firm's financial performance, a number of additional variables (e.g. firms' total assets, leverage, total sales) are taken into account in a regression that explores the link between state ownership and financial performance in the steel industry in greater depth (Box 4 above). Results in Table 1 indicate a negative and statistically significant relationship between net profits and SEs.[20] The negative relationship between the state ownership status and profits suggest that SEs are less efficient than private entities. Such inefficiencies in SEs may arise from governance, suboptimal incentives to public management and/or relaxed budget constraints associated with public support or lax regulation.

**Table 1. Summary results: relationship between SEs and profits**

| Net profit margin | SEs | LEV (t-1) | EMP | IOS (t+1) | BRICS (bin) | SEs # BRICS |
|---|---|---|---|---|---|---|
| **Full sample** | - | - | 0 | 0 | - | - |
| **PS matched sample** | 0 | n.a. | n.a. | n.a. | 0 | - |

*Note*: The table presents results obtained from the econometric analysis as specified in Box 4 and shows the signs of coefficients as result of the econometric exercise. The first line reports the results from the whole sample, while the second row reports results from the PS matched sample. Signs (+) and (-) document respectively a positive and negative significant relationship between the relative independent variable and the dependent variable (profit margin). Zeroes (0) report that the relationship between the independent variable and the dependent variable are not statistically significant at the 90% level. See Annex D for the detailed results.
*Source*: OECD calculations based on data from ORBIS.

The geographic dimension of state support to public enterprises also deserves some attention. The regression exercise performed on the full sample and the PS matched sample shows that the relationship between profits and SEs located in BRICS economies is statistically significant and negative, suggesting that the results on lower profitability found for SEs in general, are primarily driven by SEs located in BRICS economies. [21]

## 4.1. Persistence of losses, restructuring and state ownership

The declining average profitability of SEs steel sector in the last years raises questions about whether state ownership is per se a barrier to firms' restructuring. Compared to other sectors, financial and industrial restructuring in the steel sector has proven to be particularly challenging due to, for example, high sunk costs and closure-specific costs. However, while private firms experiencing financial distress may strive in finding solutions that may help restoring profitability in a relatively short period of time, it is not clear whether softer financial and regulatory constraints associated with state ownership may delay restructuring or the exit of unproductive and uncompetitive firms.

Table 2 reports the share of firms that have recorded consecutive periods of operating losses from 2008 and 2014, according to ownership type. The results suggest that SEs are more likely to record longer periods of negative profits compared to their private counterparts. About 14% of SEs exhibited losses for two consecutive years, compared to 4.4% in the case of PEs. Interestingly, the share of PEs with two years of consecutive losses is lower than the share of SEs with four years of consecutive losses. After four years, only 1.2% of PEs continue to have losses, compared to 4.7% in the case of SEs.

**Table 2. Type the title here**

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| | 1 year | 2 years | 3 years | 4 years |
|---|---|---|---|---|
| **PEs** | 8.5% | 4.4% | 2.2% | 1.2% |
| **SEs** | 16.8% | 13.9% | 8.8% | 4.7% |

*Note*: The table reports the shares of PEs and SEs that have recorded consecutive periods of operating losses between 2008 and 2014.
*Source*: OECD calculations based on data from ORBIS.

In order to get more insights from the relationship between the persistence of losses and type of ownership, Table 3 reports the results of a regression exercise that relates the maximum number of financial periods that a firm has recorded consecutive losses to state ownership. The results suggest that SEs are significantly and positively correlated with persistence in financial losses (notably for smaller SEs), which indicates that state support may reduce the incentives to restructure during a period of financial distress.[22] [23]

**Table 3. Summary results: state ownership and loss persistence**

| | SEs | EMPLOYEES | IOS | LEV | BRICS (bin) | SEs # BRICS |
|---|---|---|---|---|---|---|
| **Maximum Consecutive Losses** | + | + | - | 0 | 0 | 0 |
| **Average number of losses** | + | + | - | 0 | 0 | 0 |

*Note*: The table presents results obtained from the econometric analysis as specified in Box 4 and shows the signs of coefficients as result of the econometric exercise. The analysis is based on the full sample in contrast with regressions using a matched sample described in Annex C because of limitations in the number of observations. Signs (+) and (-) document respectively a positive and negative significant relationship between the relative independent variable and the dependent variable (profit margin). Zeroes (0) report that the relationship between the independent variable and the dependent variable are not statistically significant at the 90% level. See Annex D for the detailed results.
*Source*: OECD calculations based on data from ORBIS.

State ownership seems to play a role in delaying restructuring during periods of sustained losses. The policy challenge is therefore to ensure that appropriate framework conditions and governance structures are in place so that state ownership does not represent a barrier to restructuring/exit of inefficient firms and to the reallocation of resources to more productive uses.

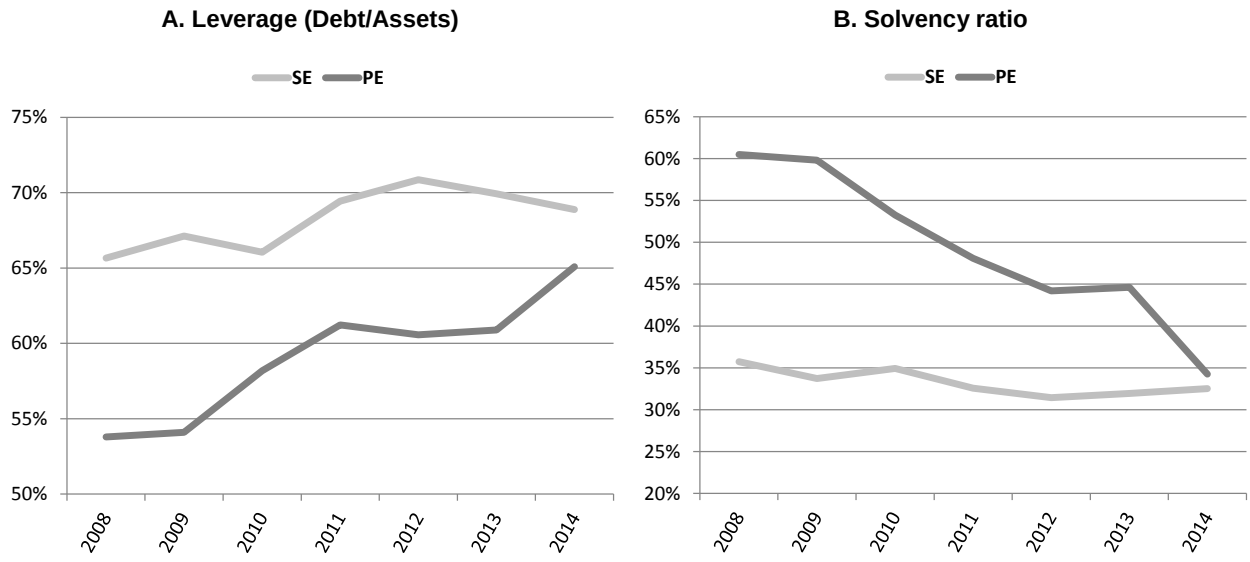
## 4.2. Debt Neutrality between SEs and PEs

Financing is an important channel for preferential treatment of SEs. The same access to finance conditions for both SEs and PEs would imply that state ownership should not be systematically linked to lower interest rates on debt, preferential credit channels or advantages in debt restructuring. Moreover, it should be expected that, under debt neutrality conditions, the levels of indebtedness of SEs would be close to those of PEs. In the steel industry, preferential financing conditions to SEs are particularly relevant for capacity investments and closures, which ultimately affect the overall sustainability of the industry at global level. This section tests debt neutrality by looking more closely into whether SEs

are more indebted and whether they are subject to lower interest rates compared to their private counterparts.

Data show that state enterprises in the steel sector are significantly more indebted than PEs with similar characteristics. In 2014, total liabilities accounted for almost 70% of assets for the average SE, compared to 65% for the comparable private counterparts (Figure 9.A). Indebtedness levels for PEs, which were on average below 55% before the 2008-09 financial crisis have however been increasing more rapidly than for their state-owned counterparts. It is nevertheless interesting to note that, on average, SEs have been sustaining indebtedness levels above 65% for the whole period of analysis (2008-14). Not surprisingly, the ability of SEs to meet financial obligations (solvency ratio) is considerably lower *vis-à-vis* PEs (Figure 9.B). However, solvency ratios for PEs and SEs seem to have been rapidly converging — solvency ratios of PEs have been declining rapidly in recent years and stood at 34% in 2014, compared to 60% in 2008.[24]

**Figure 9. Indebtedness indicators by ownership type**




*Note*: The charts compare the average indebtedness of all SEs companies, with the average indebtedness of an equivalent number of PEs with the same characteristics — see Annex C for further detail on how to compare SEs and PEs

In an attempt to verify whether SEs are associated with access to preferential financing, the analysis in this paper resorts to an indicator of financing cost, expressed as the ratio between interest expenses and total debt.[25] Graphical analysis shows that this indicator does not differ much between SEs and PEs (Figure 10), suggesting that the former have not necessarily benefited from better financing terms and conditions.

**Figure 10. Interest expenses over debt by ownership type**

*Note*: The charts compare the average share of interest payments over total debt (including current and non-current liabilities) of all SEs companies, with the average for an equivalent number of PEs with the same characteristics — see Annex C for further detail on how to compare SEs and PEs
*Source*: OECD calculations based on data from ORBIS.

In fact, the econometric exercise performed on matched SEs and PEs with similar characteristics for all the economies does not provide evidence of any differences on interest expenses across ownership types. However, the distinction between different geographies shows that SEs located in BRICS economies are more likely to face lower interest expenses than PEs (Table 4).[26] This suggests that some forms of preferential financing might be present for SEs in this group of economies.

**Table 4. Summary results: relationship between SEs and interest expenses**

| Interest expenses over debt | SEs (bin) | BRICS (bin) | SEs # BRICS | OECD (bin) | SEs # OECD |
|---|---|---|---|---|---|
| **Full Sample** | 0 | + | 0 | - | 0 |
| **PS matched sample** | 0 | + | - | - | 0 |

*Note*: The table presents results obtained from the econometric analysis based on a PS matched sample, and as specified in Box 4. The table shows the signs of coefficients as result of the econometric exercise. Signs (+) and (-) document respectively a positive and negative significant relationship between the relative independent variable and the dependent variable (interest expenses). Zeroes (0) report that the relationship between the independent variable and the dependent variable are not statistically significant at the 90% level. See Annex D for the detailed results.
*Source*: OECD calculations based on data from ORBIS.

# 5. Steelmaking capacity and new investments by SEs

Excess capacity has important implications for the sustainability of the industry and has led to concerns in the OECD Steel Committee on whether direct and indirect forms of government support (including through SE activity) promote capacity expansions or sustain economically unviable capacities, creating considerable distortions in international steel markets.[27] The analysis in this section shows that the majority of investments in new steelmaking capacity in recent years have been made by SE and that the majority of the capacity closures since 2016 have been taking place in private companies.

## 5.1. Steelmaking capacity investments and closures

Despite the supply-demand imbalances in the steel sector, companies have continued to invest in new steelmaking facilities (OECD, 2015[21]). Data on steelmaking capacity investments between 2013 and 2014 show that an important number of new capacity additions or expansion were carried out by SEs or to some extent financed by the government (see Table 3, OECD, 2015[20]).[28] Moreover, data presented in Table 5, shows that while some capacity investments did not involve SEs directly, projects were financed by state/public banks, public financial institutions or dedicated state funds.

**Table 5. Summary of 17 investment projects in the iron and steel sector with explicit information about government related financial support, by economy**

| Country of Financial Support | SOE-led projects | Projects linked to government financing, in the form of: | | | | Total SB/PFI/SF cases | Approximate capacity installed |
|---|---|---|---|---|---|---|---|
| | | SOE+SB/PFI | SOE+SF | SB/PFI | SF | | |
| Algeria | 1 | | 1 | | | 1 | 5 000 |
| Brazil | | | | 1 | | 1 | 3 000 |
| Canada | | | | | 1 | 1 | 200 |
| China | 1 | 3 | 1 | | | 4 | 23 200 |
| India | 3 | | | 1 | | 1 | 16 800 |
| Indonesia | | 1 | | | | 1 | 1 400 |
| Kazakhstan | | | | 1 | | 1 | Details unknown |
| Korea | | 1 | | 1 | | 2 | 3 000 |
| Russian Federation | | | | 1 | | 1 | 900 |
| South Africa | | | 1 | | | 1 | 5 000 |
| Chinese Taipei | | | | 1 | | 1 | 3 450 |
| Turkey | | | | 1 | | 1 | 1 200 |
| United States | | | | | 1 | 1 | 1 500 |
| Viet Nam | | 1 | | | | 1 | 500 |

*Note*: Summary of cases where credit is extended by state-owned banks (SBs) or obtained through public financial institutions (PFIs) and cases where funding is obtained directly from state or local governments or through state development funds, state funds (SFs). These are projects where government support has been mentioned explicitly, therefore, the actual number of government-supported projects is likely to exceed those identified. For all the cases studied for China, information on the amount of capacity associated with one project was not provided.
*Source*: (OECD, 2015[21])

Looking at recent investments in steelmaking capacity around the globe, it is worth noting that a considerable share of planned and on-going capacity investments is implemented by SEs. Interestingly, most of the capacity investments are in non-OECD/EU economies and seem to be driven by SE investment. Capacity investments by SEs account for more than 55% of all capacity investments that are already operating or expected to come on stream in the future. These data suggest that SEs tend to invest more in steel capacity than private entities, possibly because of implicit forms of preferential treatment or because of explicit government strategies to expand capacity.[29]

**Table 6. Investments in new steel capacity by ownership type**

Operating and planned investments

| | | *Operating/Underway* | | | *Planned* | | |
|---|---|---|---|---|---|---|---|
| | | ***SEs*** | ***PEs*** | ***unidentified*** | ***SEs*** | ***PEs*** | ***unidentified*** |
| **Capacity (mmt)** | *OECD* | 0 | 25.8 | 1.9 | 0 | 24.9 | 11.1 |
| | *non-OECD* | 152.7 | 120.3 | 46.2 | 97.4 | 133.2 | 22.1 |
| | | ***SEs*** | ***PEs*** | ***unidentified*** | ***SEs*** | ***PEs*** | ***unidentified*** |
| **No. investments** | *OECD* | 0 | 15 | 4 | 0 | 9 | 9 |
| | *non-OECD* | 70 | 89 | 52 | 41 | 50 | 34 |

*Note*: The table contains data on the number of capacity investments and the corresponding amounts of capacity (expressed in mmt) for crude steelmaking capacity projects (expected to be) deployed between 2012 and 2025. Data are sorted by a geographical dimension (OECD/EU and non-OECD/EU economies) and by ownership type (SEs and PEs).
*Source*: OECD calculations based on (OECD, 2016[22])

The rapid increases in global steelmaking capacity have however come to a halt in 2015-16 as the market conditions deteriorated rapidly, with several cancellations and postponements and only a few new projects, mostly in economies where steel demand is growing rapidly (OECD, 2017[23]). The deterioration in the excess capacity situation in recent years has put pressure on the steel industry to restructure and close down the least efficient operations. Implicit guarantees and other forms of preferential treatment towards steelmaking SEs might act as an important barrier to exit. Moreover, closure of SEs can be particularly complex and politically costly, notably in cases when the commercial and social functions of the enterprise are not separate. Interestingly, most of the steelmaking plant closures between 2015 and 2016 have been private companies, accounting for the lion's share of capacity closed (Table 7).[30]

**Table 7. Capacity closures by ownership type**

OECD/EU and non-OECD/EU countries

| | **Number of closures** | | **Capacity closed (mmt)** | |
|---|---|---|---|---|
| | **SEs** | **PEs** | **SEs** | **PEs** |
| **OECD** | 0 | 11 | 0 | 13.4 |
| **non-OECD** | 14 | 16 | 7.6 | 8.7 |

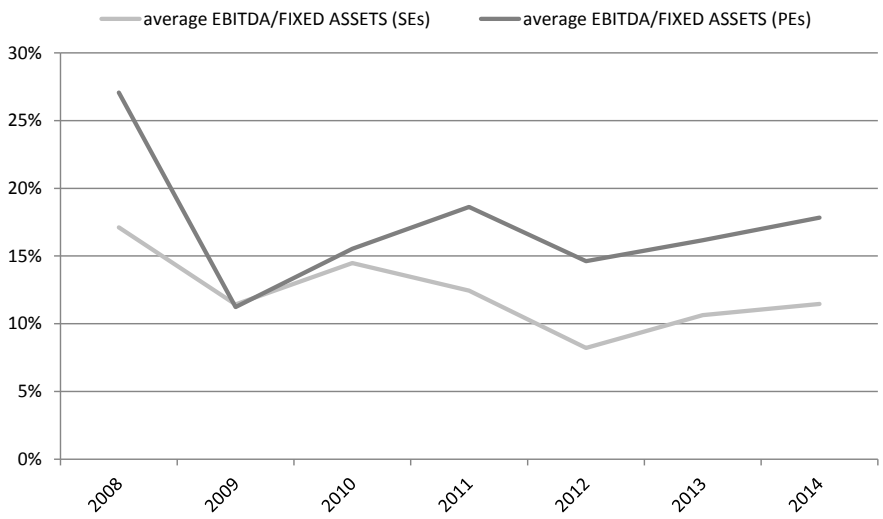
*Note*: The table contains data on the number of capacity closures (at the plant-level) and the corresponding amounts of capacity closed (expressed in mmt), observed in 2016 and 2017. Data are sorted by a geographical dimension (OECD/EU and non-OECD/EU economies) and by ownership type (SEs and PEs). Data on the total number of existing plants by ownership type is not available.
*Source*: OECD calculations based on OECD (2017[23]).

## 5.2. Financial performance and steel capacity in state enterprises

Exploring the relationship between financial performance and capacity can shed some light on whether state enterprises take advantage of privileged treatment to undertake new investments, regardless their economic and financial records

In light of significant challenges in matching plant-level information on capacity with firm-level financial information, and assuming that a very substantial share of fixed assets in the steel industry is associated with the volume of steel capacity, fixed assets are used as an approximation of the level of steelmaking capacity in each company.[31] Using fixed assets as proxy for steelmaking capacity, Figure 10 shows that state enterprises retrieve lower profits for each unit of capacity than their comparable private counterparts. This result suggests that SEs do not use capacity as efficiently as PEs, an outcome that has important implications for the discussion on capacity investment and capacity closures.

**Figure 11. Operating performance and fixed assets**




*Note*: The chart compare the average EBITDA/Fixed Assets of all SEs companies, with the average EBITDA/Fixed Assets of an equivalent number of PEs with the same characteristics — see Annex C for further detail on how to compare SEs and PEs. Please note that fixed assets values in emerging economies tend to be higher on average than those in developed economies because of more recent asset accumulation and depreciation in latter economies. Since the presence of SEs is much higher in emerging economies than in developed economies, the average EBITDA/Fixed Assets ratio for SEs can be downward biased in the above chart.
*Source*: OECD calculations from the ORBIS dataset.

# 6. The role of policy

## 6.1. Policy implications in steel markets

### *Financing of SEs*

The amount of outstanding debt accumulated by SEs is a reason for concern. Persistently high levels of indebtedness suggest that SEs are benefiting from financing advantages. The ability of SEs to meet financial obligations is considerably lower that their private counterparts, but they nevertheless remain in the market, and benefit from lower interest rates in some economies.

Relatively high amounts of debt in SEs are ultimately the responsibility of governments and could result in considerable losses for the taxpayer, not to mention the building up of non-performing loans and their associated systemic risks within the financial sector. Policymakers should remove all direct and indirect forms of preferential treatment towards SEs. This would also involve signalling to financial and steel markets that SEs are allowed to fail, by ensuring that consistently loss-making and highly indebted SEs are allowed to start bankruptcy procedures and, when necessary, liquidated. This would force investors to internalise the risks of investing (or lending to) in SEs, in the same manner as they do for PEs.

### *Dealing with excess capacity*

Dealing with excess capacity in the presence of SEs poses particular challenges. More specifically, the closure of SEs can be more complex and politically costly than in the case of PEs, notably when commercial and non-commercial functions are not separated and SEs have public service obligations alongside their commercial activities. In addition, barriers to exit might be higher for SEs than for PEs — e.g. softened bankruptcy legislation; signalling effect in credit worthiness; larger number of employees and associated social costs.

While SEs have sometimes been argued to serve as a channel through which governments could try to reduce excess capacity, there are concerns regarding potential competition implications and loss of efficiency in resource allocation. Crude steelmaking capacity closures in 2016 and 2017 include SEs, as described in Section 5. Some of these closures are however the outcome of administrative measures, requiring predefined targets for capacity closures and certain capacities need to be immediately closed. These measures can be effective in rapidly closing down capacity, but they are not market-based and raise questions on whether the least efficient firms are being closed down and the most efficient firms are allowed to thrive. Moreover, administrative measures are likely to yield better results for companies controlled by the central government, whereas enforcement of these by sub-central administrations or for private companies might prove to be more challenging.

Even though SE capacity seems to be less profitable than PE capacity, further analysis would be required to understand whether the specific SEs' capacity being closed is more or less efficient than private capacities remaining in the market. While administrative measures could be a solution to quickly reduce excess capacity, addressing policy-induced market distortions (including through SEs) and market failures arising from industrial

specificities will be crucial to structurally address the excess capacity challenge going forward.

Failing to ensure a level playing field means that those SEs that are inefficient might be allowed to survive at the expense of more efficient private firms. Removing any form of preferential treatment to SEs would help with a reducing excess capacity in the present as well as avoiding excess capacity crisis in the future.

## 6.2. Instruments that can help ensuring a level playing field

### *General approaches and OECD work on state-owned enterprises*

The OECD Guidelines on Corporate Governance of State-Owned Enterprises have recommendations on how governments can ensure that "SOEs operate efficiently, transparently and in an accountable manner". The Guidelines highlight the importance of ensuring that SEs are not exempted from the application of general laws, tax codes and regulations. Moreover, the Guidelines also promote fairness between state and private undertaking in the access to debt and equity finance, and suggest that SEs should not benefit from any indirect support that confers an advantage over private competitors in terms of preferential financing, tax arrears or preferential trade credits.

Existing regulatory approaches can be used to mitigate potential challenges associated with the existence of SEs. Another important contribution from the OECD in the area of state enterprises is the OECD Database on National Practices and Regulations with Respect to State Enterprises. This database takes stock of country-specific practices and regulations relevant for the activity of SEs, overviews the different regulatory instruments and practices involving SEs across the different economies and covers 41 indicators across 43 countries (Kowalski and Perepechay, 2015[7]).[32]

### *SEs in the context of international regulations and agreements*

When the activity of SEs extends across the borders, either through trade or investment, ensuring competitive neutrality is particularly challenging. First, some economies may use SEs so as to pursue strategic economic and political objectives, with potential detriment to their foreign competitors. Second, the enforcement of domestic rules may be purposely less stringent when SEs compete in foreign markets. Third, the regulatory framework that disciplines the state sector may vary considerably across countries, which might ultimately distort the cross-border level playing field. Finally, the application of disclosure and transparency policies, which are of paramount importance in the context of SEs, may be less rigorous at international level (Kowalski and Perepechay, 2015[7]).

As SEs are increasingly competing with private firms in global markets, policies aimed at minimising the potential distortionary effects of SEs on trade and investments should minimise the effects they may produce at cross-border level. In the context of globally traded goods such as steel, policies that discipline the role of SEs in the marketplace should promote fairness of treatment between public and private undertakings, while avoiding undue restrictions to the participation of multinational SEs to local markets. It is thus important that governments cooperate for better designing a policy framework that may ensure fair treatment of SEs at cross-border level, honouring at the same time their commitments under international agreements.

In addition, when domestic objectives are in conflict with international constraints and in presence of large cross-border spillovers, the policy challenge is to ensure that governments

have the right incentives to implement policies that prioritise international objectives to national interests. This requires a policy framework that promotes reforms in the areas of corporate governance of the state sector and competitive neutrality policies that are coordinated at international level (Kowalski and Rabaioli, 2017[13]). As such, it is important that international principles and guidelines (including the OECD Guidelines) are followed and that policymakers cooperate and discuss the best approaches to solve the challenges arising from the cross-border activity (or implications) of SEs.

International regulations and agreements already go a long way to discipline discriminatory government behaviour in favour of SEs For instance, WTO Subsidies and Countervailing Measures Agreement (SCM) disciplines government support to firms in forms of trade-distorting financial preferences that are granted to firms, including SEs. In addition, the application of the SCM disciplines to SEs as subsidy grantors or conveyors depends on whether they act, or can be considered as “government" or a "public body”.[33]

### *Steel Committee Mandate and the Multilateral Guidelines*

Concerns about the behaviour of SEs in the steel sector were markedly noted by the Steel Committee in 2013 with the inclusion of a SE-specific additional intermediate objective in the Mandate of the Steel Committee. More precisely, the Mandate of the Steel Committee states: “[to] avoid the provision of preferential treatment to state-owned steel enterprises and ensure that such enterprises act in accordance with market principles”.

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# *Endnotes*

1. More precisely, the Mandate of the Steel Committee states: "[to] avoid the provision of preferential treatment to state-owned steel enterprises and ensure that such enterprises act in accordance with market principles".

2. The 10% ownership threshold is assumed to reflect any relevant form of influence or control. The paper focuses on providing systematic evidence. Therefore, companies with "golden shares" or other types of special voting rights are not included to facilitate the empirical analysis, as they would need to be analysed on a case-by-case basis. This threshold is in line with OECD (2015[2]).

3. "State" may thus include central and local administration, governmental agencies, public financial institutions, or other entities and financial vehicles within the public sphere operating in either countries or territories.

4. See OECD (2017[26]) for an overview of the different instruments and forms of government support used in the steel sector.

5. Please note that in the presence of market failures or considerable externalities, the state may wish to help correcting for them.

6. The OECD *Business Survey on State Influence on Competition in International Markets* conducted in 2014 was designed to document specific advantages granted to state enterprises that result in cross-border distortions. This business survey focused on five main economic sectors including manufacture of steel and mining of steelmaking raw materials. The survey was conducted on 157 firms of which 20% represented steel sector. For more details, see Kowalski and Perepechay (2015[7]).

7. The OECD *Database on National Practices and Regulations with Respect to State Enterprises Database* is available at: http://oe.cd/state-enterprises . For more information on the Database, see also Kowalski and Perepechay (2015[7]).

8. As an example, SEs in China have been found not to be affected by liquidity constraints in the period 2000-07, contrary to PEs (Guariglia, Xiaoxuan and Song, 2010[29]).

9. This indirect form of support is however difficult to empirically distinguish from direct forms of preferential financing.

10. As an example, the International Monetary Fund has recently noted that China should address the SEs debt problem, by hardening their budget constraints and liquidate loss-making companies (IMF, 2016[27]).

11. This indirect form of support is however difficult to empirically distinguish from direct forms of preferential financing.

12. As an example, the International Monetary Fund has recently noted that China should address the SEs debt problem, by hardening their budget constraints and liquidate loss-making companies (IMF, 2016[27]).

13. For example, the 2017 OECD Economic Survey of China notes that a major obstacle to getting rid of public zombie companies is the obstruction of the insolvency process by the insolvency manager for fear of state asset embezzlement (OECD, 2017[31]).

14. The Steel Authority of India Ltd (SAIL), a state-owned enterprises belonging to the government of India, had a monopoly in the market for flat products in the country until 1992, when a series of reforms of the public sectors has gradually liberalised the market for such products. See also (Naib, 2004[28]).

15. Data matching crude steel production and ownership are only available for the world's top 100 crude steel producing companies.

16. For the largest 50 steelmaking companies, this share has increased significantly between 2010 and 2011 (see OECD (2012[15])) as some SEs increased their production capacity and joined the top league, in detriment of companies scaling down production in the aftermath of the financial crisis of 2009.

17 The European Union is a member of the Steel Committee and accordingly this data includes all EU Member States.

18. Please note that "East Asia" includes: China, Democratic People's Republic of Korea, Indonesia, Malaysia, Mongolia, Myanmar, Philippines, Singapore, Chinese Taipei, Thailand, Viet Nam; "CIS" includes: Azerbaijan, Belarus, Kazakhstan, Moldova, Russia, Ukraine, Uzbekistan; "South Asia" includes: Bangladesh, India, Pakistan, Sri Lanka; "African and Middle East" includes: Algeria, Congo, Egypt, Ghana, Iran, Jordan, Kenya, Libya, Mauritania, Morocco, Nigeria, Oman, Qatar, Saudi Arabia, South Africa, Syria, Tunisia, Uganda, United Arab Emirates; "Americas" includes: Argentina, Brazil, Colombia, Cuba, Ecuador, El Salvador, Guatemala, Paraguay, Peru, Trinidad and Tobago, Uruguay, Venezuela; "Europe" includes: Albania, Bosnia and Herzegovina, Bulgaria, FYROM, Montenegro, Romania, Serbia.

19. Calculations are made using all available data from ORBIS for the 4-digit sector 2410 *Manufacture of basic iron and steel*, according to ISIC Rev. 4 classification. See Annex A for further details on the ORBIS dataset. It is worth noting that the 4-digit sector 2410 includes a large number of small private firms, and SEs are typically larger than PEs on average. This may explain why the number of SEs is quite low compared to PEs.

20. Note that the second line in Table 1 reports results from a regression using the PS-matched sample and therefore does not include the control variables specified in Box 4.

21. Please note that different levels of development of financial markets in emerging economies could lead to marginally higher financial expenses on debts. This exemplifies the challenges associated with analysing the linkages between financial performance and state ownership. The regressions use country fixed effects to control for any country-specificities.

22. This result is robust to alternative measures of loss persistence, such as the average number of losses recorded by each firm in the dataset. Persistence in losses is more prevalent in smaller SEs rather than larger ones, as suggested by the negative and statistically significant coefficient found for the interaction between SEs and measures of the size of firms.

23. It should be noted that technology is also an important dimension to take into account, insofar as most SEs are integrated producers, for which adjustment in periods of financial distress is more challenging that compared to more flexible producers (e.g. minimill plants).

24. Solvency ratio indicates the percentage of short and long-term liabilities that can be covered by cash generated by a firm in a given year. See Annex B for further details.

25. This indicator provides information on the shadow interest rate for a company, averaged across all debt contracts across all maturities.

26. Note that the Table 4 reports results from a PS-matched sample and thus a set of regressions that do not include the usual control variables used in this report (see Box 4). When the analysis

includes all the variables described in Box 4, for the relationship between SE and the interest ratio is not statistically significant, both in the full and in the matched sample (see also Annex D).

27. Statement by Ronald Lorentzen, Chairman of the OECD Steel Committee, 82nd Session of the OECD Steel Committee, Paris, 23-24 March 2017. Available at: http://www.oecd.org/sti/ind/82-oecd-steel-chair-statement.htm .

28. Further information on the methodology is available at OECD (2015[14]) and the OECD Steelmaking Capacity Portal at www.oecd.org/sti/ind/steelcapacity.htm. The data portal is updated on a yearly basis.

29. Please note that it is not possible to disentangle the two effects through standard statistical exercises.

30. It would be important to compare the number of plant closures and the capacity closed by ownership type with the absolute number of existing plants for each corresponding ownership type, but unfortunately, this information is not yet available. The OECD is working to improve its information on steelmaking capacity and ownership at plant level, along with other important firms' characteristics.

31. These challenges relate not only to the level of aggregation (financial accounts are disclosed at the firm level), but also to the different names attributed to the same company used in the different databases of capacity and financial indicators.

32. The OECD Database on National Practices and Regulations is accessible online at: http://qdd.oecd.org/subject.aspx?Subject=8F22EF7D-B780-4570-A4B1-7E0CB3AD7E04 .For more information on the Database see Kowalski and Perepechay (2015[7]).

33. See https://www.wto.org/english/docs_e/legal_e/24-scm.pdf .

# Annex A. ORBIS dataset: financial and ownership information

The ORBIS dataset is a cross-country longitudinal firm-level database available from Bureau van Dijk (BvD). The ORBIS dataset is the largest cross-country firm-level database that is available and accessible for economic and financial research. The dataset includes detailed financial and company information, in addition to ownership tables. The ORBIS version used in this report is the one obtained by the OECD from BvD in 2016. See Andrews, Criscuolo and Gal (2016[24]), and Gal (2013[25]) for a detailed description of the coverage and variables available from this dataset.

Information on state linkages are retrieved from ORBIS ownership information on shareholders' identity, ownership shares, identification of the global ultimate owner. This information, coupled with company characteristics, including geography, type of business activity and industry codes, allows constructing all the ownership links, going up through ownership trees up to the mother company.

The sample of companies selected contains only steel firms, identified through the industry classification *NACE 2410 Manufacture of basic iron and steel and of ferro-alloys*. Financial information retrieved from ORBIS used in this paper ranges from 2007 to 2014.

The identification of SEs is performed through the selection of those firms that are classified as public authorities, states and governments, according to the BvD Historical Ownership Database User guide 2015 through the ownership layers. SEs are those companies for which a public entity detain a direct or indirect share or higher than 10%.

Given the potential lack of coverage of ORBIS ownership information for non-OECD/EU economies, the analysis is complemented through desk research aimed at identifying the company identification codes of those firms that are state-owned based on OECD (2015[2]).

# Annex B. Variables definition [1]

AVERAGE NUMBER OF LOSSES average number of losses recorded by each specific firm in the dataset.

DEBT/ASSETS is computed as the ratio between total firm's liabilities and total assets at time t.

EBITDA MARGIN is computed as the percentage of EBITDA on sales at time t. EBITDA is calculated by deducting all expenses from revenue except interest, tax, depreciation and amortisation. It serves as a good core profitability measure across companies, regardless of their cost structure and operating leverage. EBITDA to sales ratio shows the share of the sales of a company that can be translated to EBITDA.

EMPLOYEES is the number employees at time t. In regressions, it is computed as the natural logarithm of firm's number of employees.

INTEREST RATIO is computed as the ratio between total firm's interest expenses and total liabilities at time t. The interest ratio provides an indication of how costly is the debt to a given company. Moreover, it provides information on a shadow interest rate over all the maturities and debt contracts.

IOS (t+1) (Investment opportunity set) is the natural logarithm of the demand of steel at time t+1 measured in terms of Million Metric Tonnes (MMT) at country level . Source: World Steel Association.

LEV (t-1) is computed as the lagged ratio between total debt (including current and non-current liabilities) and total assets.

MAXIMUM CONSECUTIVE LOSSES is calculated as the maximum number of consecutive losses recorded by each specific firm in the dataset.

PROFIT MARGIN is computed as the percentage of net profits on sales at time t. Unlike EBITDA, net profit takes into account all expenses, including tax, interest, depreciation and amortisation. Net profit margin measures the overall profitability of a company. It shows how much of each dollar collected by a company as revenue translates into profit.

ROA is computed as the ratio between firm's net income and total assets at time t. ROA Indicates the amount of earnings generated by a given amount of capital (assets) and therefore the efficiency of capital employed. Since firms analysed operate in the same industry, eventual issues with distinct asset structures are minimised.

SALES is the firm's total revenues at time t.

SEs is a dummy variable equal to one if:

- the firm is identified as public firm in the OECD/ORBIS database;
- the firm is totally or partially owned (with a stake of at least 10%) by a state-linked firm;

[1] If not otherwise specified, the variables used for this analysis were assembled from the OECD/ORBIS dataset.

- the firm is (totally or partially) owned by a firm that is in turn owned (totally or partially) by a state-linked firm. In this case, the product of equity participation should be higher or equal to 10%.

Sources used are OECD/ORBIS dataset, complemented by OECD steelmaking capacity dataset and desk research.

SOLVENCY RATIO is computed as the ratio between the sum of net profits and depreciation to total liabilities at time t. The Solvency ratio indicates the firm's ability to service debt.

# Annex C. Propensity score matching: comparing SEs with PEs that have the same characteristics

Estimating the effect of state-ownership on firms' economic performance is a challenging task. Two important difficulties were identified in the context of this paper. First, sampling problems can easily arise because SEs are significantly lower in numbers than PEs. Second, indigeneity problems can be present. As an example, governments may decide to invest in some specific firm because it is more profitable that others, making it difficult to disentangle whether any differences in profitability among firms should be imputed to their ownership or not. Standard statistical techniques may yield biased results, which would affect the reliability of descriptive statistics and/or econometric exercises.

Propensity score matching (PSM) is a statistical procedure inspired by natural experiments that allows overcoming these issues. PSM selects two samples of observations from the whole population that share some similar characteristics. One sample includes firms that are affected by a treatment (or policy variable), to be compared to the sample of individuals that are "not treated". By grouping together firms that are very similar in a number of characteristics, PSM allows isolating the effect of the treatment on the outcome variable, avoiding possible biases due to sample selection and indigeneity.

In this report, the treatment variable identifies SEs. The propensity score procedure enables to select, from the whole universe of steel-making firms in the world, two sub-groups of firms that share relevant characteristics that are likely to have an impact on the outcome that is under analysis. The matching variables include the annual turnover, leverage, number of employees and country of headquarters. Standard descriptive statistics or regressions are then calculated on the matched (reduced) sample. The final results are then a comparison between SEs and PEs with the same characteristics.

# Annex D. Main tables: regression results

**Table A D.1. State ownership and profits: results from the full sample**

| PROFIT MARGIN | | | | |
|---|---|---|---|---|
| **SE (bin)** | -4.813*** | 2.646 | -3.935*** | 2.357 |
| | (1.542) | (3.802) | (1.499) | (4.194) |
| **EMPLOYEES** | 0.132 | 0.145 | 0.170 | 0.193 |
| | (0.167) | (0.167) | (0.191) | (0.191) |
| **IOS (t+1)** | 0.00179 | 0.00221 | -0.00547 | -0.00515 |
| | (0.00443) | (0.00446) | (0.00415) | (0.00417) |
| **LEV (t-1)** | -0.322 | -0.354 | -1.275** | -1.291** |
| | (0.337) | (0.346) | (0.608) | (0.611) |
| **BRICS (bin)** | | -9.703*** | | -9.732*** |
| | | (2.993) | | (2.993) |
| **SE (bin) # BRICS (bin)** | | -8.841** | | -7.431* |
| | | (4.146) | | (4.475) |
| **Observations** | 13 610 | 13 610 | 10 076 | 10 076 |
| **Number of Firms** | 3 919 | 3 919 | 2 873 | 2 873 |
| **R squared** | 0.0330 | 0.0335 | 0.046 | 0.046 |
| **Model** | RE | RE | RE | RE |
| **Sample** | FULL | FULL | OECD+BRICS | OECD+BRICS |
| **COUNTRY fe** | YES | YES | YES | YES |
| **YEAR fe** | YES | YES | YES | YES |

*Note*: The table presents results from the econometric analysis. The first two columns report the estimated coefficients from the analysis of the all countries considered in the dataset, while the third and fourth columns report results obtained from the sample restricted to OECD/EU and BRICS economies. Three, two and one star mean respectively 99%, 95% and 90% level of significance.

**Table A D.2. State ownership and profits: results from a PS matched sample**

| PROFIT MARGIN | | |
|---|---|---|
| SE (bin) | -0.424 | -5.796*** |
| | (3.474) | (1.807) |
| BRICS (bin) | -5.370 | |
| | (8.388) | |
| OECD (bin) | | -10.70 |
| | | (7.096) |
| SE (bin) # BRICS (bin) | -6.924* | |
| | (3.975) | |
| SE (bin) # OECD (bin) | | -0.319 |
| | | (3.399) |
| Observations | 1 413 | 1 413 |
| R squared | 0.08 | 0.08 |
| Model | RE | RE |
| Sample | FULL | FULL |
| COUNTRY fe | YES | YES |
| YEAR fe | YES | YES |

*Note*: The table presents results from the econometric analysis based on 1:1 matched sample built upon propensity score techniques. Three, two and one star mean respectively 99%, 95% and 90% level of significance. The table includes two geographical dummy variables: OECD (bin) is equal to one when the company is located in one the economies belonging to the OECD, while the dummy variable BRICS defines the firms that are located in the economies: Brazil, Russia, India, China and South Africa.

**Table A D.3. State ownership and loss persistence**

| | Maximum Consecutive Losses | | Average number of losses | |
|---|---|---|---|---|
| **SE (bin)** | 0.841*** | 0.596** | 0.121*** | 0.126** |
| | (0.123) | (0.285) | (0.0215) | (0.0497) |
| **EMPLOYEES** | 5.37e-06 | 5.16e-06 | -8.59e-07 | -8.54e-07 |
| | (4.50e-06) | (4.51e-06) | (7.84e-07) | (7.87e-07) |
| **IOS** | -2.058*** | -2.053*** | -0.327*** | -0.327*** |
| | (0.186) | (0.186) | (0.0324) | (0.0325) |
| **LEV** | 0.416*** | 0.415*** | 0.157*** | 0.157*** |
| | (0.00958) | (0.00958) | (0.00167) | (0.00167) |
| **BRICS (bin)** | | 2.032** | | 0.224 |
| | | (0.939) | | (0.164) |
| **SE (bin) # BRICS (bin)** | | 0.283 | | -0.00562 |
| | | (0.316) | | (0.0552) |
| **Observations** | 3 993 | 3 993 | 3 993 | 3 993 |
| **R squared** | 0.420 | 0.418 | 0.705 | 0.705 |
| **Model** | OLS | OLS | OLS | OLS |
| **Sample** | FULL | FULL | FULL | FULL |
| **COUNTRY fe** | YES | YES | YES | YES |

*Note*: The table presents results from the econometric analysis based on the full sample. Maximum consecutive losses is a time invariant variable, which is calculated as the maximum number of consecutive losses recorded by each specific firm in the dataset. Average number of losses is time invariant and represents the average number of losses recorded by each specific firm in the dataset. Time invariant models (from column three to column six) are calculated via robust OLS models. In these cases: i) time variant regressors are averaged at company level; ii) time fixed effects are not included in the regression. The table includes one geographical dummy variable: BRICS defines the firms that are located in the economies: Brazil, Russia, India, China and South Africa. Three, two and one star mean respectively 99%, 95% and 90% level of significance.

**Table A D.4. State-ownership and debt neutrality: full sample**

| INTEREST EXPENSES over DEBT | | | | | |
|---|---|---|---|---|---|
| **SOE (bin)** | -0.105 | -0.105 | -0.105 | -0.00213 | -0.114 |
| | (0.0758) | (0.0758) | (0.0758) | (0.0114) | (0.0818) |
| **EMPLOYEES** | -0.000242 | -0.000242 | -0.000242 | -0.000242 | -0.000242 |
| | (0.00120) | (0.00120) | (0.00120) | (0.00120) | (0.00120) |
| **IOS (t+1)** | 4.20e-05** | 4.20e-05** | 4.20e-05** | 4.20e-05** | 4.20e-05** |
| | (1.87e-05) | (1.87e-05) | (1.87e-05) | (1.87e-05) | (1.87e-05) |
| **PROFIT MARGIN** | -0.00317 | -0.00317 | -0.00317 | -0.00317 | -0.00317 |
| | (0.00244) | (0.00244) | (0.00244) | (0.00244) | (0.00244) |
| **BRICS (bin)** | | 0.0267** | | 0.0267** | |
| | | (0.0117) | | (0.0117) | |
| **OECD (bin)** | | | -0.0267** | | -0.0267** |
| | | | (0.0117) | | (0.0117) |
| **SOE (bin) # BRICS (bin)** | | | | -0.127 | |
| | | | | (0.0938) | |
| **SOE (bin) # OECD (bin)** | | | | | 0.115 |
| | | | | | (0.0818) |
| **Constant** | 0.0370*** | 0.0370*** | 0.0637*** | 0.0370*** | 0.0637*** |
| | (0.0112) | (0.0112) | (0.0159) | (0.0112) | (0.0159) |
| **Observations** | 10 308 | 10 308 | 10 308 | 10 308 | 10 308 |
| **R-squared** | 0.00145 | 0.00145 | 0.00145 | 0.00148 | 0.00146 |
| **Number of firms** | 2 545 | 2 545 | 2 545 | 2 545 | 2 545 |
| **Sample** | FULL | FULL | FULL | FULL | FULL |
| **COUNTRY fe** | YES | YES | YES | YES | YES |
| **YEAR fe** | YES | YES | YES | YES | YES |

*Note*: The table presents results from the econometric analysis based on the full sample. All columns report the estimated coefficients from the analysis of the all countries considered in the dataset. Three, two and one star mean respectively 99%, 95% and 90% level of significance.

**Table A D.5. State-ownership and debt neutrality: results from a matched sample**

| INTEREST EXPENSES over DEBT | | |
|---|---|---|
| **SE (bin)** | 0.00751 | -0.0158 |
| | (0.00910) | (0.0113) |
| **BRICS (bin)** | 0.0389*** | |
| | (0.0143) | |
| **OECD (bin)** | | -0.0634*** |
| | | (0.00700) |
| **SE (bin) # BRICS (bin)** | -0.0276* | |
| | (0.0161) | |
| **SE (bin) # OECD (bin)** | | 0.0275 |
| | | (0.0186) |
| **Observations** | 854 | 854 |
| **R squared** | 0.039 | 0.035 |
| **Model** | RE | RE |
| **Sample** | FULL | FULL |
| **COUNTRY fe** | YES | YES |
| **YEAR fe** | YES | YES |

*Note*: The table presents results from the econometric analysis based on 1:1 matched sample built upon propensity score techniques. Three, two and one star mean respectively 99%, 95% and 90% level of significance. The table includes two geographical dummy variables: OECD (bin) is equal to one when the company is located in one the economies belonging to the OECD, while the dummy variable BRICS defines the firms that are located in the economies: Brazil, Russia, India, China and South Africa.