FIRMS’ EFFICIENCY, EXITS AND GOVERNMENT PROCUREMENT CONTRACTS

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The views expressed in this paper are those of the author and do not necessarily represent the position of the Bank of Russia

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Motivation

Recent cross-country studies based on firm level data attribute the productivity growth slowdown to the *increasing gap in productivity* levels between the most and least efficient firms within the same industries rather than to a decline in the rate of technological progress.

Two questions:

1. Why has technological diffusion from leading companies to the less efficient ones slowed down and why has it become more difficult for the less efficient firms to replicate best practices?

2. Why *do inefficient firms not exit the market*, continuing to use scarce production factors in their operations?

This study concentrates on the analysis of firm dynamics in the Russian economy and the factors enabling inefficient firms to stay in the market.

I regard the *public procurement system as a possible source of supporting inefficient companies* in various industries.

Government procurement contracts are widely used to support domestic firms via increasing demand.

In Russia, government purchasing contracts accounted for 21% of GDP in 2018, with a significant share of firms involved in public procurement. Thus, government financial support through public procurement is quite substantial and could have a considerable impact on the Russian economy.
Related literature

Two strands of literature on recent productivity growth trends and on public procurement as an instrument of industrial policy.

1. **Recent productivity growth trends.** A number of studies provide evidence of an increasing productivity gap among firms within industries, provoking a discussion about whether this has an effect on firms’ entry and exit rates and slows aggregate GDP growth.
   - Andrews, Criscuolo and Gal (2016) looking at the TFP trends within an economy, finds that the mechanism of the diffusion of leading technologies from leaders to laggard firms has changed, while the productivity gap between these groups has been widening since 2000 in OECD countries.
   - A number of recent studies show a similar trend of a productivity dispersion increase within industries (Cette, Corde and Lecat (2018) for France; Berlingieri, Blanchenay and Criscuolo (2017) for OECD countries; Decker, Haltiwanger, Jarmin and Miranda (2016) for US; Gamberoni, Giordano and Lopez-Garcia (2016) for EU countries).

2. **The second line of the recent literature focuses on the efficiency of support for various types of firms via industrial policy or the public procurement system and its effect on firm dynamics.**
   - Acemoglu, Akcigit, Alp, Bloom and Kerr (2018): an optimal industrial policy should be designed in such a way as to allow resources from the low-type firms move freely to the innovation activity of high-type firms, and this can be brought about by motivating low-productivity firms to exit the market.
   - Aghion, Cai, Dewatripont, Du, Harrison and Legros (2015): demonstrate that sectoral government support promotes productivity growth more effectively where it focuses on more competitive sectors, and especially when it is not confined to just one or a handful of firms within the sector.
   - Andrews, Criscuolo and Gal (2016): the increase in productivity gap was larger in sectors where market reforms fostering competition were less comprehensive.
   - Thus, current research in this area shows that industrial policy should be targeted in such a way as to support the most efficient players.

The Russian economy:
   - Voskoboynikov (2017) shows on aggregated data that growth in both labor and total factor productivity has been slowing since 2010.
   - Golikova, Gonghar, Kuznetsov and Yakolev (2008) documented huge gap in productivity between the best 20% and the worst 20% of the firms (10-20 times depending on the sector) in 2007.
Main findings

• Productivity growth trends in Russia are similar to those in other countries where technology leaders enjoy productivity growth with a gap increasing between them and other companies.
• The most efficient firms quit the market at a faster rate than firms in other efficiency groups in the Russian economy.
• Survival functions of the least efficient firm do not always differ significantly from those of other companies.
• Financing from government procurement contracts helps both the most and the least efficient firms to survive and shelters them from competitive pressure.
• In the short run, the positive effect of winning government procurement contracts for leaders seems in to be only observed in their home regions, providing indirect evidence that the public procurement system does not support all types of firms with growth potential but only those affiliated with local authorities.
Outline

Data
Empirical strategy. Stochastic frontier analysis
Productivity trends in 2009-2015
Exits and efficiency levels. Survival analysis
Exits and government procurement contracts. Survival analysis
Firms’ Efficiency, Exits and Government procurement contracts

DATA
Data

Firm level data
  RUSLANA dataset
  Russian firms' balance sheets from 2008 to 2015.
  The sample includes data on the non-farm non-financial sectors

Data on entry and exit
  SPARK dataset
  Information on the date of firm incorporation (entry) and liquidation (exit)

Government procurement contracts
  SPARK dataset
  Data on the auction winner, contract sum, date of the contract, region of the contract supplier
Data

Stochastic production functions is estimated separately for 282 industries, mainly for three- or four-digit industries in NACE 1.1 classification

We use data on

- value added (Y)
- capital (K)
- number of employees (L)

No data on the payroll fund for the entire period of observation

Value added for firm $i$ in period $t$=
- Total Sales for firm $i$ in period $t$ -
- (Total Cost for firm $i$ in period $t$ -
- Average wages in region $k$ and in the industry $j$ in period $t$ * Number of employees of firm $i$ in period $t$)

Value added is deflated by industrial PPIs (for sectors C, D, and E) and by the SNA deflators for the other sectors

The deflators for capital based on the data on nominal capital stocks and volume indices of capital stocks at the sectoral level
## Sample, description

<table>
<thead>
<tr>
<th>Sector</th>
<th>Number of obs. in whole sample 2008-2015</th>
<th>Number of obs. in 2008</th>
<th>%, 2008</th>
<th>Number of obs. in 2015</th>
<th>%, 2015</th>
<th>% in 2015, Rosstat</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. Mining and quarrying</td>
<td>14 649</td>
<td>1 438</td>
<td>1.1</td>
<td>2 310</td>
<td>1.2</td>
<td>0.5</td>
</tr>
<tr>
<td>D. Manufacturing</td>
<td>252 760</td>
<td>26 121</td>
<td>20.5</td>
<td>38 140</td>
<td>20.3</td>
<td>10.4</td>
</tr>
<tr>
<td>E. Utilities</td>
<td>24 652</td>
<td>2 380</td>
<td>1.9</td>
<td>3 935</td>
<td>2.1</td>
<td>0.8</td>
</tr>
<tr>
<td>G. Wholesale and retail trade</td>
<td>601 614</td>
<td>60 441</td>
<td>47.3</td>
<td>84 142</td>
<td>44.8</td>
<td>44.5</td>
</tr>
<tr>
<td>H. Hotels and restaurants</td>
<td>51 747</td>
<td>4 109</td>
<td>3.2</td>
<td>8 200</td>
<td>4.5</td>
<td>2.8</td>
</tr>
<tr>
<td>I. Transport and communications</td>
<td>86 508</td>
<td>8 196</td>
<td>6.4</td>
<td>13 924</td>
<td>7.4</td>
<td>8.4</td>
</tr>
<tr>
<td>K. Real estate, renting and business activities</td>
<td>201 135</td>
<td>22 233</td>
<td>17.4</td>
<td>33 111</td>
<td>17.6</td>
<td>25.0</td>
</tr>
<tr>
<td>O. Other community, social and personal service activities</td>
<td>27 982</td>
<td>2 832</td>
<td>2.2</td>
<td>4 198</td>
<td>2.2</td>
<td>7.6</td>
</tr>
<tr>
<td>Total</td>
<td>1 261 047</td>
<td>127 750</td>
<td>100</td>
<td>187 960</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
Firms’ Efficiency, Exits and Government procurement contracts
Stochastic Frontier Analysis (SFA)

\[ Y = F(L, K, t) \cdot e^{-u(t)} \]

Not all the firms succeed in organizing their production in an efficient way, and some of them could operate below the production possibility frontier determined by the most efficient firms.

Simultaneously, productivity growth rates and the distance to the technological frontier are estimated for individual firms.
Stochastic Frontier Specification

\[
\ln Y_{it} = \alpha + \alpha_L \ln L_{it} + \alpha_K \ln K_{it} + \alpha_t t + \alpha_{LL} (\ln L_{it})^2 + \alpha_{KK} (\ln K_{it})^2 + \alpha^2_t + \\
+ \alpha_{KL} \ln K_{it} \ln L_{it} + \alpha_{Kt} \ln K_{it} \cdot t + \alpha_{Lt} \ln L_{it} \cdot t - u_{it} + \varepsilon_{it}
\]

where

- \( Y \) is value added
- \( L \) is employment
- \( K \) is fixed assets
- \( t \) is time

Inefficiency term - time decay model

Battese and Coelli (1995)

\[
u_{it} = e^{-\gamma (t-T)} u_i
\]

\( u_i \sim N^+ (\mu, \sigma^2) \)
TFP Growth Decomposition

\[ TFP \text{ Growth} = \Delta TP + \Delta TE + \text{RTS} \]

\[ \Delta TP = \frac{\partial \ln F(K, L, t)}{\partial t} \]

- technological progress
  (shift of the production frontier between two periods)

\[ \Delta TE = - \frac{\partial u_{it}}{\partial t} \]

- change in technological inefficiency
  (change in the distance to the frontier which is moving itself)

\[ \text{RTS} = (\varepsilon - 1)(\frac{\eta_K \Delta K}{\varepsilon K} + \frac{\eta_L \Delta L}{\varepsilon L}) \]

- return to scale term

\[ \varepsilon = \eta_K + \eta_L - \text{return to scale} \]
TFP Growth Decomposition
PRODUCTIVITY TRENDS IN 2009-2015

Firms’ Efficiency, Exits and Government procurement contracts
Average TFP growth and its decomposition

TFP Growth Decomposition

- TFP Growth Rate
- Rate of Technical Change
- Change in Technical Efficiency
- RTS Term
TFP growth trends

![Chart showing TFP growth trends from 2009 to 2015. The chart displays the percentage changes in TFP growth with both simple and weighted averages. The years 2009 to 2015 are represented on the x-axis, while the percentage change is shown on the y-axis. The data points indicate negative growth for most years, with a slight positive change in 2015.]
TFP growth in efficiency groups

Efficiency level – distance to the frontier (TE)

Efficiency groups

- **Leaders**
  top 10% of firms with the highest technological efficiency (closest to the frontier in the industry)

- **Baseline group**
  firms with an efficiency level of 20-90%

- **Laggards**
  bottom 20% of firms with the lowest technological efficiency
Accumulated TFP growth by efficiency group

Accumulated TFP Growth by Efficiency Group
Simple Average

Accumulated TFP Growth by Efficiency Group
Weighted Average
Productivity growth trends among technology leaders and laggards

• The most efficient firms push up the production possibility frontier …

• … but a significant part of firms in the economy do not innovate and laggards do not show a catching-up behavior

• As a result, the average TFP growth rates appear to be negative over the entire period in question, although positive dynamics are observed, with the decline slowing towards the end of the period

• Firms showing high rates of productivity growth increase their market shares

• The market share of less efficient firms shrink over time but they do not exit the market. As a result, the scarce recourses stay locked in inefficient production
Firms’ Efficiency, Exits and Government procurement contracts

EXITS AND EFFICIENCY LEVELS. SURVIVAL ANALYSIS
Firms’ efficiency and exit rates

Entire period setup (exit by 2016)  
Yearly setup (exits in 2011-2016)
Survival Analysis. Model specification

Hazard rate at age \( t \) is the conditional probability of exit at age \( t \) after having survived until that age.

Proportional hazard specification: the hazard function is a product of the baseline hazard and a term that shifts the baseline hazard in accordance with the influence of various covariates.

\[
h(t, x, \beta, \gamma_b) = \phi(x, \beta)h_b(t),
\]

\( h \) is the hazard rate

\( h_b \) is the base hazard function (function of a firm’s age), corresponding to \( \phi(\cdot) = 1 \)

\( \phi(x, \beta) = e^{x'\beta}, \) \( x \) is the vector of explanatory variables, and \( \beta \) is estimated coefficients.

Cox proportional hazard model. Semi-parametrical approach - the parametrical form of the base hazard function is left unspecified.
The most efficient companies quit markets at a faster pace than average companies in the economy.

The conditional probability of exit of laggards in the short run is comparable with that of leaders and in the long run the hazard ratios for the least efficient firms do not differ from those for the more efficient groups.

In Russia the creative destruction mechanism seems to work in the way opposite to what is conventionally expected.

<table>
<thead>
<tr>
<th>Dependent variable: firm age at exit</th>
<th>Entire period setup (exit by 2016)</th>
<th>Yearly setup (exits in 2011-2016)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coef. (1)</td>
<td>Coef. (3)</td>
</tr>
<tr>
<td>Efficiency level, Leaders - top 10%</td>
<td>0.017 (0.025)</td>
<td>0.182*** (0.029)</td>
</tr>
<tr>
<td>Efficiency level, Laggards - bottom 20%</td>
<td>0.009 (0.021)</td>
<td>0.124*** (0.025)</td>
</tr>
<tr>
<td>Firm size, Small</td>
<td>0.432*** (0.020)</td>
<td>0.231*** (0.023)</td>
</tr>
<tr>
<td>Firm size, Medium</td>
<td>0.564*** (0.039)</td>
<td>0.267*** (0.045)</td>
</tr>
<tr>
<td>Firm size, Large</td>
<td>-0.026 (0.057)</td>
<td>-0.341*** (0.067)</td>
</tr>
<tr>
<td>Sector dummies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sector C. Mining and quarrying</td>
<td>-0.564*** (0.096)</td>
<td>-0.762*** (0.119)</td>
</tr>
<tr>
<td>Sector D. Manufacturing</td>
<td>-0.369*** (0.024)</td>
<td>-0.429*** (0.028)</td>
</tr>
<tr>
<td>Sector E. Utilities</td>
<td>-0.195*** (0.062)</td>
<td>-0.404*** (0.058)</td>
</tr>
<tr>
<td>Sector H. Hotels and restaurants</td>
<td>-0.636*** (0.052)</td>
<td>-0.629*** (0.058)</td>
</tr>
<tr>
<td>Sector I. Transport and communications</td>
<td>-0.368*** (0.037)</td>
<td>-0.380*** (0.042)</td>
</tr>
<tr>
<td>Sector K. Business services</td>
<td>-0.601*** (0.026)</td>
<td>-0.599*** (0.031)</td>
</tr>
<tr>
<td>Sector O. Private services</td>
<td>-0.929*** (0.071)</td>
<td>-0.948*** (0.080)</td>
</tr>
<tr>
<td>Number of observations</td>
<td>381,389</td>
<td>381,389</td>
</tr>
</tbody>
</table>

Cox proportional hazards model. Standard errors are in parentheses.

*Omitted category: Baseline group (efficiency level between 20-90%). *Omitted category: Micro firms. *Omitted category: Sector G. Wholesale and retail trade

*** p<0.01, ** p<0.05, * p<0.1
Firms’ Efficiency, Exits and Government procurement contracts

EXITS AND GOVERNMENT PROCUREMENT CONTRACTS. SURVIVAL ANALYSIS
Government procurement contracts

Government contract dummy

i. **Entire period setup**: 1 if the firm won a government procurement contract at least once in the 2011-2016 period; 0 otherwise

ii. **Yearly setup**: 1 if the firm won a government procurement contract at least once in any year from 2011 to 2016; 0 otherwise

<table>
<thead>
<tr>
<th></th>
<th>Entire period setup (exit by 2016)</th>
<th>Yearly setup(exits in 2011-2016)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Government contract</td>
<td>Government contract</td>
</tr>
<tr>
<td></td>
<td><strong>no</strong></td>
<td><strong>yes</strong></td>
</tr>
<tr>
<td>All firms</td>
<td>64.8</td>
<td>35.3</td>
</tr>
<tr>
<td>Leaders (top 10%)</td>
<td>56.0</td>
<td>44.0</td>
</tr>
<tr>
<td>Baseline group (middle 20-90%)</td>
<td>64.0</td>
<td>36.0</td>
</tr>
<tr>
<td>Laggards (bottom 20%)</td>
<td>73.1</td>
<td>26.9</td>
</tr>
</tbody>
</table>
What kind of firms obtain government contracts

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Entire period setup</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Government contract in 2011-2016 (yes 1, no 0)</td>
<td>Coef.</td>
<td>Marginal effects</td>
<td></td>
</tr>
<tr>
<td>Efficiency level(i), Leaders - top 10%</td>
<td>0.118***</td>
<td>0.026***</td>
<td></td>
</tr>
<tr>
<td>Efficiency level(i), Laggards - bottom 20%</td>
<td>-0.354***</td>
<td>-0.072***</td>
<td></td>
</tr>
<tr>
<td>Firm size(ii), Small</td>
<td>0.874***</td>
<td>0.200***</td>
<td></td>
</tr>
<tr>
<td>Firm size, Medium</td>
<td>1.375***</td>
<td>0.321***</td>
<td></td>
</tr>
<tr>
<td>Firm size, Large</td>
<td>1.825***</td>
<td>0.419***</td>
<td></td>
</tr>
<tr>
<td>Sector dummies(iii)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sector C. Mining and quarrying</td>
<td>-0.448***</td>
<td>-0.088***</td>
<td></td>
</tr>
<tr>
<td>Sector D. Manufacturing</td>
<td>0.131***</td>
<td>0.026***</td>
<td></td>
</tr>
<tr>
<td>Sector E. Utilities</td>
<td>1.768***</td>
<td>0.393***</td>
<td></td>
</tr>
<tr>
<td>Sector H. Hotels and restaurants</td>
<td>-0.614***</td>
<td>-0.117***</td>
<td></td>
</tr>
<tr>
<td>Sector I. Transport and communications</td>
<td>-0.027*</td>
<td>-0.006*</td>
<td></td>
</tr>
<tr>
<td>Sector K. Business services</td>
<td>0.096***</td>
<td>0.021***</td>
<td></td>
</tr>
<tr>
<td>Sector O. Private services</td>
<td>-0.027</td>
<td>-0.006</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-0.874***</td>
<td>(0.06)</td>
<td></td>
</tr>
</tbody>
</table>

Number of observations | 381,389 | 381,389 |

Logit model. Standard errors are in parentheses.

- The probability of being awarded a government contract is 2.6% higher for leaders and 7.2% lower for laggards in comparison with firms form the baseline group.
- The probability of getting a government contract increases with a firm's size.
- Firms in the electricity, gas and water supply sector win government contracts 39% more often than those in the wholesale and retail sector.
- The probability of being involved in public procurement is also slightly higher for manufacturing firms and companies from the business services sector than for those in trade.
- Firms from the extractive sector, hotels and restaurants, as well as the transport and communications sectors obtain government contracts less often than companies from the wholesale and retail sector.
Government procurement contracts

Entire period setup (exit by 2016)

Yearly setup (exits in 2011-2016)
## Government procurement contracts

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All contracts</td>
<td>All contracts</td>
<td>Contracts in home region</td>
</tr>
<tr>
<td></td>
<td>(7)</td>
<td>(8)</td>
<td>(9)</td>
</tr>
<tr>
<td>Efficiency level①, Leaders - top 10%</td>
<td>0.091*** 1.096***</td>
<td>0.193*** 1.213***</td>
<td>0.242*** 1.274***</td>
</tr>
<tr>
<td></td>
<td>(0.029) (0.032)</td>
<td>(0.031) (0.038)</td>
<td>(0.038) (0.048)</td>
</tr>
<tr>
<td>Efficiency level, Laggards - bottom 20%</td>
<td>-0.019 0.981</td>
<td>0.109*** 1.115***</td>
<td>0.090*** 1.095***</td>
</tr>
<tr>
<td></td>
<td>(0.023) (0.022)</td>
<td>(0.026) (0.029)</td>
<td>(0.028) (0.031)</td>
</tr>
<tr>
<td>Government contract dummy</td>
<td>-0.956*** 0.384***</td>
<td>-0.903*** 0.405***</td>
<td>-0.954*** 0.385***</td>
</tr>
<tr>
<td></td>
<td>(0.027) (0.011)</td>
<td>(0.043) (0.018)</td>
<td>(0.053) (0.020)</td>
</tr>
<tr>
<td>Leaders X Government contract</td>
<td>-0.236*** 0.790***</td>
<td>-0.118 0.889</td>
<td>-0.286** 0.751**</td>
</tr>
<tr>
<td></td>
<td>(0.058) (0.046)</td>
<td>(0.096) (0.085)</td>
<td>(0.130) (0.098)</td>
</tr>
<tr>
<td>Laggards X Government contract</td>
<td>-0.100* 0.905*</td>
<td>-0.239** 0.787**</td>
<td>-0.220* 0.803*</td>
</tr>
<tr>
<td></td>
<td>(0.056) (0.051)</td>
<td>(0.115) (0.091)</td>
<td>(0.132) (0.106)</td>
</tr>
<tr>
<td>Firm size②, Small</td>
<td>0.630*** 1.877***</td>
<td>0.326*** 1.385***</td>
<td>0.169*** 1.184***</td>
</tr>
<tr>
<td></td>
<td>(0.020) (0.038)</td>
<td>(0.023) (0.032)</td>
<td>(0.026) (0.031)</td>
</tr>
<tr>
<td>Firm size, Medium</td>
<td>0.927*** 2.527***</td>
<td>0.442*** 1.556***</td>
<td>0.298*** 1.347***</td>
</tr>
<tr>
<td></td>
<td>(0.040) (0.100)</td>
<td>(0.046) (0.071)</td>
<td>(0.054) (0.073)</td>
</tr>
<tr>
<td>Firm size, Large</td>
<td>0.432*** 1.541***</td>
<td>-0.099 0.906</td>
<td>-0.349*** 0.706***</td>
</tr>
<tr>
<td></td>
<td>(0.058) (0.090)</td>
<td>(0.068) (0.061)</td>
<td>(0.083) (0.059)</td>
</tr>
<tr>
<td>Sector dummies</td>
<td>yes yes</td>
<td>yes yes</td>
<td>yes yes</td>
</tr>
<tr>
<td>Observations</td>
<td>381,389 381,389</td>
<td>1,069,862 1,069,862</td>
<td>785,820 785,820</td>
</tr>
</tbody>
</table>

Cox proportional hazards model. Standard errors are in parentheses

①Omitted category: Baseline group (efficiency level between 20-90%). ②Omitted category: Micro firms

*** p<0.01, ** p<0.05, * p<0.1
Government procurement contracts

Entire period setup (exit by 2016)

Yearly setup (exits in 2011-2016)
Government procurement contracts in home region

Yearly setup (exits in 2011-2016)
Conclusion

- The results obtained suggest significant positive rates of technological progress. However, the widening gap in the distance to the technological frontier for less efficient firms was seen over the entire period of observation. The catching-up behavior was not observed for laggard firms and the gap in productivity levels kept increasing after the 2008 crisis.

- The most efficient enterprises increase their share in the domestic market. At the same time, there is a significant share of inefficient enterprises which do not exit the market, continuing to use production factors inefficiently.

- Survival analysis shows that leaders exit the market more promptly than less efficient firms.

- Additional financing from government contracts helps inefficient firms to survive and shelters them from competition with more efficient enterprises.

- The positive effect of winning government procurement contract for leaders in the short run is observed only for home region which seems to suggest that the public procurement system does not support all types of firms with growth potential but only those that are affiliated with local authorities.
Policy implications

In order to address the goal of accelerating TFP productivity growth, it is necessary to concentrate on creating conditions for inefficient companies’ prompter exit from the market.

Measures to achieve this may include

- simplification of the bankruptcy procedure
- shifting the accent of government support from troubled to growing enterprises, instead of supporting inefficient firms through the government procurement system
- developing programs for retraining or reemployment of personnel leaving inefficient companies

After the sanctions were imposed on Russia, the role of public procurement as an instrument of economic policy to support enterprises affected by the sanctions became more evident. The effectiveness of this economic policy may be questionable if it affects firm dynamics through changing market mechanism of selection of more productive firms.
THANK YOU!
Accumulated TFP growth by sector

Sector C - Mining and quarrying; Sector D – Manufacturing; Sector E - Utilities; Sector G - Wholesale and retail trade; Sector H - Hotels and restaurants; Sector I - Transport and communications; Sector K - Real estate, renting and business activities; Sector O - Other community, social and personal service activities
Accumulated TFP growth by efficiency group

Accumulated TFP Growth by Efficiency Group
Manufacturing

Accumulated TFP Growth by Efficiency Group
Services

Top 10%
Other
TFP growth trends in OECD countries