



PRODUCT MARKET REGULATION

NETWORK SECTORS INDICATORS

Methodology for calculating the 1975-2018
Time Series



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This note explains the approach used by the OECD to ensure that there was no interruption in the time series of the PMR Network Sectors indicators, following the change in the structure and content of the PMR indicators in the 2018 vintage.

Product Market Regulation Network Sectors Indicators: Methodology for calculating the 1975-2018 time series

1. Introduction

1. In 1998, the OECD developed two set of Product Market Regulation indicators to measure the extent to which regulation in markets for goods and services fosters competition. One set - the PMR Economy-wide Indicators - measures how competition-friendly a country's regulatory environment is by assessing laws and regulations in a broad range of economic sectors and policy domains. A second set - the PMR Sector Indicators - quantifies regulatory barriers to firm entry and competition with a focus on network industries and the service sector. These indicators have been updated every 5 years since 1998.

2. Until 2013, the PMR sector indicators for network industries covered energy, transport and communications. For this reason, they were referred to as ETCR indicators. For these indicators the OECD reconstructed the values for all the years between each of the 5-year updates and backcasted the values back to 1975. Hence, for the ETCR indicators there exist a time series that spans from 1975 until 2013.

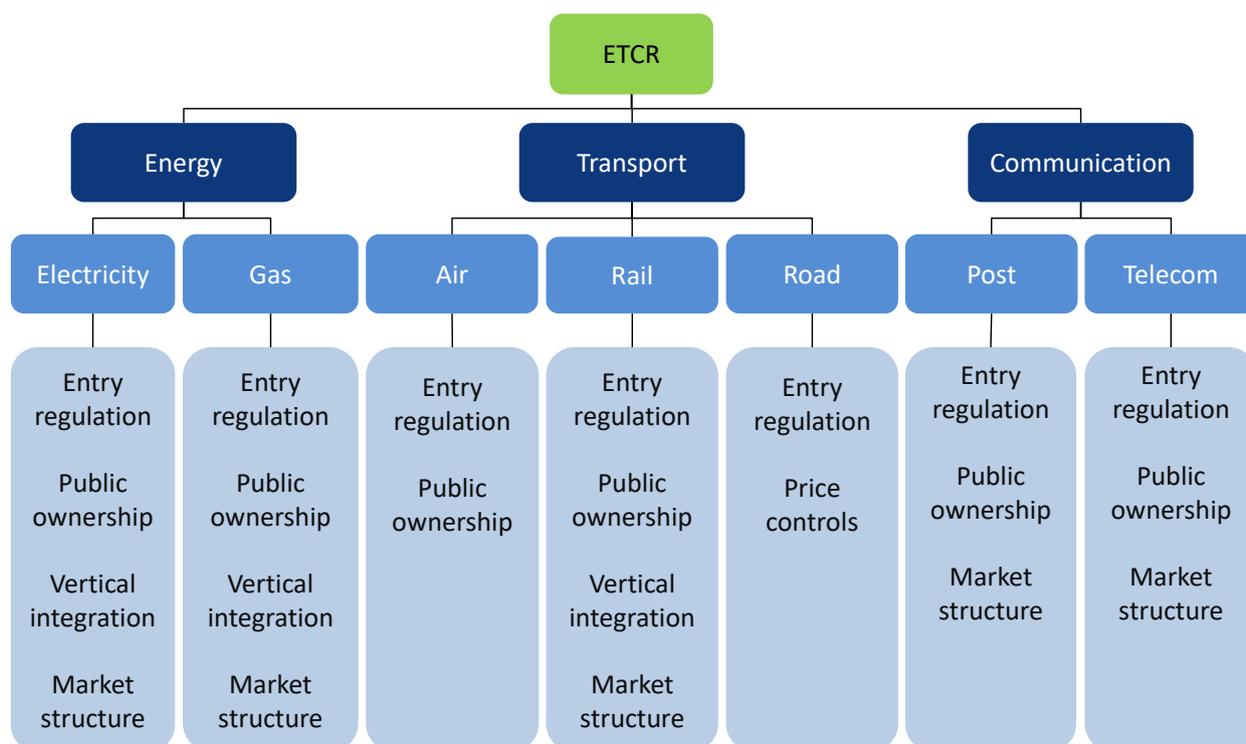
3. For the latest update, the OECD undertook a major review of the content and the structure of the PMR indicators with the aim to ensure that these indicators maintain their relevance in the context of evolving insights from economic theory, modifications in the technological and business environment, and changes in the practice of regulation. Due to this review, the 2018 vintage of the PMR indicators cannot be compared with previous vintages.

4. Despite this methodological change, the OECD has developed a methodology to ensure that there was no interruption in the time series of the PMR Network Sectors indicators. This note provides details on this approach, and explains what values are available and for which years. The values herein discussed can be found in the Excel file *OECD_Network Sector-regulation-indicators_time series.xlsx* on the OECD webpage (<http://oe.cd/pmr>).

2. The changes in the PMR Network Sectors indicators

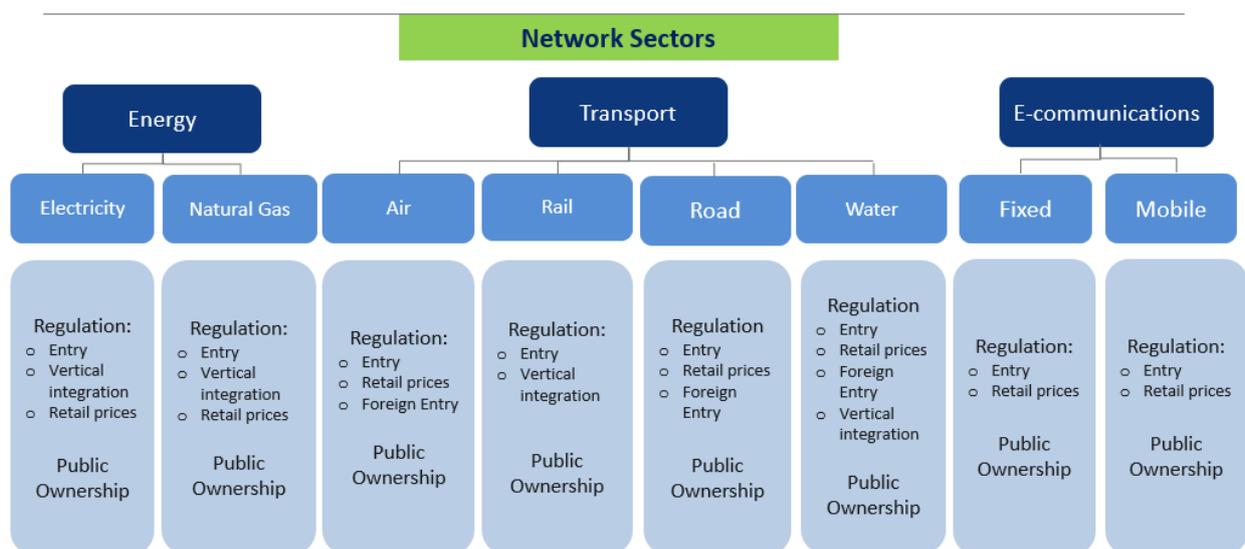
5. Until the 2018 update, the OECD had produced a set of indicators that measured how competition friendly regulation was in network sectors. Figure 1 shows the structure and content of these indicators until 2013.

Figure 1. Tree structure of the ETCR indicators until 2013



6. As part of the review of the PMR indicator methodology, in 2018 the content and structure of the PMR Network Sectors indicators were modified. The 2018 PMR Network Sectors indicators continue to cover energy, transport and communications, but they now consider more sectors in these three industries. Figure 2 shows the structure of the new Network Sectors indicators

Figure 2. The tree structure of the new PMR Network Sectors indicators



7. The main changes between the 2013 and 2018 vintage consist of the addition of the water transport sector and the inclusion of transport of passengers by coach in road transport. In addition, the indicators for Telecommunications has been renamed E-communications to highlight the importance of data services. Moreover, in 2018 the results for the fixed and mobile sectors are assessed separately, since the competition and regulatory issues can differ in these two segments due to differences in technology and in the development of the two sectors. The post sector, on the other hand, is no longer included, since this sector has lost regulatory relevance over the past years.

8. The content of the PMR Network Sectors indicators has also been enriched. Until 2013 these indicators only included a subset of the information relative to the sectors they covered that was collected through the PMR questionnaire. In 2018, the OECD decided to include all the information on these sectors collected through the PMR questionnaire in order to provide a more complete overview of these sectors' regulatory environment. In addition, the 2018 PMR questionnaire now includes additional questions that consider recent regulatory developments in network sectors. This change represents a significant improvement, as these indicators can now provide a more complete and accurate assessment of regulatory barriers to competition in the network sectors.

9. More details on changes to the PMR Network Sectors indicators can be found in the OECD Working Paper *"The 2018 Edition of the OECD PMR Indicators and Database – Methodological Improvements and Policy Insights"*.

3. The methodology used for creating a single time-series

10. For the reasons discussed above, the "old" ETCR indicators, for which values exist between 1975 and 2013, and the "new" Network Sectors Indicators for 2018 are not comparable.

Hence, the OECD has developed a methodology to “connect” the two sets of indicators to create a single time series from 1975 to 2018.

11. The first step consisted in calculating the Network Sectors indicators based on the 2018 methodology for the year 2013 and for the years in-between 2013 and 2018. This has required the collection of all the data necessary to include the new sectors and regulatory areas that were not covered in the 2013 ETCR indicators. This approach allowed to generate a time series between 2013 to 2018, which we shall refer to as PMRNetworkSectors_2.

12. The OECD could not use this approach to compute the indicators for the years before 2013, because of the amount of resources the data collection would have required and the difficulty in finding reliable information for all the years going back to 1975.

13. Hence, the next step consisted in splicing the ETCR values for 1975 to 2013, which we shall refer to as PMRNetworkSectors_1, on the 2013-2018 series PMRNetworkSectors_2, and calculate a time series for the years 1975 to 2018. We shall refer to this third longer time series as PMRNetworkSectors_3. The two steps in creating the time series are discussed in detail in the following section.

3.1. Computing the new Network Sectors indicators for the years in-between 2013 and 2018

14. In order to calculate the Network Sectors Indicators for the years between 2013 and 2018, i.e. the values of the series PMRNetworkSector_2, the OECD collected the data that were not available in the PMR database for 2013 because of the changes that were introduced in 2018.

15. The OECD started by collecting all this information for 2013 by relying on the laws and regulations provided by respondents when answering to the 2018 PMR questionnaire, and by searching for the required information available on the website of the relevant sector regulator. In addition, sector studies undertaken by the OECD and other international organisations were also used to fill in any gaps¹.

16. If the some data could not be found², two options were adopted:

- When more than 25% of the information was missing, the OECD contacted the authorities in the relevant countries to obtain the necessary data.
- When less information was missing, it was assumed that the data relative to 2018 was valid also for the year 2013 (or in other words that there had been no change in corresponding regulations between 2013 and 2018).

17. For the years in between 2013 and 2018, if the data available for 2013 and 2018 differed, the OECD identified the year in which the change had taken place. This change could consist in a regulatory reform or in the sale of some or all the shares held by the government in a

¹ In the few cases where data was available for 2013, but it was missing for 2018, it was assumed that no reform had taken place between 2014 and 2017, and the missing value was kept only for the year 2018.

² The percentages of missing data are anyway very low and more details by sector can be found in the excel file *OECD_Network Sector-regulation-indicators_time series.xlsx* available on the OECD webpage (<http://oe.cd/pmr>).

state-owned enterprise operating in the network sectors. This information allowed the OECD to compute the Network Sectors indicators also for the years 2014 to 2017.

18. When the year or years in which the change took place could not be identified, two approaches were taken depending on the nature of the information involved.³

- In the case of qualitative information (*i.e.* referring to a specific regulatory practice), the OECD assumed that the reform had happened in 2018 (*i.e.* the first time in which the OECD was aware with certainty of a policy change). Hence, in these cases the information relative to 2013 was kept unchanged for the years from 2014 to 2017.
- In the case of quantitative information⁴, the OECD applied a linear interpolation to estimate the value for each year t between 2014 and 2017:

19. In the case of quantitative information⁵, the OECD applied a linear interpolation in order to estimate the value for each year t between 2014 and 2017:

$$Value_t = Value_{t-1} + \frac{(VAL_{Y_{end}} - VAL_{Y_{first}})}{(Y_{end} - Y_{first})}$$

Where Y_{first} and Y_{end} are first and last years for which reliable data is available, and $VAL_{Y_{first}}$ and $VAL_{Y_{end}}$ are the values for these years.

20.

3.2. Connecting the two time series

21. To connect the two series *PMRNetworkSector_1* and *PMRNetworkSector_2*, the OECD used 2013 as the base year for connecting the two series, because it is the only year for which values for both series were available.

22. The two series were connected by ‘shifting’ the *PMRNetworkSector_1* by an amount equal to the difference between the value of the Network Sector Indicator for 2013 (in series *PMRNetworkSector_2*) and the ETCR indicator for the same year (in series *PMRNetworkSector_1*), *i.e.* the difference in the values for 2013 of the indicator under the two methodologies. The shifting was done for each sector “s” and each country “c” for which both sets of indicators were available:

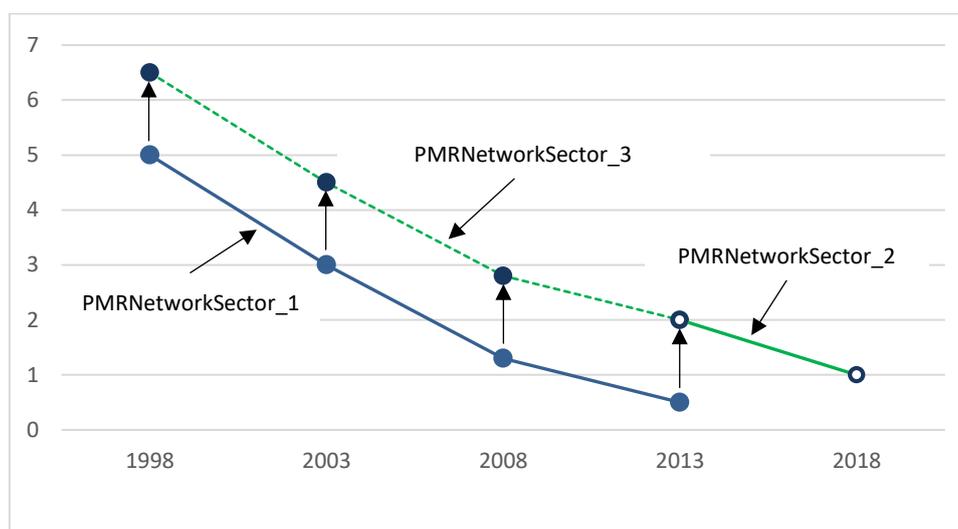
$$PMRNetworkSector_{3_{s,c}} = PMRNetworkSector_{1_{s,c}} + (PMRNetworkSector_{3_{s,c}}^{2013} - PMRNetworkSector_{1_{s,c}}^{2013})$$

23. The extent and direction of this adjustment was different for each country and each sector. Figure 3 shows graphically the shifting involved in the splicing.

³ The percentages of cases in which the year/s could not be identified are very low and more details by sector can be found in the excel file *OECD_Network Sector-regulation-indicators_time series.xlsx* available on the OECD webpage (<http://oe.cd/pmr>).

⁴ These values mostly referred to the shares owned by the government in the largest firm in each of the network sectors.

⁵ These values mostly refer to the shares owned by the government in the largest firm in each of the network sectors.

Figure 3. Shifting the time series

Note: The values shown in the Figure are illustrative values for the explanatory purposes and do not refer to any specific sector or country.

24. The series PMRNetworkSector_3 shows the trend of the regulatory change from one year to another between 1975 and 2018, but the values of the Network Sectors indicators between 1975 and 2013 do no longer provide a measure of the level of the regulatory environment. In this series, up to 2013, only the differences over time should be considered, which represent the change in the regulatory environment.

25. It should also be highlighted that, because of the ‘shifting’, some of the values for the years between 1975 and 2013 series are below 0 or above 6, even though the PMR indicators’ scale is between 0 and 6. This is one further reason to consider only the differences over time and not the level values of the indicators. Indeed only the values for the years from 2013 to 2018 represent a precise assessment of the regulatory set-up, because these have been calculated from actual information on laws and regulations, while the values for previous years have simply been spliced.

26. Because of the difference in the structure of the two sets of indicators (the old ETCR for 1975-2013 - PMRNetworkSector_1 and the new Network Sectors Indicators for 2013-2018 - PMRNetworkSector_2), the new time series for 1975-2018 - PMRNetworkSector_3 - covers a smaller set of sectors (6 sectors), i.e. only those that existed in both vintages. It is also important to stress the splicing has been performed using a single indicator for Ecommunications for 2013 and 2018, which is the average of Fixed E-communications and Mobile E-communications. The reason for this is that before 2013 there was no separation between fixed and mobile networks and services in the indicator for the Telecommunications. Table 1 shows the sector coverage of 3 time series.

Table 1. Sectors covered in the three time series

Sectors		PMRNetworkSector _1 (1975-2013)	PMRNetworkSector or_2 (2013-2018)	PMRNetworkSector r_3 (1975-2018)
Energy	Electricity	Yes	Yes	Yes
	Natural Gas	Yes	Yes	Yes
Communi- cations	Fixed Ecommunications	Telecommunications	Yes	Ecommunications
	Mobile Ecommunications		Yes	
	Post		No	
Transport	Air	Yes	Yes	Yes
	Rail	Yes	Yes	Yes
	Road Freight	Yes	Yes	Yes
	Road Passenger	No	Yes	No
	Water	No	Yes	No

27. As for the country coverage, this again is only possible for those countries for which values for both PMRNetworkSector_1 and PMRNetworkSector_2 are available. All three series are available for all current OECD member countries except Latvia, Lithuania and the United States⁶.

⁶ Latvia became an OECD member in 2016 and Lithuania in 2018, therefore there are no values for these two countries in PMRNetworkSector_1. No data is yet available for the United States for 2018, hence PMRNetworkSector_2 could not be calculated for this country. The lack of these values implies that these three countries could not be included in PMRNetworkSector_3.