

INDUSTRIAL POLICY THROUGH STATE AID: TRANSITION OF THE EU AUTOMOTIVE INDUSTRY

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Abstract

How do the EU Member States' state aid awards differ along the way to transitioning to electrified mobility? This paper utilizes a novel firm-level dataset of state aid awards in a Czechia and Hungary case study. It inspects a key part of the EU industrial policy delivered by national authorities, which gained increased attention after recent macroeconomic and geopolitical shocks. New industrial policy in the EU seems heavily reliant on state aid, although it has been an indispensable policy element for decades. We find and comment on the increased use of state aid to attract battery production to Hungary, examine regional aid's primary role in supporting its auto and battery industries, and calculate the distribution of state aid awards across time and firms within the Czech and Hungarian industries. The paper prepares the new dataset for future research avenues to inspect the effect of state aid awards on firms' performance.

Keywords: industrial policy, state aid, automotive industry, electromobility, European integration

JEL Code: O33, D72, L52

Introduction

A shift in the global economic policy paradigm towards a more state-led interventionist regime led to the launch of the new EU industrial policy. Within one of its building blocks, the Net Zero Industry Act, and within the supporting mechanism of the Temporary Crisis and Transition Framework and the well-established Important Projects of Common European Interest, the EU Member States are encouraged to pursue the goal of green industrial transition through public support, which leads to largely polarizing discussions raised by less deep-pocketed countries. State aid has been, however, a crucial part of industrial and regional development across the EU Member States for decades. We focus on the automotive industry's transition to electromobility; hence, we aim to inspect the state aid in automotive and battery industries in Czechia and Hungary and answer the research question of how different state aid can be at the

firm level within the country-industries. One must remember that a wider institutional setting includes environmental and climate policies, which direct the technical change towards cleaner auto technologies (Aghion et al., 2016), and state aid can be a way to support this transition. Hence, our study concerns the one of two possible mechanisms supporting the transformation.

The paper is divided into the three following parts. For starters, we present an overview of industrial policy and its specific part of state aid, mentioning the research on state aid and the automotive industry. Then, we describe the novel firm-level dataset of state aid awards and the method for deriving state aid to the automotive and battery industries within Czechia and Hungary. Finally, we introduce the results of our analysis and descriptive statistics on the state aid awards in time. We close the paper by discussing the usefulness of this data for future research avenues.

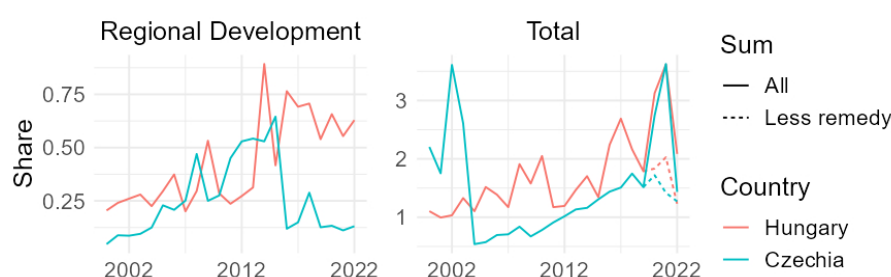
1 EU Industrial Policy

At least since the Global Financial Crisis, the EU has been continuously reporting on new industrial strategies, but only the recent events materialized into prompt action. The EU industrial policy has long been based on competition policy, a strong element of European integration as the EU Member States largely delegate their industrial policy mandate to the European Commission (EC). The EU Single Market rules *de facto* limit public support to businesses that could distort the market and leave scope for specific state aid categories deemed coherent within the internal market. Within the EU industrial policy, authors differentiate between the EU-wide programs and the country-level spending through state aid (Landesmann & Stöllinger, 2020). Importantly, as they show for a pre-COVID four-year period, national state aid spending has been the most essential part of the industrial policy-related spending for several member states, including the Western European countries. For countries within central and eastern Europe, EU-wide programs have been more important than state aid. However, state aid to GDP was still higher for the EU-CEE Member States than for the rest.

Within the common rules for various areas of state aid, countries have different possibilities for state aid given by the economic state and fiscal capacity, political and electoral competition at home, or by boundaries of the already approved programs. A relatively large share of state aid spending has been traditionally aimed at cohesion goals through regional development where eligibility criteria also apply, setting the limits for state aid intensity to investment costs. To illustrate the development of state aid in two selected countries, Czechia and Hungary, Figure 1 shows total state aid spending as a share of national GDP, with spending

on regional development displayed separately. Hungary continues with a gradual increase in regional aid spending up to 2022, reaching more than 50% of total state aid spending excluding the remedy aid. In contrast, Czechia cut off most of its regional aid within the period following a change in regional aid rules in 2014. Interestingly, Landesmann and Stöllinger (2020) show that the industry-related state aid in the EU-CEE countries (Czechia, Hungary, Poland, Slovakia, Slovenia) has been, on average, reaching more than 1.5% of GDP per year between 2014 and 2017, i.e., reaching a high share of the total state aid spending.

Fig. 1: State aid by objective as a share of national GDP (in %)



Source: Author's calculations based on EC (n.d.-b)

In Czechia and Hungary, the automotive industry builds the backbone of their domestic economies with a relatively high share of domestic GDP. In 2023, Czechia was the 3rd largest auto producer in the EU with almost 1.4 million cars produced, whereas Hungary placed 7th with production above 0.5 million cars¹. Domestic automotive industries within the two countries were mainly built through foreign investments over the past decades. This was part of broader strategies welcoming foreign direct investments (FDIs) as part of our single market integration, where state aid played an important role. However, the governments struggle now to formulate a clear vision for the automotive industry's transformation (Pavlínek, 2023). The change towards electric vehicle production programs is relatively slower than in Western Europe. Battery production, on the other hand, found a home in the eastern region with significant battery industry frontrunners—Poland and Hungary—of which the latter, Hungary, has been supplying almost 25% of all batteries for EU auto production in 2022 (Klier & Rubenstein, 2024). This success came at the cost of generous state aid through new investment promotion within the national industrial policies. It will only be in the upcoming years that we can evaluate whether such industrial policies make a difference.

¹ For more information on the automotive industry statistics, consult the European Automobile Manufacturers' Association (ACEA).

In a recent industrial policies' review, Juhász et al. (2024) comment on the relative lack of empirical evidence on industrial policies with modern causal inference methods. One of the most critical questions to policymakers is whether public support, for example, through state aid, brings tangible results compared to a counterfactual development. They point to several recent publications that establish the causal relationship between public spending and economic outcomes. Criscuolo et al. (2019), for example, establish a link between the regional aid eligibility criteria, firm-level employment, and investments in the UK case study. Cingano et al. (2022) focus on a specific investment aid program in Italy to study firm-level effects thanks to the cutoff in eligibility for the state aid. A study by Sidorkin and Srholec (2022) inspects two specific state aid research and development (R&D) programs in Czechia, finding their relative success at generating additional R&D output at home compared to non-supported firms.

Zooming in on the automotive industry, Schito (2021) relies on a dataset of state aid measures found in the state aid case register (EC, n.d.-a). He follows the NACE C29 category (*Manufacture of motor vehicles, trailers and semi-trailers*) and agrees that this strategy misses state aid in horizontal programs and state aid to companies within the supply chains which are, however, not classified within the selected NACE. The paper's main concern is the institutional framework and political determinants of state aid and their interplay with the traditional auto industry. State aid is used for an electoral competition, not much so for the set policy goals. Nicolini et al. (2017) observe similar government behavior in election years when the electoral competition drives vertical state aid. The EU Member States are also responsive with new public support to similar state aid approved within the EU. Other studies also mainly rely on the country-industry data available through the state aid case register, not inspecting the actual effects of state aid on firms. We, however, focus on a firm-level data set of all state aid awards, which the Commission considers potentially distorting the market, and offer a novel, helpful dataset for future research.

2 Data and Methodology

To inspect the firm-level national state aid toward the auto and battery industries, we rely on a dataset of awards to individual companies in the EU². Compared to the aggregate country-level data available through the State Aid Scoreboard (EC, n.d.-b) or the case-level data available through the Case Search (EC, n.d.-a), the State Aid Transparency Public Search (EC, n.d.-c) offers individual award-level data, albeit with limitations discussed below. Its advantage is in

² The dataset and R code used in this paper are available upon request; please contact the corresponding author.

the availability of data on the beneficiary, including aid amount (ideally in discounted value, but mostly reported in nominal amount), aid objective, aid instrument, granting authority, and the date of granting. Other information includes the unique state aid number and unique national ID of a company, as well as the size, region, and sector of activity (NACE 3-digit identification). Multiple awards can be allocated within a single state aid case, on which one would find aggregate information in the Case Search (EC, 2016).

There are, however, limitations to the dataset and its use. Three fundamental questions regarding the dataset are: (1) what state aid information is published within the dataset, (2) how long time series exist and how often it is updated, and (3) how useful it is for an EU-wide study. First, the EU Member States are responsible for transparently self-reporting firm-level data on any state aid governed by national institutions (not depending on the funding source) that is formally granted and reaches EUR 0.5 million (including specific rules for cumulation of aid)³, be it notified aid or aid within GBER⁴. These are awards—it does not report on the actual spending and investment plan in time. It shows, however, a moment of formal decision as an information to firms. Second, this level of transparency has been first introduced within the Communication on State Aid Modernisation in 2012 and its rules apply to the EU Member States since 1 July 2016. This has been a step from the Commission to ensure that any aid that could potentially have a distortive effect on the competition and the EU Single Market, must be made available for transparent public search. Data must be reported within six months following granting the aid (within twelve months in case of tax advantages), currently spanning almost eight years (on an ongoing basis). Third, the EC uses a single portal for collecting the data, a Transparency Award Module (TAM), which almost all EU Member States use. However, some countries, including Poland, Romania, and Spain, use their national transparency platforms, which makes the EU-wide data collection more painful. Their awards are not displayed within the State Aid Transparency Public Search. We downloaded our datasets at the end of Q1-2024, and many 2024 awards were already available. However, one should be aware that countries are usually late with their reporting obligations (Wishlade et al., 2020), and 2023 (at minimum) will still see new additions in time⁵.

This paper presents the usefulness of the data and findings on a case of the Czech and Hungarian automotive industry with an extension to cover the emerging battery industries

³ With subsequent amendments to specific state aid awards, lowering the transparency threshold to EUR 0.1 million. We abstract from rules for agriculture, aquaculture, and forestry.

⁴ General Block Exemption Regulation.

⁵ See Wishlade et al. (2020) for a methodological and practical issues' overview.

within the two member states. In this case study, as we inspect only two specific countries, we take advantage of including a broader selection of companies within the automotive supply chains than NACE C29. We use the national automotive industry associations (AutoSAP in Czechia, MAGE in Hungary) that are also members of the European Automobile Manufacturers' Association, or ACEA, and extract the information on the member firms within the two associations to broaden the firm portfolio within the automotive industry (we consider all original equipment manufacturers and suppliers) next to the companies within the NACE C29 category. To allow for an inspection of the emerging battery industry, a key part of the transition towards electromobility, we gather data from the transparency register on awards within a relatively narrower NACE C27.2 category (*Manufacture of batteries and accumulators*) and use a list of individual companies within two national battery industry associations (CBC in Czechia, HUBA in Hungary), taking into account all the companies available on the member lists excluding universities. Merging these sources, we obtain a list of individual state aid awards granted to the emerging battery industry and its key suppliers. The subsequent chapter highlights the first results on the different uses of state aid in the Czech and Hungarian automotive and battery industries, reporting on descriptive statistics and evaluating the results and their usefulness for follow-up research focusing on empirically investigating the effects of state aid awards on firms.

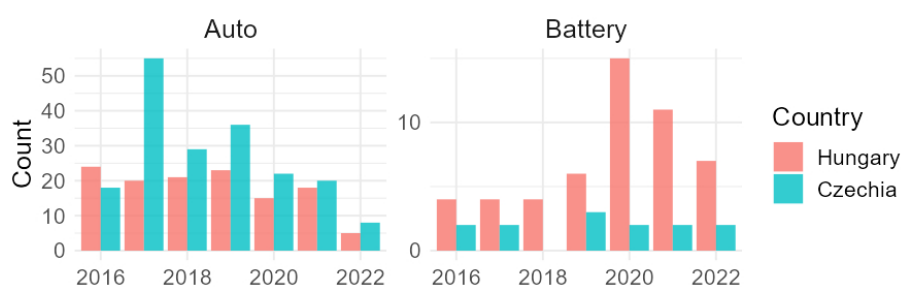
3 Results

This chapter presents the results of analyzing granted state aid awards to the automotive and battery industries in Czechia and Hungary. There are three comments to note. First, the Czech and Hungarian award datasets are available only in local currencies. To make it comparable, we simplify the EUR aid value calculations by using an annual average exchange rate of the year preceding the year of granting (end-year exchange rate is sometimes used within aid notifications). Second, we present results only for the period from Q3-2016 to Q4-2022, as we still foresee changes and additions to the 2023 statistics. We leave out all support in the form of remedies due to COVID-19 or compensations due to high electricity prices. We sum state aid awards in case they are granted to the same subject within the same day (but check for double entries). If, for example, awards utilize different instruments or have different objectives within a single granting to a subject, we use the instrument and objective of the highest award to determine the characteristics of the summed award. That is why transparency is required to account for cumulation and below threshold awards are sometimes also reported. All other

below-threshold awards are disregarded in our simplified analysis as they need not be comprehensive. Third, suppose awards in our datasets would fall into both industry categories (for example, a traditional auto producer is granted state aid for a project where the main activity is the production of batteries). In that case, we use it only once and match it to the battery industry statistics to make sure we capture the technical change, although many electromobility-related awards remain unobserved within the state aid awards to auto industry.

From 1 July 2016 to the end of 2022, Czechia granted 201 firm-level awards above EUR 0.5 million within the automotive and battery industries, whereas Hungary granted 177 awards. Although Czechia has been relatively more active in the total number of newly granted state aid awards to individual firms in the auto industry, 188 to 126, these awards are dispersed amongst more than two times bigger industry in terms of value added compared to Hungary. In the last few years, there has been a drop in new awards compared to the pre-COVID years in both countries (see Figure 2). While the Czech battery industry remains almost non-existent and with only 13 awards in the observed period, Hungary is very active in public support of the emerging battery industry, with tens of significant awards granted in 2020 and especially in 2021, towards the incoming or already operating Asian investors from South Korea, Japan, and, increasingly, China. In total, Hungary granted 51 awards within the emerging battery industry and the observed period.

Fig. 2: State aid awards within the automotive and battery industries

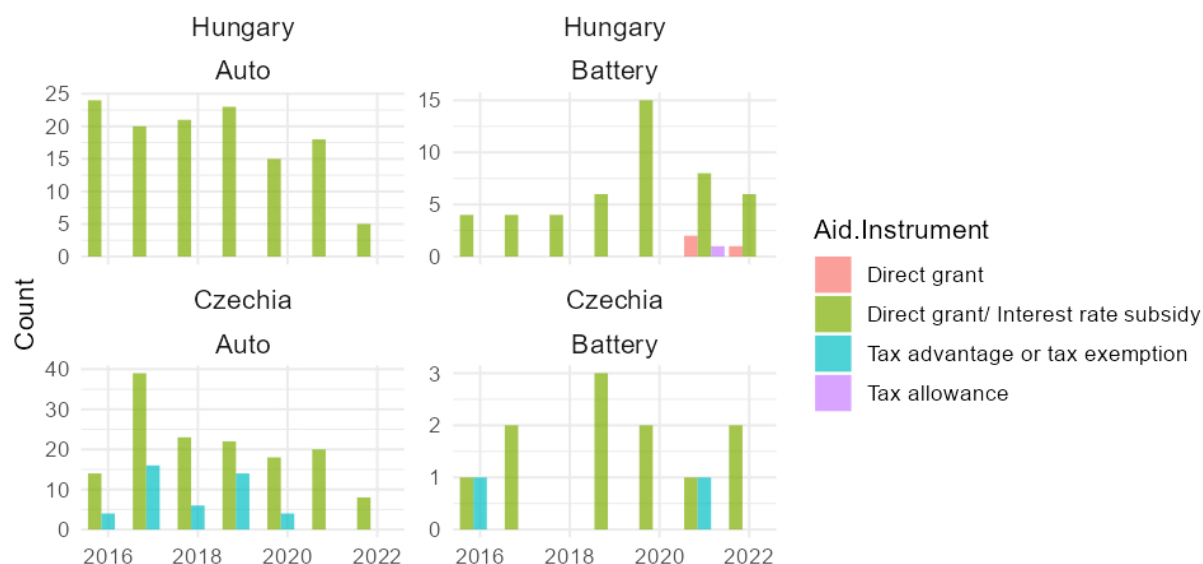


Source: Author's calculations based on EC (n.d.-c)

Various instruments can be used within a single grant (especially those not reaching EUR 0.5 million individually), but we inform on the highest-value instrument of the grant awarded to a single company within a single day after summing their values. Figure 3 presents the results for the aid instrument analysis. From all the granted awards to the auto and battery industries, direct grants and interest rate subsidies clearly dominate. Although one sees in that

tax advantages or exemptions were also relatively numerous in Czechia, Hungary almost always applies direct support through grants or interest rates as the leading instrument.

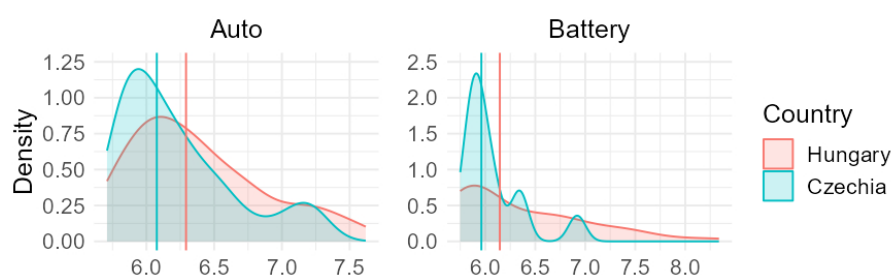
Fig. 3: State aid awards by the aid instrument



Source: Author's calculations based on EC (n.d.-c)

In terms of the value of the state aid awards, Hungary awarded almost twice as much as Czechia did in the observed period. From almost EUR 1.2 billion, Hungary allocated approximately 55% to the auto industry and 45% to the emerging battery industry. In Czechia, 96% of the total of EUR 607 million was granted to the auto industry. In Figure 4, we first show the distribution of log-transformed state awards (including the country-industry award medians) to see the underlying distribution of award values. Clearly, without the transformation, one would see a heavily skewed distribution with a large share of relatively "lower-value" awards and some exceptionally "high-value" awards, a case we witness especially in the Hungarian battery industry. Generally, Hungarian state aid awards have a higher value compared to the Czech awards, both by looking at medians (in Figure 4) or by inspecting means where the difference is amplified by the large but rare awards. However, distribution for the Czech battery industry bears little information as it consists of only units of awards (see Figure 2).

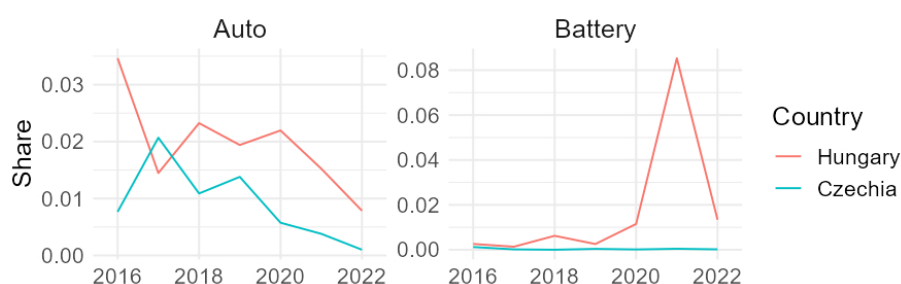
Fig. 4: Distribution of state aid awards incl. median (log base 10)



Source: Author's calculations based on EC (n.d.-c)

The regional aid map of Hungary within the observed period enabled almost the highest possible state aid ratio across the country (which was not the case in Czechia). Hence, it is no surprise that almost 90% of awards to its auto industry and 47% of awards to the battery industry are conditioned on the objective of regional development. However, it is only 47% for the auto industry in Czechia. In terms of value, regional aid dominates. Almost 94% of battery state aid awards in Hungary come from this area of state aid. The same is true for the auto industry, as well as in the case of Czechia, where it is responsible for almost 78% of auto state aid awards. On the other hand, Czech auto firms enjoy higher aid for research infrastructures, industrial research, and energy efficiency, while experimental development is another preferred aid in Hungary's auto industry.

To put the granted state aid award values into perspective, we calculate a ratio of the annual sum of new awards' values to the previous year's gross value added of the automotive industry (defined by NACE C29), presented in Figure 5, and apply the same denominator for the awards to the battery industry to make these ratios of automotive and battery industries' awards comparable. In the last few years, the value of granted state aid awards to the auto industry decreased compared to its gross value added (one must not forget that we exclude remedy aid in 2020, 2021, 2022). In the Hungarian battery industry, state aid skyrocketed in 2021 mainly because of granting two awards of a record-like value, one being the highest firm award in the national dataset reaching more than EUR 0.2 billion, both for a South Korean battery producer.

Fig. 5: State aid awards' value as a share of national auto industry GVA⁶

Source: Author's calculations based on EC (n.d.-c)

Overall, there are relatively significant differences between the use of state aid within the auto and battery industries of Czechia and Hungary. Hungarian state aid awards are more generous in absolute terms, and they tend to heavily rely on “VIP” cash schemes for the foreign investors to attract their investments and use the opportunity to its maximum for building the battery industry within the regional aid map rules. While certain areas in Czechia also benefit from high regional aid intensities, it was not yet the case to attract large battery investments, although there are currently ongoing discussions with yet unspecified investor as of April 2024. In the Czech auto industry, one finds relatively more awards granted with the aim to boost R&D, energy efficiency or the general research infrastructures, and this could also be possible due to lower state aid for greenfield investments in the past years. While this paper did not explore the development in FDIs, it is true that the last decade was marked by record-like unemployment levels in Czechia and there was not an appetite for new large-scale investments, where state aid could have played a prominent role. Czechia has been relatively less generous in its investment promotion compared to Hungary and neighboring countries. However, the recent change in the EU industrial policy pushes Czechia into an increased race-to-the-bottom state aid competition to attract various investments, including the auto and battery production facilities.

Conclusion

We began the paper with a question: how do the EU Member States' state aid awards differ along the way to transitioning to electrified mobility? The paper presented a novel firm-level dataset that helped to highlight the differences between state aid to the automotive and battery industries in Czechia and Hungary. We firstly presented an overview on industrial policy and state aid, followed by describing the dataset and the steps necessary to prepare the dataset for

⁶ Gross value added; see Eurostat (national accounts) for more information.

the analysis, and finally introduced the results and descriptive statistics on the state aid awards in time. The paper highlighted the differences between the aid amounts, instruments, and tools used to boost the auto and battery industries in Czechia and Hungary, highlighting the increased role of emerging battery industry of the latter, complemented by record-like state aid awards.

The paper prepared the new dataset for future research avenues to inspect the effect of state aid awards on firms' performance. We commented on the limitations of the dataset but also its possible use. Within the follow up research, we plan to merge data from the state aid awards with firm-level performance through data in the Orbis database to inspect whether state aid has any effect on the granted firms within the auto and battery industries, with a possible extension into R&D support and its effect on patenting activity with data available through the Patstat database. We believe the data could gradually complement the research on directed technical change and the automotive industry's transition (Aghion et al., 2016).

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