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Revisiting industrial policy: Lessons learned from the establishment of an automotive OEM in Portugal☆

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ABSTRACT

This paper uses the establishment of Autoeuropa in Portugal, an automotive Original Equipment Manufacturer (OEM), as a case study to examine industrial policy aimed at stimulating technological innovation. The automotive industry, in particular Autoeuropa, represents an important socio-economic contribution to the Portuguese industrial production. We focus the analysis on Portugal due to its role as a small and peripheral economy, deprived of significant R&D capacity. The approach considered in this paper builds on the Triple Helix conceptual framework to examine how Autoeuropa's establishment has helped to promote technological innovation in Portugal. Data was collected from databases, interviews with experts in the field, and archival data. Our results indicate that the increasingly transnational business requires evolving from nationalistic approaches towards new collaborative policy frameworks. In this context, large international collaborative arrangements play an emerging role, and therefore should be promoted through new policy frameworks. Moreover, given the current context in which companies move their production activities to the most cost-effective location, it looks increasingly relevant to promote the role of research and technology organisations and technology-based firms as part of the industrialisation strategy.

1. Introduction

The combination of local public support with foreign direct investment (FDI) through an Original Equipment Manufacturing (OEM) establishment is expected to lead to job generation, capacity building and economic growth. Benefits arising from OEM establishment go beyond the obvious direct effects on employment and income tax collection. Evidence from examples such as Australia (Caves, 1974), Canada (Globerman, 1979) and Mexico (Blomström and Persson, 1983) show that FDI can enhance domestic manufacturing firms' performance through standards implementation and information sharing between the domestic plants and foreign firms. However, in some cases, such as Venezuela, technology spillovers from FDI are far from expected (Aitken and Harrison, 1999). Aitken and Harrison (1999) inferred that this might be the result of low foreign investment or because Venezuela's economy is not developed or diversified enough to benefit from foreign companies. Additionally, Borensztein et al. (1998) provided evidence that FDI benefits are dependent on the absorptive capacity of the host country, measured by human capital available in the host economy.

Processes related with diversification and industrial specialisation are complex and uncertain, involving the incorporation of knowledge and technology in people and organisations (Conceição et al., 1998; Conceição et al., 2003; Heitor and Bravo, 2010; Sheffi, 2005). Moreover, shifts towards modular production, associated with the entrenchment of global supply chains has added pressure to cut down costs, which represents challenging obstacles in the creation of higher-level local suppliers (Fine, 1998). This is particularly true in the automotive sector, where supply chains involve a large number of participants that must work together and coordinate their activities in order to ensure the successful final assembly of the automobile. Thus, creating and developing the necessary knowledge base to integrate this competitive industry takes several years of continued investment and cumulative capacity (Kim, 2001).

Governments' support and targeted policies might help to create, develop and accumulate technological capacity, fostering economic competitiveness and reducing socioeconomic vulnerability. Nevertheless, the boundaries and limits of public intervention remain a key issue in many political systems worldwide (e.g. Mazzucato, 2013). This is clearly a critical question in socio-technical research. Therefore, in this article, we explore the key conditions and agents necessary to foster technological spillovers through OEM establishment. The analysis carried out herein considers the automotive industry since it induces the development of high value-added chains with a multiplier effect on the economy, crosses several areas of knowledge, deals with a

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multiplicity of technologies, skills and organisational processes (Pavlínek and ŽiŽalová, 2014).

Motivated by the socio-economic contribution of the automotive sector to the Portuguese industrial production, this paper uses the establishment of Autoeuropa in Portugal as a relevant example for the study of industrial policy aimed at stimulating technological innovation. The reason for choosing Portugal is two-fold. First, as a Southern European country Portugal represents a relevant case study of a peripheral economy that has been integrated into global automotive production networks (Almodovar and Texeira, 2014). The other reason is that Portugal is small country with an industrial structure characterised by small firms, which rely on limited resources and therefore have a reduced bargain power to negotiate with OEMs or supplying multinationals (Veloso et al., 2000).

The paper is structured as follows. Section 2 presents a brief contextualisation of the automotive industrial production, discussing specificities of this sector. Section 3 outlines the conceptual approach. Section 4 provides the research setting and methodology. The results are presented and discussed in Section 5. Finally, Section 6 concludes with the final remarks and implications for industrial policy.

2. Automotive innovation dynamics

In recent years, manufacturing production has been shifting towards the most cost-effective location (e.g., Hepburn, 2011). As Spence and Hlatshwayo (2012) have shown for America, value-added grew across the economy, but employment in manufacturing declined substantially due to the relocation of low value-added activities, especially to rapidly growing emerging economies. Even though employment reduction has been mainly attributed to technological advances in automation and robotics, an additional important factor, which has been sometimes neglected, is the considerable increase in outsourcing functions in global supply chains (Berger, 2013). In Europe, there was an apparent spatial clustering of high value-added manufacturing activities in Central and Nordic countries such as Norway, Sweden, Finland, Germany and Austria (Reis et al., 2016).

Industrial production has generally been portrayed in the literature as crucial to economic growth. Indeed, it is shown that industrial production is associated with high productivity levels, higher income growth rates, and the ability to generate exports (Fingleton, 1999; Sirkin et al., 2011). Additionally, manufacturing requires the existence of a set of associated services, which leads to higher employment rates. Thus, FDI through the establishment of an OEM has been widely used as an instrument to foster employment.

Several studies have already provided evidence that FDI is of crucial importance to economies not only due to its direct effect of foreign capital application on national projects, but also through indirect effects as knowledge and information sharing, technological and human capital development and integration of local suppliers in global production chains (e.g., Caves, 1974). Nevertheless, the theoretical link between FDI and technology spillovers to local economy is not undisputed in the literature (Pavlínek and Žižalová, 2014).

As OEMs become more focused on design and assembly, they transfer production responsibilities abroad, changing the local industrial landscape (Locke and Wellhausen, 2014). This process undermines domestic competitiveness since it removes the majority of the private economy's R&D capabilities from the region (Tassey, 2014). This process has also effects on regional employment structure since it leaves regions with a specialised workforce without a job. But, on the other hand, it creates new job opportunities for regions receiving industrial production (Cowie, 2001). According to Ács and Naudé (2012), the process of structural change or industrialisation is not independent of the development stage of a particular country. Thus, it is expected that countries and regions with strong industrial bases profit the most from globalisation due to their ability to produce and use knowledge and technologies mostly developed in a wide network of organisations constituting a distributed knowledge base (Berger, 2013). Processes related with diversification and industrial specialisation comprise the incorporation of knowledge and technology in people and organisations (Conceição et al., 1998; Conceição et al., 2003; Heitor and Bravo, 2010; Sheffi, 2005). Thus, firms use R&D to gain understanding of new products and processes, which allows them to assimilate and exploit new knowledge (Cohen and Levinthal, 1989). By looking at OECD rankings for business expenditures on R&D (BERD) in the European Union (EU), as illustrated in Fig. 1, we notice that R&D expenditures in the EU are mainly concentrated in a small number of companies; and even though there has been an increase in R&D levels of investment in recent years, almost half of the investment is still made by the firms that figure in the ranking of top 20 R&D investors in Europe.

Fig. 2 presents the R&D investment structure of the top 500 firms in the EU from 2003 to 2012, showing no significant changes during this period. It is noticeable that the automotive sector benefited the most from R&D investments. It is also worth noting that the investment in this sector is extremely concentrated in a small number of German companies, such as Volkswagen, DaimlerChrysler, Robert Bosch and BMW. In fact, these companies account for more than 60% of the R&D investment made in the automotive sector by the top 500 firms in EU, with no companies from Southern European countries in the automotive sector figuring in these numbers.

Despite the high importance of the automotive sector Europe, in terms of R&D investment, the respective dynamics taking place in the rest of the world are considerably different. For instance, the position of the firms on the top 20 changed noticeably throughout the years in the US and Asian countries. Indeed, the automotive sector has been changing worldwide due to a wave of merges, acquisitions and strategic alliances aiming at ensuring a global presence as well as the possibility to take advantage of economies of scale, reducing costs and increasing profitability. In an industry such as the automotive, which is marked by intense competition and dwindling business margins, this process leads to a standardisation of the automobile basic skeleton. Standardisation also allows plants to produce multiple and varied models simultaneously, which allows OEMs to respond more efficiently to sudden changes in demand and consumer preferences.

To cope with so many and ever-fast uncertainties, governments can stimulate innovation through effective regulation (Lee et al., 2011) or even through the provision of incentives that stimulate effective risk management, especially in fields of high technological uncertainty (Mazzucato, 2013). For instance, in the automotive sector several governments subsidised the development of electric vehicles over the years through the funding of research programmes, infrastructures and tax incentives. Globally, there is a growing tendency towards environmental friendly regulations, which means that technological transformative changes are on the way (Donada, 2013). Given the growing technological advances in the digital world, it is no surprise that the demand for interactive safety systems, vehicle connectivity and even self-driving cars will call for new expertise and attract new competitors outside the well established automakers (Gao et al., 2014).

Recent work suggests that sectorial policy tends to promote productivity growth and innovation, in particular when it enables competition (Aghion et al., 2011). The interplay of these forces would call into question whether and to what extent technological changes affect the automotive dominant design, which significantly impacts not only car components, but also the current product architecture and consequently, the entire supply chain. It is within this broader context that we need to analyse and understand the role of national industrial policies on automotive OEMs establishment, particularly in countries such as Portugal with comparatively low investments in R&D, as shown in Fig. 3.

3. Conceptual approach

Research on innovation systems (e.g. Ostry and Nelson, 1995) draw our attention to the relationship between the globalism of firms'