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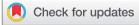
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# Global Production Networks, Foreign Direct Investment, and Supplier Linkages in the Integrated Peripheries of the Automotive Industry

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abstract

This article examines the regional development effects of foreign direct investment (FDI) in the integrated peripheries of the automotive industry by analyzing supplier linkages between foreign subsidiaries and domestic firms. It develops the spatial concept of integrated peripheries in core-based macroregional production networks. Conceptually, it draws on the dynamic notion of uneven development in contemporary capitalism, namely, on David Harvey's spatio-temporal fix and on the global production networks concept of strategic coupling to investigate the mode of articulation of integrated peripheries into macroregional production networks. Empirically, it analyzes the quantity and quality of supplier linkages in the automotive industry of Slovakia based on unique data collected by the author from both foreign subsidiaries and domestic firms through a survey completed by 133 automotive firms in 2010 and interviews with 50 automotive firms conducted between 2011 and 2015. The empirical analysis uncovered weak and dependent supplier linkages between foreign subsidiaries and domestic firms, which undermine the potential for technology and knowledge transfer from foreign subsidiaries to the domestic economy and positive long-term regional development effects of large FDI by automotive industry corporations in integrated peripheries.

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As the inward stock of foreign direct investment (FDI) grew more than sixteen times in developing countries between 1990 and 2015 (United Nations Conference on Trade and Development [UNCTAD] 2016), scholars have sought to better understand the effects of FDI on less-developed host economies (Görg and Greenaway 2004; Meyer and Sinani 2009). The automotive industry represents an ideal sector to study these effects, since it has experienced large FDI flows during this period and has become one of the most globalized industries (Sturgeon, Van Biesebroeck, and Gereffi 2008). Between 2003 and 2015, the total value of announced greenfield FDI projects for motor vehicles and other transport equipment reached USD 953 billion, by far the highest of all manufacturing sectors (UNCTAD 2016). Particular groups of less-developed economies have been targeted by automotive FDI either because of their large markets (China, India, and Brazil) or the combination of low production costs, geographic proximity to affluent markets, and membership in regional trade agreements in what I call integrated peripheries (Mexico, Spain, the countries of East-Central Europe (ECE), and Turkey) (Humphrey, Lecler, and Salerno 2000; Carrillo, Lung, and Van Tulder 2004).

This article draws on the global production networks (GPN) perspective (Henderson et al. 2002; Coe et al. 2004; Coe and Yeung 2015) and Harvey's (2005, 2006) work on uneven development in order to conceptualize the growth and regional development effects of automotive FDI in integrated peripheries by analyzing supplier linkages with a particular focus on linkages between foreign subsidiaries and domestic firms. Linkages are considered to be extremely important by stimulating production and job creation, stabilizing investments by embedding investors in host economies, and by being an important precondition for the transfer of knowledge and technology into host economies (Blomström and Kokko 1998; UNCTAD 2001; Giroud and Scott-Kennel 2009). However, there is a paucity of in-depth firm-level analyses of FDI linkages in integrated peripheries. Empirically, this article focuses on Slovakia, which exemplifies the rapid growth of the automotive industry in integrated peripheries since the 1990s and thus represents an opportunity to study the effects of large automotive FDI on regional economic development through the formation of linkages between foreign subsidiaries and domestic firms.

This article uses original qualitative data I collected through a survey of 299 Slovak-based foreign and domestic automotive firms and 50 face-to-face interviews with managers of automotive firms in Slovakia. In particular, I will address three research questions: First, how can we conceptualize the growth and regional development effects of FDI in integrated peripheries? Second, how is the nature of automotive FDI in integrated peripheries reflected in the extent (quantity) of supplier linkages between foreign subsidiaries and domestic firms? Third, how can we evaluate the mode of articulation of domestic firms into automotive GPNs and its potential regional development effects in integrated peripheries by measuring the quality of supplier linkages between foreign subsidiaries and domestic firms?

This article is innovative for four reasons. First, it advances the spatial concept of integrated peripheries as distinct production areas of the contemporary automotive industry. Second, it builds on Harvey's (2014) spatiotemporal fix and the GPN perspective to conceptualize the growth and regional development effects of the foreign-controlled automotive industry in integrated peripheries. Third, it develops methodology designed to evaluate the quality of supplier linkages between foreign subsidiaries and domestic firms. Fourth, to the best of my knowledge, it represents the first in-depth analysis of supplier linkages in the automotive industry of Slovakia based on original firm-level data. The empirical analysis uncovered weak and dependent linkages between foreign subsidiaries and domestic firms that limit the potential for technology transfer from foreign firms to the Slovak economy, a situation that is typical of peripheral and FDI-dependent regional economic development. As such, underdeveloped linkages constitute a major barrier for the development of a stronger domestic supplier industry and for the weakening of the overwhelming capital and technological dependence of the Slovak automotive industry on foreign capital.

The article is organized as follows. I begin with a characterization of the integrated peripheries of the automotive industry and conceptualize their development in contemporary capitalism. Second, I discuss the nature of strategic coupling in integrated peripheries in order to understand their mode of articulation into GPNs. Third, I explain the importance of FDI linkages for regional economic development in integrated peripheries. Fourth, I briefly characterize the Slovak automotive industry and summarize data collection. Fifth, I analyze the quantity of supplier linkages in the Slovak automotive industry. Sixth, I evaluate the quality of linkages between foreign subsidiaries and domestic firms. Finally, I summarize the results in the conclusion.

## The Integrated Peripheries of Core-based Macroregional Production Networks

I start by developing the spatial concept of integrated peripheries, which helps us not only understand the ever-changing geography of the global automotive industry, but it also allows us to highlight the ways in which particular areas of automotive production are articulated in GPNs and the regional development effects of this articulation. Here, although my thinking is influenced by earlier conceptualizations of the international division of labor (IDL), such as the New IDL thesis (Fröbel, Heinrichs, and Kreye 1980) and its critique (Schoenberger 1988; Henderson 1989) or the Law on Uneven Development (Hymer 1972), I draw on more recent dynamic notions of IDL and uneven development proposed by Harvey (2006) and the GPN perspective.

At a general-system level, the spatial patterns of capitalist economic development are driven by profit-seeking behavior. Capitalist firms can achieve excess profits by employing superior technologies or by investing in more profitable locations. The

investment of surplus capital in such superior locations provides a spatiotemporal fix for declining profitability in existing locations due to increasing production costs and decreasing growth (ibid.). In the words of Harvey (2014, 152): “The organisation of new territorial divisions of labour, of new resource complexes and of new regions as dynamic spaces of capital accumulation all provide new opportunities to generate profits and to absorb surpluses of capital and labour.” Integrated peripheries thus represent a particular form of the spatiotemporal fix that allows core-based automotive firms to maintain or increase the rate of profit by developing production in lower-cost areas that are geographically adjacent to core regions of production and consumption. However, these spatiotemporal fixes are only a temporary solution to profitability of individual firms because their excess profits diminish as other firms invest in similar superior locations (Harvey 2006) and because regional growth does not last, since its sources are depleted over time. Consequently, production costs start to rise and the rate of profit begins to decline, eventually forcing firms to seek new more profitable locations. However, Harvey does not systematically identify different forms of spatiotemporal fixes that develop based on  
144 different sources of economic growth and profit opportunities that make particular regions attractive for capital investment and accumulation. These can include surpluses of low-cost labor, particular labor skills, rapid technological development, rapidly growing markets, high-quality infrastructure, and the existence of particular natural resources. Therefore, I need to turn to a mesolevel explanation provided by the GPN perspective and its concept of strategic coupling for the understanding of how different spatiotemporal fixes operate and articulate different firms and regions into GPNs.

The GPN perspective has argued that successful regional economic development is attainable through the articulation of less-developed regions and countries into transnational production networks (Henderson et al. 2002; Coe et al. 2004). Despite its primary focus on the subnational region for the understanding of economic development (Coe and Yeung 2015), the GPN analysis thus recognizes that the patterns of economic development are strongly affected by the processes of global capital accumulation (Harvey 2006) and by the existing spatial division of labor at different geographic scales (Massey 1984). Regional economic development is conceptualized as the outcome of the strategic coupling between regional assets and the needs of GPNs (Coe et al. 2004; Yeung 2009; Coe and Yeung 2015), which means that it is very much dependent on the existence of surplus capital looking for investment opportunities abroad and spatiotemporal fixes around the world in order to increase or at least maintain the rate of profit (Harvey 2006, 2014). The nature and outcome of strategic coupling and regional development are thus affected by the position of that particular place or region in the IDL.

It is in this context that I identify the core-based macroregional organization of GPNs in the automotive industry, while aiming to analyze the regional development effects of this network organization. By focusing on these two spatial scales, I am aiming at a better understanding of the growth and regional development outcomes of the contemporary automotive industry in integrated peripheries than what is offered by traditional national-level analyses (Coe and Yeung 2015).

An integrated periphery refers to a dynamic area of relatively low-cost (industrial) production that is geographically adjacent to a large market and has been integrated in a core-based macroregional production network through FDI. In an integrated periphery, production, organization, and strategic functions in a given industry are externally controlled through foreign ownership (see Table 1). In the world-systems perspective,

these integrated peripheries are typically classified as being part of the global semi-periphery, but parts of them can also be classified as core (e.g., Spain) or periphery (e.g., Morocco) (Van Hamme and Pion 2012). Integrated peripheries represent one of the numerous examples of the uneven development dynamics of contemporary capitalism, in which capital is searching for growth and profit opportunities in new geographic areas. Spatiotemporal fix in integrated peripheries is the outcome of the voluntary opening of these new and potentially more profitable territories for penetration by foreign capital (e.g., Mexico after 1965, Spain after 1972, ECE after 1989) to take advantage of surplus capital from the core areas of the global automotive industry, while offering surplus labor in integrated peripheries (Harvey 2005). This spatiotemporal fix is based on the contemporaneous existence of four regional assets in integrated peripheries: low-cost labor, geographic proximity to large markets, membership in regional trade agreements, and investment incentives. Spatiotemporal fix in the form of FDI in particular locations and regions of integrated peripheries has thus been made possible not only by the mobility of surplus capital but also by technological and organizational fixes (Yeung 2009; Coe and Yeung 2015) in the contemporary automotive industry (e.g., Sturgeon, Van Biesebroeck, and Gereffi 2008). Although I focus on the automotive industry in this article, integrated peripheries also provide the spatiotemporal fix for other globally integrated industries such as apparel (Pickles and Smith 2016) and electronics (Starosta 2010).

Decreases in the cost of production and increased product variety are at the heart of the competitive strategies of vehicle manufacturers attainable through the internationalization of production (Freyssenet and Lung 2000). Curbing wage costs (7–10 percent of the value of the car) and the price of components (almost 70 percent) while maintaining or not significantly increasing marketing and distribution costs, can be achieved by locating the production of components, assembly of the most cost-sensitive models, and the labor-intensive assembly of niche market vehicles to low-cost areas situated in the proximity of large automobile markets. Such areas are woven into transnational automotive production networks through investment by core-based assembly firms and component suppliers. Integrated peripheries therefore include countries that are located close to Western Europe and the United States but have significantly lower production costs and participate in regional trade agreements that provide tariff-free access to macroregional markets (Humphrey and Oeter 2000). These countries are peripheral in the context of automotive industry macroregional production networks by producing entry-level vehicles, generic and labor-intensive components, and lacking strategic functions such as research and development (R&D), strategic decision making, and finance (Layan and Lung 2004; see Table 1).

The first integrated peripheries of the automotive industry were developed in Mexico, Spain, and Portugal in the 1980s (Carrillo, Lung, and Van Tulder 2004; Charnock, Purcell, and Ribera-Fumaz 2016). Turkey followed in the late 1980s and early 1990s (Wasti and Wasti 2008) and ECE in the 1990s and 2000s (Pavlínek 2002a, 2002b). More recently, Serbia and Morocco were integrated on the periphery of the European automotive production system (Benabdejilil et al. 2015; Pavlínek 2017; see Table 2). The integration of new peripheries and the related spatial shifts in the European and North American automotive industries are the outcome of gradual wage convergence with core areas in older integrated peripheries and constant efforts of automotive firms to curb wage costs by shifting parts of production to lower-cost countries, while also using lower-cost locations to limit wage increases in the entire production network through interplant competition and threats of relocation of production (Phelps and Fuller 2000; Aláez, Gil, and Ullibarri 2015).

Table 1

*Spatial Zones in Core-based Automotive Industry Macroregional Production Networks*

	Core	Semiperiphery	Integrated Periphery
Foreign ownership and control	Low to medium	High	Very high
Domestic global assembly firms	Yes	No	No
Number of domestic suppliers in the global top 100	High	Low	None or very low
Structure of automotive FDI	Outflows predominate	Mixed	Inflows predominate
R&D: Spending, number of R&D workers, patent applications	High	Medium	Low
Structure of assembled vehicles	High share of expensive vehicles	Mixed	High share of cheap/small vehicles
Structure of produced components	Higher share of technologically advanced components	Mixed	High share of generic and labor-intensive components
Capabilities of domestic suppliers	High	Mixed	Low
Supplier linkages	Predominantly developmental	Mixed	Predominantly dependent
Labor costs per employee	High	Medium to high	Low
Wage adjusted labor productivity	Low	Low to medium	High
Examples	Germany, United States	Britain, Canada	ECE, Turkey, Mexico

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Source: Author.

Table 2

*Passenger Car Production in Integrated Peripheries, 1990–2015 (Thousands of Units)*

	1990	1995	2000	2005	2010	2015	Share of Exports in 2015 (%)	Share of Global Car Exports in 2015 (%)	Value of Car Exports in 2015 (USD bn.)
Czechia	188	208	451	594	1,070	1,298	92	2.5	16.9
Hungary	0	51	134	149	209	492	93	1.7	11.2
Poland	266	366	533	540	785	535	99	1.0	6.5
Romania	90	88	77	172	324	387	92	0.5	3.2
Serbia	179	8	11	13	17	82	95	0.2	1.3
Slovakia	0	20	181	218	557	1,039	99	2.1	14.1
Slovenia	74	88	123	138	201	133	99	0.4	2.4
<i>ECE total</i>	<i>797</i>	<i>829</i>	<i>1,510</i>	<i>1,824</i>	<i>3,162</i>	<i>3,965</i>	<i>95</i>	<i>8.4</i>	<i>55.6</i>
Portugal	60	41	179	189	115	115	96	0.3	2.3
Spain	1,679	2,131	2,366	2,098	1,914	2,219	87	4.9	33.1
<i>Iberia total</i>	<i>1,740</i>	<i>2,172</i>	<i>2,545</i>	<i>2,287</i>	<i>2,028</i>	<i>2,334</i>	<i>87</i>	<i>5.2</i>	<i>35.4</i>
Turkey	168	233	297	454	603	791	73	1.0	6.9
Morocco	0	0	16	8	36	260	98	0.3	1.7
Mexico	720	699	1,279	846	1,386	1,968	82	4.9	32.8
<i>Total</i>	<i>3,424</i>	<i>3,933</i>	<i>5,648</i>	<i>5,419</i>	<i>7,215</i>	<i>9,319</i>	<i>91</i>	<i>19.8</i>	<i>132.4</i>

Sources: Organisation Internationale des Constructeurs d'Automobile (2016) (2000–2015 figures); U.S. Department of Transportation (2016) (1990–1995 figures); World's Top Exports (2016).

Although this is a varied group of countries, the automotive industry, in integrated peripheries, shares the following basic features (Table 1): (1) predominantly export-oriented production (Table 2); (2) a high degree of foreign ownership and control (Contreras, Carrillo, and Alonso 2012; Eurostat 2016); (3) significantly lower wages than in the automotive industry core countries (Conference Board 2016); (4) specialization in the mass production of entry-level vehicles, low-volume production of special models, and labor-intensive production of components (Layan 2000; Pavlínek 2002b); (5) underdevelopment of automotive R&D and other higher value-added functions (Layan 2000; Pavlínek 2012); (6) more flexible labor practices than in the automotive

industry core countries (Pavlínek 2002b; Aláez, Gil, and Ullibarri 2015); and (7) FDI-friendly automotive industry state policies and intense state competition over automotive FDI (Drahokoupil 2009; Pavlínek 2016).

The export-oriented automotive industry has grown rapidly in integrated peripheries since the early 1990s (see Table 2). All high-volume assembly plants in integrated peripheries are foreign owned, and foreign ownership also dominates the supplier sector, reflecting the rapid internationalization of the supplier industry since the early 1990s (Sturgeon and Lester 2004). Although the automotive industry in integrated peripheries is based on state-of-the-art factories and technologies, it is almost totally dependent on the import of capital, technologies, and operational skills directly related to production from abroad. The majority of parts and components is also imported directly or manufactured in foreign subsidiaries. At the same time, the majority of strategic functions is conducted abroad (Pavlínek 2016; Pavlínek and Ženka 2016), which, along with the outflow of profits and the weak linkages of foreign subsidiaries with host economies, is likely to limit the long-term benefits of this growth and contribute to the technological underdevelopment of integrated peripheries (Britton 1980; Grabher 1997). In the next section, I draw on the GPN perspective in order to consider the mode of articulation of integrated peripheries in automotive GPNs by focusing on the concept of strategic coupling.

## The Nature of Strategic Coupling in Integrated Peripheries

The mode of articulation of regions into GPNs is based on the particular form of time and space contingent strategic coupling, with different forms of coupling leading to different regional development outcomes (Coe et al. 2004; Yeung 2009, 2016; Coe and Yeung 2015). Following Coe and Yeung (2015) classification, I argue that integrated peripheries are articulated into GPNs through structural coupling, which represents the least favorable mode for integrated regions and places. Structural coupling is based on generic regional assets (MacKinnon 2012), such as surpluses of relatively cheap labor, industrial parks, and transportation infrastructure, allowing transnational corporations (TNCs) to strongly exercise their structural power. The assembly platform type of structural coupling, which is relevant in the automotive industry, is best illustrated by the FDI-driven export-oriented standardized assembly of goods and services in globally integrated industries and is exemplified by high levels of external dependency and control. This translates into greater value transfer and the greater likelihood of decoupling and cost-driven relocations, especially in the labor-intensive supplier sector. Although significant value creation takes place in foreign subsidiaries, integrated peripheries capture only a low share of the value created because of high shares of low-wage assembly jobs, low shares of nonproduction and strategic functions, and the repatriation of profits and low corporate taxes (Smith et al. 2002; Pavlínek 2016; Pavlínek and Ženka 2016). Integrated peripheries thus represent an example of the less-favorable articulation of regions into GPNs through FDI.

Spatiotemporal fix in integrated peripheries has been made possible by technological and organizational fixes. The organizational fix is based on the reorganization of the automotive supplier industry since the 1980s, which significantly reduced the number of suppliers and organized the remaining ones into tiers (Humphrey and Memedovic 2003). The requirements of just-in-time (JIT) production, along with local content and follow sourcing requirements, led to the increased clustering of especially Tier 1 suppliers around assembly plants (Sturgeon, Van Biesebroeck, and Gereffi 2008). However, due to the rapid internationalization of the supplier industry (Sturgeon and

Lester 2004) and global supply, the vast majority of these suppliers in integrated peripheries are foreign subsidiaries that tend to assemble components or modules from imported parts or those supplied by other foreign subsidiaries rather than from those supplied by the domestic industry. Consequently, the existence of domestic suppliers and their capabilities are no longer important factors in the location decisions of foreign assembly firms, since components that need to be supplied just in time are sourced through follow supply and the remaining components can be imported. The technological fix is based on new transportation technologies, logistical systems, and the modern transportation infrastructure in integrated peripheries that allow for global sourcing, the JIT delivery of preassembled modules, and exports of finished vehicles and components (Kaneko and Nojiri 2008; Coe 2014).

148 It is in this context that I will focus on linkages between foreign subsidiaries and host country firms (henceforth domestic firms) in the automotive industry of integrated peripheries. There has been little research on these linkages despite being considered the most important mechanism of technology transfer from more- to less-developed regions (Blomström and Kokko 1998; UNCTAD 2001; Giroud and Scott-Kennel 2009; Santangelo 2009). The quantity *and* quality of linkages thus strongly affect the nature of strategic couplings with automotive GPNs and, consequently, the long-term regional developmental consequences of FDI in integrated peripheries.

## FDI Linkages in Integrated Peripheries

Supplier linkages between foreign subsidiaries and domestic firms represent an important mechanism through which domestic firms become articulated into GPNs. This is especially the case in the automotive industry, which relies on extensive networks of component suppliers. Although the GPN approach recognizes the importance of linkages between foreign and local firms (e.g., Coe and Yeung 2015), to the best of my knowledge, GPN scholars have not developed a systematic approach to evaluate these linkages. Therefore, I will draw on economic geography and international business literature to categorize supplier linkages from the perspective of their regional development potential and link these categories to different modes of strategic couplings developed by the GPN approach. This approach will allow me to evaluate the nature of strategic coupling in the automotive industry in integrated peripheries through analyzing supplier linkages between foreign subsidiaries and domestic firms.

FDI linkages are repeated transactions between foreign subsidiaries and domestic firms, including linkages between foreign subsidiaries and various host-country institutions (Hansen, Pedersen, and Petersen 2009). FDI linkages can be classified into three basic categories (Giroud and Scott-Kennel 2009): vertical (supplier), horizontal (collaborative or relational), and institutional linkages. Vertical linkages can be either backward (i.e., with suppliers, such as foreign subsidiaries, buying supplies from domestic firms) or forward (i.e., with customers, such as foreign subsidiaries, supplying domestic firms). Horizontal linkages are formed through strategic alliances with other firms. Institutional linkages are linkages with host-country institutions, such as R&D institutes and universities, producing knowledge (Santangelo 2009). Backward supplier linkages between foreign subsidiaries and domestic firms are considered the most important for the potential upgrading of domestic firms and a crucial precondition for spillovers (Blomström and Kokko 1998; UNCTAD 2001; Santangelo 2009). The formation of such linkages therefore constitutes an important mechanism through which the development potential of FDI in less-developed countries and regions can be realized (Giroud and Scott-Kennel 2009).

Although the number of linkages is important, it is the nature of these linkages that indicates the mode of strategic coupling with GPNs and ultimately determines the long-term developmental effects of FDI in host economies. Turok (1993) categorized linkages into two basic types, developmental and dependent, in order to distinguish between the different developmental potential of different linkages for domestic firms. Developmental linkages are based on long-term collaboration between foreign subsidiaries and domestic firms, which is typical of the international partnership type of functional couplings with GPNs (Coe and Yeung 2015). Developmental linkages increase the likelihood of technology and knowledge transfer from foreign subsidiaries, which encourages the upgrading of domestic firms, including functional upgrading and the development of higher value-added functions such as R&D. In contrast, dependent linkages are typical of the assembly platform type of structural couplings with GPNs, which are characterized by the dependency of firms and regions on external actors (Coe and Yeung 2015). Dependent linkages are based on shorter-term, price-based and often adversarial relationships between foreign subsidiaries and domestic firms, in which cost cutting is the main reason for establishing linkages by foreign subsidiaries (Turok 1993), and the exchange of information and knowledge with domestic firms is limited (UNCTAD 2001). Domestic firms tend to supply simple standard components, do not engage in product development (Turok 1993), and are contractually highly dependent on foreign firms in captive production networks, which may lock domestic firms into simple, low value-added activities and undermine the potential of domestic suppliers to benefit from supplier linkages (UNCTAD 2001; Gereffi, Humphrey, and Sturgeon 2005; Pavlínek and Ženka 2011; Pavlínek and Žížalová 2016). Developmental linkages thus have a greater positive long-term regional development potential for host economies than dependent linkages by encouraging the functional upgrading and development of domestic firms (Turok 1993) and by increasing the locational stability of foreign investors in host economies (UNCTAD 2001). Additionally, I will also consider the possibility of negative effects of foreign subsidiaries on domestic firms (Hymer 1972; Bellak 2004) in the assembly platform type of structural couplings through what I call detrimental linkages relating to employment and labor market effects of FDI such as employee poaching (Pavlínek and Žížalová 2016).

Firm-level data from less-developed host regions typically suggest weak supplier linkages between foreign subsidiaries and local firms, indicating a weak potential for spillovers and, therefore, limited development potential of FDI (Turok 1993; Phelps 1993a). The potential for local linkages between foreign subsidiaries and domestic firms has further decreased in the contemporary economy mainly because of the increased use of global sourcing by TNCs (Humphrey 2000; Tavares and Young 2006; Williams et al. 2008). Furthermore, in the automotive industry, modular production has become a norm, in which preassembled modules and the most important components are delivered sequentially just in time from dedicated suppliers located in supplier parks close to car assembly plants. These supplier parks typically have few linkages, if any, to the surrounding region (Larsson 2002). It should not be therefore surprising that the evidence from integrated peripheries suggests that foreign subsidiaries usually fail to develop supplier linkages with domestic firms (Lagendijk 1995; Carrillo 2004; Pavlínek and Žížalová 2016). If domestic firms are integrated in captive production networks organized and controlled by foreign TNCs at all, they supply simple, standardized, slow-changing and low value-added components through dependent linkages, and are squeezed by larger and more powerful foreign buyers.

This situation suggests that while FDI in integrated peripheries increased rapidly since the early 1990s (UNCTAD 2016), FDI's regional development potential has been decreasing because its effects have mainly been short term, such as job creation, capital formation, trade, and the balance of payment effects while the limited development of predominantly dependent linkages with local firms weakened the potential long-term positive effects of FDI (Young, Hood, and Peters 1994; Hatani 2009). We might therefore expect a limited development of linkages between foreign subsidiaries and domestic firms and the existence of predominantly dependent linkages in the automotive industry of integrated peripheries. The limited and dependent linkages of domestic firms with foreign subsidiaries would therefore suggest the articulation of integrated peripheries into GPNs through predominantly structural couplings. The validity of these assumptions will be examined in the empirical part of this article.

## The Case Study Area and Data Collection

150 Slovakia represents a typical example of the automotive industry integrated periphery. FDI-driven export-oriented growth started in the 1990s, following an investment by German Volkswagen (VW), but the most rapid development took place in the early 2000s prior to the 2008–2009 economic crisis and was related to the 2004 EU entry, the development of an aggressive foreign investment promotion regime by the Slovak state, and a large surplus of cheap labor, indicated by the 19.5 percent unemployment rate in 2001 (Pavlínek 2016). In the early 2000s, Kia and PSA Peugeot Citroën (PSA) set up assembly operations in Slovakia, and VW was rapidly expanding production. Foreign component suppliers built 128 new factories between 1997 and 2015 (Pavlínek 2017). By 2014, foreign capital almost completely controlled the automotive industry in Slovakia, accounting for 98 percent of production value, 97 percent of gross investment in tangible goods, 93 percent of persons employed, and 96 percent of value added at factor cost, which represents the highest level of foreign control of the automotive industry in ECE (Pavlínek 2017). Average personnel costs per employee in the automotive industry were 74 percent lower in Slovakia than in Germany in 2014 (86 percent lower in 2001) (Eurostat 2016). Wages increased as the surplus of cheap labor diminished especially in western Slovakia, which has been most targeted by automotive FDI (Figure 1) but the average gross monthly salary for production workers continued to be very low at €590 in 2015 (Slovak Investment and Trade Development Agency 2016). The majority of assembled cars are entry-level models or compact cars, although VW also established the labor-intensive low-volume assembly of luxury models in Slovakia, which is another typical specialization of integrated peripheries (Pavlínek 2002b). The development of automotive R&D and other higher value-added functions has been very limited (Pavlínek 2012, 2016).

I collected the data through a firm-level questionnaire and on-site face-to-face interviews with directors or top managers of automotive firms (Figure 1). The goal of the questionnaire and interviews was to collect information about the position, competencies, and linkages of foreign subsidiaries and domestic firms in the Slovak automotive industry. The questionnaire was conducted in 2010 and included 299 firms with more than 20 workers in the broadly defined automotive industry, which includes not only firms classified in the automotive industry (NACE 29) but also firms that supply the automotive industry but are classified in different industries such as rubber, plastic, and iron and steel industries. I received answers from 133 firms (68 foreign subsidiaries and 65 domestic firms), a response rate of 60 percent. The survey data

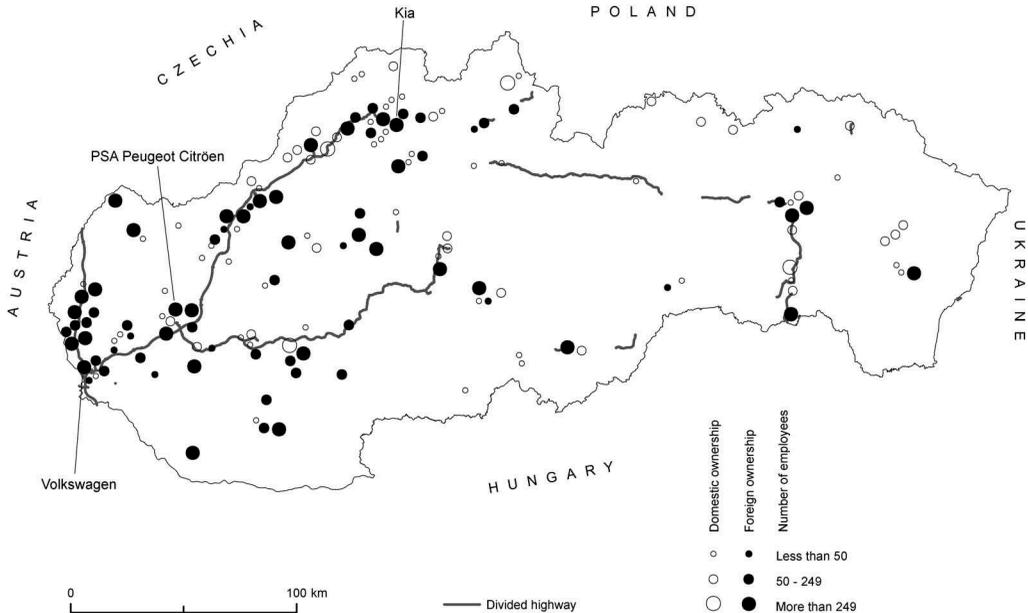


Figure 1. Spatial distribution of the surveyed and interviewed foreign subsidiaries and domestic automotive firms in Slovakia based on their number of employees.

Source: Author.

included information about the technological complexity of production, competencies and activities conducted, R&D, and supplier linkages.

The interviews were conducted in Slovakia between 2011 and 2015 and involved fifty firms, twenty-two domestic firms and twenty-eight foreign subsidiaries. The interview questions were different from the survey, were tailored differently to foreign and domestic firms, and collected more detailed information about individual firms than the survey.

## The Quantity of Supplier Linkages

The quantity of supplier linkages of foreign subsidiaries indicates the form of the spatiotemporal fix in integrated peripheries and the mode of coupling of integrated peripheries into automotive GPNs. The survey and interview data point to weak backward and forward supplier linkages between domestic firms and foreign subsidiaries, and high dependence of both on imports of parts and components. Foreign subsidiaries have developed strong forward supplier linkages with assembly firms because of JIT delivery and local content requirements, but their backward and forward linkages with domestic firms and especially other foreign subsidiaries in Slovakia are weakly developed. Instead, foreign subsidiaries are strongly integrated into transnational production networks and heavily depend on supplies from abroad and on sales of their products abroad, with the exception of Tier 1 suppliers, who supply assembly operations in Slovakia.

In terms of forward linkages, foreign subsidiaries supply either assembly firms in Slovakia or export their products abroad but do not supply other foreign subsidiaries in Slovakia (see Tables 3 and 4). In terms of backward linkages, foreign subsidiaries buy

a very low share of supplies in Slovakia, while being heavily dependent on imports (see Table 4), with the vast majority buying less than 10 percent and buying mostly various services rather than components, as revealed by the interviews (cf. Contreras, Carrillo, and Alonso 2012). This first suggests that foreign subsidiaries mainly source their supplies from abroad rather than from Slovak-based firms (both foreign subsidiaries and domestic firms). Second, linkages among foreign suppliers operating in Slovakia are weakly developed. Third, supplier linkages between foreign subsidiaries and domestic firms are also weakly developed.

Domestic firms, as expected, have stronger linkages with other domestic firms than foreign subsidiaries do, weak supply linkages with foreign subsidiaries, and are highly dependent on imports (see Table 4). These very limited supply linkages between domestic firms and foreign subsidiaries mean that the vast majority of domestic firms cannot benefit from the possibility of direct spillovers from foreign subsidiaries. The actual share of domestic firms not benefiting from spillovers is even higher, since linkages (and dependent linkages in particular) do not automatically translate into spillovers (Saggi 2002). This suggests a weak long-term potential for the positive firm-level effects of automotive FDI in the Slovak economy.

Interviews with foreign subsidiaries confirmed the survey results (see Table 5) and identified the underlying reasons for weak supplier linkages of foreign subsidiaries in

**Table 3**

*Structure of Procured Supplies of Surveyed Automotive Firms in Slovakia*

Share of Supplies	From Domestic Suppliers		From Foreign Subsidiaries		From Abroad	
	No.	%	No.	%	No.	%
0%	26	19.5	98	73.7	4	3.0
1–24%	51	38.3	22	16.5	24	18.0
25–49%	17	12.8	7	5.3	11	8.3
50–74%	23	17.3	3	2.3	38	28.6
75–99%	14	10.5	3	2.3	48	36.1
100%	2	1.5	0	0.0	8	6.0
Total	133	100.0	133	100.0	133	100.0

Source: Author's 2010 company questionnaire.

**Table 4**

*Percent Share of Surveyed Automotive Firms in Slovakia by Ownership According to What Share of Their Supplies They Source from Domestic Firms, Foreign Subsidiaries, and from Abroad*

Share of Sourced Supplies	From Domestic Suppliers		From Foreign Subsidiaries		From Abroad	
	Foreign Subsidiaries (%)	Domestic Firms (%)	Foreign Subsidiaries (%)	Domestic Firms (%)	Foreign Subsidiaries (%)	Domestic Firms (%)
0%	25	14	69	78	0	6
1–24%	55	23	22	12	2	33
25–49%	8	17	6	4	11	6
50–74%	11	23	3	1	25	32
75–99%	2	19	0	4	52	22
100%	0	3	0	0	11	1
Total	100	100	100	100	100	100

Note:  $N = 64$  for foreign subsidiaries;  $N = 69$  for domestic firms. The meaning of the first line: 25% of foreign subsidiaries and 14% of domestic firms source 0% of their supplies from domestic suppliers etc.

Source: Author's 2010 company questionnaire.

**Table 5**

*Share of the Total Value of Supplies Sourced by Interviewed Foreign Subsidiaries in Slovakia*

Share of Sourced Supplies	Total Supplies from Slovakia		Supplies from Domestic Firms	
	No.	%	No.	%
0%	9	33.3	17	63.0
0–5%	7	25.9	5	18.5
5–10%	4	14.8	3	11.1
10–50%	7	25.9	2	7.4
Total	27	100.0	27	100.0

Source: Author's 2011–2015 interviews.

Slovakia. These include the system of centralized purchasing (79 percent of interviewed subsidiaries), which is a standard practice allowing TNCs to capture large economies of scale (Phelps 1993b), and the fact that some of the sourced components and materials are not available in Slovakia (46 percent). It is also common that buyers dictate to component makers where they have to buy parts and materials, which is almost invariably abroad. The low share of supplies bought in Slovakia by foreign subsidiaries could be further explained by two additional factors. The first is the short time since the original investment because the majority of foreign subsidiaries were established in Slovakia in the early 2000s. Supplier linkages might develop over time (UNCTAD 2001), although the experience from older integrated peripheries, such as Portugal and Mexico, suggests that it is difficult to achieve (Veloso et al. 2000; Carrillo 2004). Indeed, 63 percent of interviewed foreign subsidiaries argued that the volume and value of supplies from Slovakia slightly increased since the beginning of their production in Slovakia but almost invariably from other foreign subsidiaries and not from domestic firms. The second factor was related to the low competency of domestic suppliers who were often unable to meet the quality and delivery requirements of foreign subsidiaries. An interview quote, from a German supplier, illustrates this point:

We were actively looking for domestic suppliers in Slovakia but we could not find anybody. I don't honestly know why but I think it is because of no previous industrial history here. (Interview, June 14, 2011)

Low or nonexistent capabilities of domestic firms in the particular supplier sector thus make it difficult for foreign subsidiaries to establish supplier linkages with domestic firms. A Spanish supplier has reiterated this situation in Slovakia:

If you have no experience in the sector, you are in a difficult position. We use plastic injected items, metallic clamps, items that are common in Western Europe but not here. There is no previous tradition here. We are actively looking for suppliers. (Interview, June 20, 2011)

The overall low quantity of supplier linkages suggests that the spatiotemporal fix in the Slovak automotive industry generates excess profits mainly through cost minimization in foreign subsidiaries rather than through accessing and exploiting local capabilities. Low production costs are made possible not only because of low labor costs but also because of organizational and technological fixes, in which local capabilities and linkages with domestic firms are considered unimportant for profit generation by

foreign investors. For example, follow sourcing makes it possible for Slovak-based car assembly factories of VW, Kia, and PSA to not buy any supplies directly from domestic firms (interviews at Kia, VW, and PSA Slovakia, June 14, 16, 20, 20, 2011), which also saves the costs of establishing and maintaining supplier relationships with domestic suppliers. Modern logistical systems and transportation infrastructure allow for the cost-efficient imports of components from abroad to foreign subsidiaries clustered around assembly plants, exports of components assembled from imported materials in foreign subsidiaries, and supplying just in time from custom-built supplier parks (Larsson 2002; Pavlínek 2016). The high dependence on imports and very limited linkages among foreign subsidiaries in Slovakia that are primarily integrated in externally organized GPNs (see Table 4), are all signs of strong dependency on external TNCs, which points toward the assembly platform type of structural mode of coupling with GPNs.

In the next step, I will concentrate on the mode of strategic coupling of domestic firms with automotive GPNs by analyzing the quality of supplier linkages between foreign subsidiaries and domestic firms based on the original data collected by my  
154 2010 firm-level survey and 2011–2015 face-to-face interviews with company directors and managers in Slovakia.

## The Quality of Supplier Linkages

Integrated peripheries represent an example of spatiotemporal fix that allows automotive firms to acquire relative surplus value by locating in superior locations. Excess profits are acquired through significantly lower production costs that are mainly based on lower labor costs compared to the established locations in core regions. The quality of supplier linkages between foreign subsidiaries and domestic firms reflects the nature of spatiotemporal fix in integrated peripheries and the mode of strategic coupling of domestic firms into GPNs. It was evaluated by classifying linkages into developmental, dependent, and detrimental based on three criteria: the main reason for FDI and continuing production in Slovakia, R&D activities in domestic firms and foreign subsidiaries, and the nature of supplied components. Cost-cutting reasons for the investment and continuing production, such as low production costs or investment incentives, the absence of R&D in domestic firms and foreign subsidiaries, and the supply of simple standard components, indicate the potential for the development of dependent linkages with domestic firms and their integration into GPNs as assembly platforms. Alternatively, the search for a skilled labor force and innovation capabilities of domestic firms, the existence of R&D activities, and the supply of complex components indicate the potential for developmental linkages and the integration of domestic firms into GPNs through international partnerships.

### Reasons for Investment and Continuing Production

The evidence from Slovakia supports my argument that integrated peripheries represent an example of structural coupling of the assembly platform type in GPNs, in which cost cutting reasons play the prominent role behind their articulation in GPNs. The lower-cost export-oriented production of core-based automotive firms in integrated peripheries helps maintain or improve their overall competitiveness and profitability.

The three most important reasons for investment in Slovakia cited by interviewed foreign subsidiaries were follow sourcing (44 percent of subsidiaries), cheap labor force (28 percent), and investment incentives (21 percent). All three are essentially cost-cutting reasons. Other factors, such as labor skills and manufacturing tradition,

played a much less important role than is claimed (Jakubiak et al. 2008; Slovak Investment and Trade Development Agency 2016), because only one of twenty-seven interviewed foreign subsidiaries listed the manufacturing tradition and quality of labor force as one of its reasons for its investment in Slovakia. The three most important advantages of production in Slovakia for foreign firms identified by the interviews included low production costs, especially low labor costs (listed by 42 percent of firms that replied to the question); geographic proximity to the main customers (25 percent); and labor attitudes such as attitudes to work, willingness to learn, and labor flexibility (21 percent). Low labor costs continue to be extremely important for foreign subsidiaries, since two-thirds of them argued that the low cost of production was by far the most important strategic need of their parent company for the continuing production in Slovakia. As a director of a major French supplier succinctly put it when asked about the most important strategic need of his company in Slovakia, “Labor cost as low as they can be” (interview, June 23, 2011). However, rapid growth based on large inflows of automotive FDI has absorbed labor surpluses and led to wage increases in Slovakia, which has cut into relative surplus value. In response, some foreign firms have started to look for new superior locations or new spatiotemporal fixes (Harvey 2014) with lower wages, such as in Romania and Bulgaria, where the average personnel costs in the automotive industry were 50 percent and 73 percent lower than in Slovakia in 2014 (Eurostat 2016).

This competition from potentially lower-cost locations increases the relentless cost-cutting pressure in existing locations, which translates into poor labor conditions for workers in integrated peripheries. Wages are low and the pace of work is high, especially in the supplier industry. At the same time, the risk of decoupling and relocation is high, especially in the most labor-intensive production, such as the assembly of cable harnesses (Pavlínek 2015). For example, Delphi relocated the production of cable harnesses, which was launched in 2002 and used to employ 2,800 workers in the town of Senica, to Romania, Tunisia, and Turkey. The relocation took place in several stages in spite of the low wages paid to Slovak workers (€500 per month gross), and its last phase started just after the ten-year tax holiday expired in 2012 (interview, June 13, 2011; Pavlínek 2017). However, lower wages elsewhere are not the only threat for decoupling and relocation. Follow supply is another one. A British supplier argued:

Yes, we are thinking about relocating to Bosnia Herzegovina because one of our customers has already relocated four factories there from Germany. Another one is moving to Macedonia. We will have to follow them. Additionally, a monthly wage of a university educated worker is €400 there, which is less than half of what it is here. (Interview, September 18, 2013)

Wages of car assembly workers are generally higher than in the supplier sector, and the risk of relocation is lower because of high sunk costs. However, the average net monthly salary of assembly workers was only about €500 at PSA in 2015 with no salary increase in 2013 and 2014. One worker complained in 2015: “[My salary] is not enough to pay for basic needs. I have worked here for nine years and while the pace of work is much higher now than when I started, my salary keeps going down” (Nový Čas 2015). Another assembly worker complained that the number of workers in his unit was reduced from thirty to twenty-four in the last two years, while the output and pace of work increased and wages remained the same (ibid.). PSA agreed to increase salaries by €70 per month only after six months of negotiations with

labor unions, workers' demonstrations, and under the threat of an imminent worker strike in June 2015. This indicates high levels of exploitation and only limited local value capture in the form of wages from the car industry operations in integrated peripheries. A six-day strike over wages at VW Slovakia in 2017 won a 14 percent salary increase over the period 2017–2018 and indicated the growing resistance to working conditions and low wages in assembly factories in Slovakia. Although individual factory strikes might be successful in achieving wage increases, low wages compared to core areas of the automotive industry will continue to be the basic precondition for the future development and operation of the automotive industry in integrated peripheries.

The interviews thus suggested that cost cutting reasons were behind the vast majority of investment decisions by foreign suppliers to enter Slovakia and are the basic precondition for the continuing production there. This points toward the potential of establishing predominantly dependent (if any) linkages with domestic firms and their integration into automotive GPNs through the structural mode of strategic coupling as simple assembly platforms.

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### Firm-Level R&D

The location and organization of industrial R&D is strongly related to corporate hierarchy, in which R&D tends to be spatially highly concentrated in core regions. Peripheral regions are generally typified by the low share of R&D activities that predominantly involve the technical support of production and low-level development activities at the plant level (Malecki 1980; Howells 1990). We might therefore expect limited automotive R&D in integrated peripheries (Pavlínek 2012), since these regions are integrated into GPNs as assembly platforms through FDI in routine manufacturing, while depending on the transfer of R&D from core regions (Yeung 2009; Coe and Yeung 2015). The potential for learning and knowledge transfer through supplier linkages is greatly enhanced when foreign firms engage in R&D activities in host regions (Giroud 2012). At the same time, R&D in domestic firms increases their absorptive capacity and, therefore, their capabilities to learn from foreign firms (Cohen and Levinthal 1989). In this context, firm-level R&D in both foreign subsidiaries and domestic firms would suggest the potential for developmental linkages and point toward international partnerships. Alternatively, the absence of R&D activities indicates the potential for dependent linkages in the assembly platform type of structural couplings with GPNs.

My research found very limited R&D activities in foreign subsidiaries in Slovakia, which is supported by Eurostat data (Eurostat 2016) and also among domestic firms, suggesting their low absorptive capacity and therefore a low ability to benefit from potential linkages. The interviews revealed that despite the advantage of low R&D labor costs, the lack of skilled R&D labor represents the biggest obstacle for establishing sizeable R&D activities. A French supplier that is operating one of the largest automotive R&D centers in Slovakia argued:

The most important reason for the establishment of the R&D center here was to use low labor costs to decrease the R&D costs in France and Germany. However, we are all struggling with technical competencies and knowledge of university graduates. There is lack of technical students, engineers. I have been trying to find fresh graduates that we could train, and I can't find them. (Interview, June 23, 2011)

Eighty-six percent of the surveyed and 82 percent of the interviewed foreign subsidiaries, and 77 percent of the surveyed and 65 percent of the interviewed domestic firms,

conduct no R&D activities in Slovakia. Those that do typically engaged in the technical support of production and talked about limited R&D, small-scale R&D with very few workers, usually one or two. Although domestic suppliers have the advantage of lower costs and geographic proximity, they face significant barriers to the development of R&D, such as low competencies, and the problems of cultural and relational distance from foreign subsidiaries (Schmitt and Van Biesebroeck 2013). Both the survey and interview data thus suggest the low contribution of R&D activities of foreign subsidiaries to the potential learning and knowledge transfer to domestic firms, and the low absorptive capacity of domestic firms to benefit from these potential transfers. This points to the dependent rather than developmental nature of the vast majority of linkages in the automotive industry in Slovakia, which underlines its integration into GPNs through the assembly platform type of structural couplings.

### The Nature of Supplied Components by Domestic Firms

In order to better understand the nature of linkages between foreign subsidiaries and domestic firms, I classified the surveyed domestic firms based on the nature of their products into standard and niche suppliers. Standard suppliers are typically captive suppliers who supply simple components through dependent supplier linkages to either higher-tier foreign subsidiaries in Slovakia or abroad. Niche-market domestic suppliers do not supply the high-volume car production but typically engage in the low-volume production of niche-market products in the automotive industry. Only 35 percent of the surveyed and 47 percent of the interviewed domestic firms were classified as being involved in standard production, while the remaining ones were classified as niche-market producers. I have also classified the produced components and the nature of production of domestic firms into three categories: simple, more advanced/complex, and relatively complex. Among standard domestic suppliers, 87 percent of surveyed firms supplied simple components, 13 percent more advanced/complex components, and none supplied relatively complex components.

The survey data suggest that the majority of domestic automotive industry firms operate at the margins of the high-volume passenger car industry, if they are integrated at all, because they do not supply the high-volume production of cars in Slovakia. This suggests the presence of dependent rather than developmental linkages. The weak integration of domestic firms in the high-volume passenger car industry partially explains the weak supplier linkages between domestic firms and foreign subsidiaries, and further reiterates that the Slovak automotive industry is integrated into GPNs predominantly through external actors (foreign subsidiaries), which is typical of the structural mode of coupling into GPNs.

### The Classification of Linkages into Dependent, Developmental, and Detrimental

I evaluated the quality of supplier linkages between foreign subsidiaries and domestic firms using both the interview and survey data. Backward supplier linkages of foreign subsidiaries with domestic firms and forward supplier linkages of domestic firms with foreign subsidiaries were evaluated separately. First, I analyzed the interview data. For the interviewed foreign subsidiaries, I combined data on the nature of the supplied components and materials by domestic firms, whether their investment was driven primarily by cost savings, perceived advantages of production in Slovakia, and whether they conduct R&D in Slovakia. Sixty-three percent of the interviewed subsidiaries (seventeen firms) developed no supplier linkages in Slovakia. Each of the remaining ten firms was given one point for investment reasons unrelated to cost

cutting such as skilled labor or industrial tradition. If a foreign subsidiary listed more than one reason for investing in Slovakia, points were awarded proportionally. Advantages of production in Slovakia were evaluated the same way. One point was given for buying more advanced parts or components from domestic suppliers; zero points were given for simple components. Finally, firms were given one point if they employed any R&D workers, zero points if they had no R&D workers. The average point value of these four numbers was calculated for each firm. A score higher than 0.5 indicates developmental linkages, while a score of 0.5 and less indicates dependent linkages. No firm had a score higher than 0.3. Therefore, all supplier linkages of these ten foreign subsidiaries with domestic firms were ranked as dependent and no interviewed foreign subsidiary has developed developmental linkages with domestic suppliers (see Table 6).

158 For the interviewed domestic suppliers, I combined information about the nature of the supplied components, whether the perceived competitive advantage of domestic firms is mainly cost or technology and skill driven, whether domestic firms received any help and learned anything new from foreign subsidiaries, and the existence and extent of their R&D activities. Fifty-nine percent of the interviewed domestic firms (thirteen) had no linkages with foreign subsidiaries. In order to determine the nature of the linkages, the remaining nine firms were given a point each for not making simple products, having other than a low cost competitive advantage, having R&D workers, being helped before starting to supply components, and learning something new from foreign subsidiaries. As in the case of foreign subsidiaries, the average point value was calculated for each firm with a score higher than 0.5, indicating developmental linkages, while, a score of 0.5 and less indicated dependent linkages. No firm achieved a higher score than 0.4. Therefore, the linkages of all nine interviewed domestic firms with foreign subsidiaries were ranked as dependent (see Table 6).

The survey data were not as detailed as the interview data, and I could only use the nature of the supplied components and R&D employment as proxy measures of developmental and dependent linkages. Sixty-four foreign subsidiaries were asked to list five to seven key suppliers, and only nine named a domestic firm as one of these key suppliers. All these nine listed domestic suppliers supplied simple components. In terms of R&D, only one foreign subsidiary sourcing from domestic firms employed R&D workers in Slovakia. Two foreign subsidiaries that accounted for 91 percent of R&D workers of all surveyed subsidiaries had no supplier linkages in Slovakia. The

**Table 6**

*The Classification of Linkages of the Interviewed Foreign Subsidiaries and Domestic Firms*

	Foreign Subsidiaries		Domestic Firms	
	No.	%	No.	%
No linkages	17	63	13	59
Dependent linkages	10	37	9	41
Developmental linkages	0	0	0	0
Total	27	100	22	100

Note: Foreign subsidiaries refer to the purchase of supplies from domestic firms (backward linkages); domestic firms refer to selling supplies to foreign subsidiaries (forward linkages).

Source: Author's 2011–2015 interviews.

remaining sixty-two foreign subsidiaries together employed forty-nine R&D workers, with one accounting for half. These data therefore strongly point toward dependent linkages between foreign subsidiaries and domestic firms in those rare cases when linkages exist.

Surveyed firms were also asked to list their most important customers and supplied components, which allowed me to identify domestic firms that supply foreign subsidiaries in Slovakia. Out of sixty-seven surveyed domestic firms, I identified only seventeen firms that supplied materials and components to foreign subsidiaries in Slovakia, although only four supplied the mass production of cars. Once again, these firms supplied simple components. Only two firms employed any R&D workers. This also suggests the existence of dependent linkages between domestic firms and foreign subsidiaries. Both the interview and survey data thus confirmed the overwhelmingly dependent linkages between domestic firms and foreign subsidiaries in the assembly platform type of structural mode of coupling into GPNs.

Half of interviewed domestic firms felt negative regional development outcomes of the integration into automotive GPNs in the form of negative direct spillovers (Pavlínek and Žížalová 2016), which are the outcome of what I call detrimental linkages that are another sign of structural couplings. Detrimental linkages were felt mainly in the labor market, since the competition for especially skilled labor increased following the investment by foreign firms. More than half of interviewed domestic firms (52 percent) lost workers to foreign subsidiaries, and 59 percent argued that it became more difficult for them to hire workers after the investment by foreign firms in Slovakia. Only half of the interviewed domestic firms (ten) answered the question about salaries, and half of those were forced to increase salaries because of competition from foreign subsidiaries in order to attract workers or maintain the existing ones. The interviews with domestic firms also suggest that there has been a negligible transfer of knowledge and skills through workers trained in foreign subsidiaries to domestic firms. Only 14 percent of the interviewed domestic firms hired workers who previously worked for foreign subsidiaries, and only 5 percent (one firm) agreed that those workers brought with them knowledge that was useful. One manager of a domestic firm argued:

No, workers formerly working for foreign subsidiaries did not bring anything new to our firm. Foreign subsidiaries concentrate on simple assembly. Workers learn nothing there that could be used in a more complex production. Our firm is small and workers here need to be more flexible and know more than just a single task. (Interview, May 21, 2015).

This quote suggests that instead of transferring skills through FDI, the assembly platform type of structural couplings might lead to the de-skilling of the local labor force and negative long-term regional development effects in host regions.

Overall, in those cases when linkages between foreign subsidiaries and domestic firms exist, the majority of them are either dependent or detrimental, while developmental linkages are virtually absent, underscoring the structural mode of strategic coupling of integrated peripheries into GPNs.

## Conclusion

In this article, I first developed the spatial concept of integrated peripheries of core-based macroregional production networks and then set out to analyze the regional development effects of the rapid growth of the automotive industry in these integrated

peripheries. I conceptualized this growth by drawing on Harvey's (2014) notion of spatiotemporal fix in the context of the dynamics of capitalist uneven development. Faced with rising production costs and declining profitability in Western Europe and the United States, core-based automotive firms have developed automotive production in cheaper and, therefore, more profitable areas in integrated peripheries. At the regional scale, I employed the GPN approach and its concept of strategic coupling in order to conceptualize the mode of articulation of integrated peripheries into transnational production networks and its regional development outcomes. I showed that integrated peripheries were articulated into automotive industry GPNs through structural couplings, the least advantageous and dependent mode of integration into GPNs for countries and regions. The empirical analysis of this mode of integration focused on supplier linkages in Slovakia, which allowed me to examine the implications of the assembly platform type of structural couplings for long-term regional economic development in integrated peripheries because the quality and quantity FDI linkages are crucial for the potential diffusion of technology and knowledge in host regions through FDI. For this purpose, I have developed a methodology to evaluate the quality of  
160 supplier linkages between foreign subsidiaries and domestic firms.

The case study of Slovakia revealed only tenuous and predominantly dependent linkages of foreign subsidiaries with domestic firms and weakly developed linkages among foreign subsidiaries, with the exception of backward supplier linkages of assembly firms with their most important foreign-owned suppliers. It shows that Slovakia has been integrated into automotive GPNs mainly through sets of mostly unconnected foreign subsidiaries that operate as assembly platforms vertically integrated into externally organized GPNs and are weakly embedded in the Slovak economy. The nature of this spatiotemporal fix reflects the contemporary spatial organization and operation of the automotive industry, which is based on follow supply and global sourcing. My analysis, together with other existing evidence, strongly suggests that predominantly dependent (if any) linkages between foreign subsidiaries and domestic firms tend to develop in integrated peripheries (Ellingstad 1997; Carrillo 2004; Contreras, Carrillo, and Alonso 2012; Pavlínek and Žízalová 2016), which is typical of the assembly platform type of structural couplings with GPNs. Along with the weak development of higher value-added functions in foreign subsidiaries (Pavlínek 2016; Pavlínek and Ženka 2016), the weak, dependent, and also detrimental linkages contribute to limited knowledge transfer from FDI to domestic economies and the truncated nature of automotive FDI in integrated peripheries. Together with capital dependency, technological dependency, know-how dependency, and strategic decision-making dependency, the results of this study thus highlight the dependent nature of the automotive industry development in integrated peripheries based on their structural couplings with GPNs. This suggests that the overwhelming dependency on foreign capital is the underlying structural feature of the automotive industry in integrated peripheries. The similarity of my findings with the conclusions of earlier truncation (Britton 1980) and branch plant literature (Watts 1981) indicates that the underlying structural features and effects of industrial FDI in peripheral regions remain little changed despite the changing technological and organizational nature of capitalism. The high degree of dependency on foreign capital, technology and know-how, along with low domestic capabilities and limited value that is captured from the automotive industry in integrated peripheries thus represent major threats to future successful economic development in these regions. Since spatiotemporal fixes and strategic couplings are space and time contingent, the rapidly growing output, exports, and, in some cases, GDP will not last in integrated peripheries. More importantly, the overall benefits of the articulation into automotive industry GPNs through structural couplings have been limited, if not negative,

for workers in integrated peripheries. These conclusions undermine the optimistic expectations of sustainable regional development outcomes based on the articulation of regions and countries in global value chains (UNCTAD 2013), and call for more research into how the integration of countries and regions into externally organized GPNs through FDI might contribute to the perpetuation of uneven development, one of the potential dark sides of strategic coupling (Coe and Hess 2011).

With power and control concentrated in the hands of core-based assemblers and global suppliers that relegate the vast majority of domestic suppliers in integrated peripheries to an inferior and unfavorable position (Veloso et al. 2000; Pavlínek and Žížalová 2016), the quantity and quality of supplier linkages will likely continue to be low in the foreseeable future. This situation will limit the long-term regional development potential of FDI-driven integration into GPNs, and cement the peripheral and dependent position of integrated peripheries in the automotive industry's IDL for years to come.

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