sustainability

MDPI

Article

Role of Metropolis in Regional and Global Dimension of Value-Added Chain: Examples from Warsaw and Its Region

Mariusz-Jan Radło [1,*] and Ewelina Szczech-Pietkiewicz [2]

[1] Global Economic Interdependence Department, World Economy Research Institute, Collegium of World Economy, Warsaw School of Economics, al. Niepodległości 162, 02-554 Warszawa, Poland
[2] European Union Unit, Institute of International Economic Policy, Collegium of World Economy, Warsaw School of Economics, al. Niepodległości 162, 02-554 Warszawa, Poland
* Correspondence: mjradlo@sgh.waw.pl

Abstract: The paper aims to present the role of cities and their surroundings (metropolis) in the creation and flow of value, in order to shift the focus of analysis towards the geography of value chains. The analysis combines notions of a network of cities with value-added chains, usually examined separately, to identify the synergies between them and progress in the methodology of the combination. The aim of the paper is to identify the role of the metropolis in connecting the national and regional economy with the world economy within value chains. We present the metropolis not only as a node in global value chains, but also as an intermediary between global, national, and regional economies. We show that the Warsaw metropolis is strongly linked with itself and the rest of the national economy. In the case of the Mazovia region, the strongest links are with the national economy followed by backward links with the metropolis.

Keywords: value chains; production chains; metropolises; cities in value chains

Citation: Radło, M.-J.; Szczech-Pietkiewicz, E. Role of Metropolis in Regional and Global Dimension of Value-Added Chain: Examples from Warsaw and Its Region. *Sustainability* **2022**, *14*, 13937. https://doi.org/10.3390/su142113937

Academic Editors: Luigi Aldieri and Cuihong Yang

Received: 21 June 2022
Accepted: 19 October 2022
Published: 26 October 2022

1. Introduction

There are many reasons that create background for the research presented in this article. The recent decades have seen the growing importance of the value chain approach in development policy planning and execution [1–4]. This approach has gained recognition in the analysis of economies at the national, regional, local, and metropolitan level. The increasing popularity of the production value chain analysis is the effect of the deepening fragmentation of the production of goods and services. It caused the necessity to take into account the GVC framework in the creation of an evidence-based policy that would combine the effects of globalization processes with the policy of promoting sustainable development at the national and local level [2].

As demonstrated by Buckley [5] or Gereffi and Sturgeon [6], the attractiveness of a value chain approach consists of the understanding of how diverse sectors work, which may give an insight into the development possibilities of companies, clusters, regions, and countries. Thus, the understanding of value chains within which enterprises operate in a given sector in a region, country, or metropolis is indispensable for successful implementation of their development strategies. It helps in specifying not only development paths for enterprises but also accelerates growth in less developed regions or stimulates structural transformations that promote the engagement of enterprises in value chains or moving them up these chains. This may be linked with the development of abilities to deliver more advanced processes of higher value-added and, consequently, generating higher profits, higher remuneration, and bigger contribution to regional and national income. Apart from becoming part of global value chains, economies and enterprises may benefit from the development of local and regional production chains, whose growth increases the diversity amongst enterprises operating at national and regional levels. In this perspective, one can

note that there are many development policy areas and types of intervention in which a value chain approach is used. It may involve inclusion, expanding, or strengthening participation in GVC [3], combining the GVC-based approach with various policies including smart specializations [7,8], cluster [9], industrial [6], or trade [10]. There are also many other areas of development policy in which the GVC approach may be applied [4].

At this point it is worth paying attention to the importance of metropolises in the development of many economies, which are becoming growth poles [11,12], attracting the location of enterprises, investments, employment, and accumulating the development of entire economies. From the point of view of GVC development, global cities in particular deserve attention. Such cities, as indicated by Chakravarty et al. [13], become significant nodes in the global network of value chains. In the above perspective, global cities, as part of the GVC-based approach, can be the driving force of national economies, but also of specific regions. However, this requires an understanding of the strength and directions of value chains linking the global city with global, national, and regional value chains.

In the above context, the aim of this study is to identify the role of Warsaw and the Warsaw metropolis in connecting the national and regional economy with the world economy within global value chains. Thus, the research is focused on finding whether the capital city contributes to the sustainability of the national economy. This goal can be achieved by addressing three questions: Does Warsaw, as the growth pole of the Polish economy, contribute to the sustainable development of the economy through links within national or regional value chains? Can Warsaw be considered as a mediator between global value chains and the entire national economy? Can Warsaw be considered a mediator between global value chains and the economy of the rest of Mazovia region (outside the Warsaw metropolis)?

Although analyses examining the inclusion of economies or enterprises into value chains are already rather common as statistical data from international input-output tables have become more available, analyses of the inclusion of territorial units—including regions from different countries or cities and metropolises—are still rather scarce. Some authors are trying to 'regionalize' national input-output tables by applying econometric estimates [14–17]; nevertheless, the obtained result is always only an approximated reflection of a complex reality of these chains at international and inter-regional levels, not to mention the sub-regional level. Therefore, our research strategy is to use quantitative data for the Mazovia region in Poland obtained through CAWI/CATI (CAWI/CATI-computer-assisted web/telephote interview computer) interviews with representatives of SMEs located in the region. The survey questionnaire was based on hypotheses that were built on the basis of the literature review presented in the next section. Using the quantitative analysis of the collected data, we verify the hypotheses and answer research questions. In addition to the quantitative research strategy, aiming at pointing when and where observed phenomena occurred, we also used elements of the analytical research strategy to deal with the cause-and-effect relationship. It is used to address the issues related to the implications for development policy.

We chose Mazovia consisting of the Warsaw Capital Region (Warsaw metropolis) and the non-metropolitan part of Mazovia (Mazovia-region) surrounding the metropolis as a case study for our research due to the structure of its economy and characteristics of regional development. On the one hand, the region includes Warsaw, the capital city of Poland, with all the functions that its role entails. Warsaw is a hub for business support services and the economy of this city is strongly tilted towards this sector. On the other hand, other areas of the region are mainly agricultural with some manufacturing hubs. The dichotomy is seen not only in the importance of sectors of economy but also in the wealth of the sub-regions. Therefore, the Warsaw metropolis region and Mazovia appear to be an interesting case to test hypotheses on the regional and global dimension of value-added chains. Moreover, the Warsaw metropolis and Mazovia with its characteristics may represent other capital regions in Central and Eastern Europe. These regions underwent

dynamic economic development concentrated in metropolises as growth poles, which contrasted with the weaker dynamics of rural areas development.

2. Theoretical Background and Hypotheses Development

2.1. Theoretical Background

Value chain analyses are gaining in importance for delineating development strategies of metropolitan areas. Globally competitive cities and global value chains are two powerful development incentives for the modern economy [18] as they provide an environment that defines conditions for economic growth, increasing the productivity and creating new jobs. In this paper, we seek to consider both concepts to identify the role played by a city that is central for the development of a metropolis on the example of Warsaw, its metropolitan area, and linkages between their respective economies within value chains. Against this backdrop, global value chains can be seen as demand and supply streams that connect metropolises-specific nodes in global value chains. The importance of these nodes rests, on the one hand, on the strength of an agglomeration as a pole attracting enterprises to a metropolis, and, on the other hand, on the resultant of the sum of positions that these enterprises occupy in global value chains [13].

Traditionally, global value chains are examined at the national level [19] whereas the location of enterprises is an issue addressed usually in regional studies. That is also the effect of business practices exhibiting a strong trend towards clustering and spatial concentration. Economic geography offers a series of concepts that explain the location patterns, varying from innovation advantages from knowledge spillovers across different sectors [20] to value chain advantages from clusters of industries [21]. However, the theory of agglomeration economies [22] provides the widest basis for the analysis of concentration mechanisms. In accordance with the latter, enterprises establish themselves in the vicinity of other companies, counting on positive externalities resulting from the division of labor, the division of the product produced, and the exchange of knowledge and information. Decisions made by enterprises as to where to locate individual production stages are thus the effects of considerations of not only the marginal cost of production in a given country but also the proximity (or distance) dividing them from activities in the value chain. Cities, especially large ones that can be categorized as global cities, are essential for the development of entrepreneurship and innovation [23–25]. They are a natural location choice for multinational corporations which is why they are viewed as key nodes in the network of connections of global value chains. Moreover, as indicated by Wei and Liao [26], cities increasingly compete for foreign investments and participate in GVCs.

The subnational context has begun to gain in importance in the international business analysis, especially in the area of companies (mainly multinational companies—MNCs) location and location of foreign direct investment, with analysts taking interest in cities, clusters, regions, and sub-national administrational units [27–29]. One thread of the research in these areas comes from the observation of economic and institutional differences within national economies that motivate location decisions [30]. Another significant body of literature builds on the concept that cities are becoming independent from the national authorities and their economic regulations and can create unique locations with distinct institutional environments [31,32]. In this context, it is worth noting the importance of participation in GVCs for upgrading of local firms and taking into account the regional dimension of value chains [26,33,34]. In conjunction with the observation that cities are developing in increasingly similar patters [35], it is suggested that global cities form a supra-national network with factors that cannot be entirely explained by agglomeration economies. Therefore, global cities create especially beneficial context by bridging supranational and subnational levels.

Increasing interest in global cities as a research subject in terms of corporate networks also comes from a new approach in the urban network paradigm. Investigations into this subject depart from analyzing cities as static entities through their characteristics (e.g., number of headquarters located) toward analyzing flows between cities [36]. The shift in

paradigm can be traced to 1990s with the introduction of data on information movements between cities [37], data on connections between cities [38], as well as research in the field of globalization on people, capital, services, and goods movement across the economies.

Factors decisive for the attractiveness of a city as a potential location for innovation investment which favor the inclusion of cities in global value chains include: population density, remuneration levels, and international cooperation in the field of research and development. The relevance of the relationship between networks of cities and global value chains can be evidenced by the fact that about 40% of global high value-added investment projects (in R&D, design, and testing) are directed towards 57 global cities [19]. One of the trends which impact the global distribution of value chains and the inclusion of cities in them is the shifting of activities of multinational enterprises towards the west which has strengthened the position of European and American cities in location decisions made by enterprises, especially after the 2008 financial crisis. When it comes to the location of investment in RDDT, the Central and Eastern European countries are represented by three global cities: Budapest, Prague, and Warsaw. Other studies also prove the observation that MNCs are drawn toward global cities. Global Cities Investment Monitor examines that notion, stating that the top 35 global cities attracted nearly 45 per cent of foreign investment [39]. Another study [27] concluded that 77 per cent of FDI by multinational enterprises was directed to just 55 global cities.

Apart from the theme of global cities nature, two other areas in the multi-disciplinary literature undertake the analysis of cities and multinational enterprises, namely: companies strategic decisions in global cities, and outcomes of MNCs investment in global cities [13]. The first strategic decisions analyses investment motivations such as knowledge-seeking, expansion of market, and increase in efficiency in terms of value chain activity [40]. On the other hand, there is no evidence suggesting that the global city status may influence the chosen mode of entry for multinational companies. A large body of literature also examines the results of MNCs investment in global cities, building on the assumption that there is location-specific advantage enhancing FDI at country level [13,41]. Consequently, sub-national location specificity is attracting increasing interest; however, global cities are not the leading subject of the studies. Research performed by Nachum [42,43] suggest that MNCs gain advantage from their location in global cities, arising from their economic, institutional, and cultural environments.

It is worth juxtaposing the analysis of global value chains and their relevance to metropolises with the concept of global cities. Looking for relationships and relational mechanisms between the two approaches appears to be an interesting exercise as both concepts offer an alternative to economic analysis focused on the national economy. The impact of the firm location and urban systems is performed from both directions [36]: not only are urban systems shaped by the spatial choices of MNCs, but urban systems also influence the spatial distribution of corporations by their size, functions, and position in hierarchy [44,45]. The notions such as 'global cities' as well as 'global value networks' emerged because of the critique of research and modelling methodologies applied in social sciences that were primarily focused on countries with the intention to provide an alternative to this approach. Both concepts stress that to understand economic flows one needs to take account of the location and its relevance for the movement of goods, knowledge, capital, etc., while this impact works both ways (the location impacts the network, and the network impacts the location). On the one hand, competitive cities are an attractive location choice to enterprises that take part in global value chains; on the other hand, these enterprises, and their participation in value chains, support innovation, increase productivity, and create an attractive labor market in cities. Hence, the relationship is mutual.

Despite similarities proposed by the two approaches, network of cities and value chains, these areas are rarely examined together. An attempt to find synergy between them and to create a common methodology was made in a series of articles published in "Global Networks" [46–51]. Earlier attempts to combine the two aspects can be found in

Parnreiter, Fischer, and Imhof [52], who are trying to find the 'missing link' between global value chains and city creating processes pointing to the critical role of suppliers of financial services. Another approach to linking both discussed research areas is presented by the study of Rossi, Beaverstock, and Taylor [53]. Not only did they examine the location of suppliers of advanced services but also the location of service clients. That allowed them to identify linkages between 'service city' where services are rendered and 'decision city' where decisions are taken and allowed them to classify these links as intra-city or inter-city (or international). Results of the analysis helped in identifying locations other than Sao Paulo where the Brazilian economy was connected with global value chains.

Parnreiter [50] supplements studies global city networks with an empirical dimension, which enables a tracking management function in global cities for the example of Mexico City. He links the presence of companies that offer business services in the city with the degree of globalization of the Mexican economy, providing evidence for the existence of flows from service firms in Mexico City to enterprises responsible for the inclusion of the Mexican economy in the global network.

Another supplement to studies that bring together the global networks of cities and global value chains was proposed by Vind and Fold [49]. Results of their study indicate that in the analysis much more attention should be paid to the role played by enterprises as organizers of the economy. They also believe that the current framework for analyzing global flows does not sufficiently consider developing economies and marginalizes them as potential participants of global chains.

2.2. Literature Gap and Hypotheses

Brown et al. [51] highlight the need to develop links between studies on the global network of cities and global value chains by making reference to the imperfections of 'centre-peripheries' approach. In the analysis relying on the methodology of the World City Network, they highlight the limitations caused by not linking cities with other spatial scales. According to the authors, cities are viewed exclusively as nodes in global flows and their national or regional links are completely ignored. As for global value chains, the analysis should be more deeply linked with spatial and location factors. The authors argue there is a 'critical need' to track global chain activities in the spatial context.

Despite these inputs, there is still little knowledge that brings together notions of global cities and GVCs in terms of the spatial configuration of value chains. Therefore, an extensive review by Chakravarty et al. [13] points to this subject as a proposed future research question, especially in two areas: the role of global cities and MNCs in shaping GVCs of the future in emerging markets, and exploring if and how GVCs will be reconfigured after the COVID-19 shock to supply chains.

Summarizing the above analyses, it is necessary to point to the existing gap in research on global value chains and global cities, which includes the analysis of relationships between global, national, and regional value chains. To close this gap and summarize the discussion, we can put three hypotheses based on the special position of the Warsaw metropolis in the Polish economy and the accumulation of foreign investments. We assume that Warsaw plays a role as a significant node in both the international network of cities and value chains.

Hypothesis 1 (H1). *Warsaw metropolis links global value chains with national and regional value chains. This mimics the tendency of central regions/cities to be more strongly connected to GVCs than peripheries*.

Hypothesis 2 (H2). *the Warsaw metropolis plays a mediating role between domestic and global value chains. This role is created and shaped by a concentration of MNCs located in this area*.

Hypothesis 3 (H3). *the Warsaw metropolis plays a mediating role between the rest of the Mazovia region and global value chains consisting of linkages with GVC, with simultaneous strong backward links, and with the economy of the region.*

3. Materials and Methods

The logic of the research presented in this article is based on the global, national, and regional value chain linkage diagram shown in Figure 1. This diagram shows the forward and backward links corresponding to the sales and purchase flows in value chains, respectively. In the survey, representatives of the surveyed enterprises from particular parts of Mazovia answered whether they had customers/suppliers in another territorial unit (abroad, in Mazovia region, Warsaw Metropolis, or another Polish region).

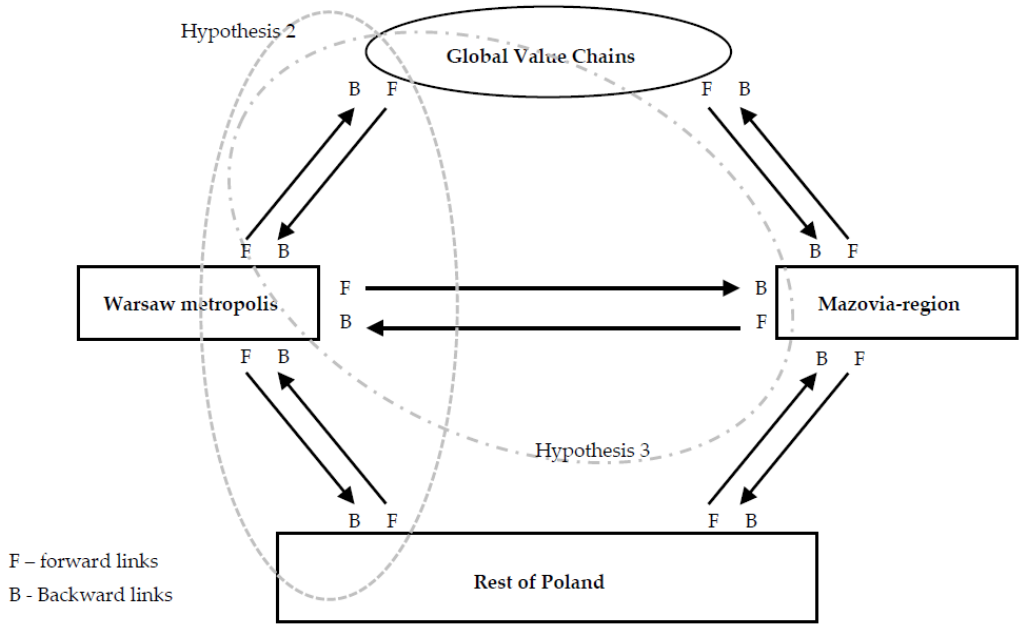

Figure 1. Research logic.

The survey was conducted on a group of 1233 small and medium sized enterprises from Mazovia, of which 631 represented the Warsaw metropolis and 602 represented the Mazovia region (Table 1). The survey was carried out between 21 September 2020 and 23 October 2020. The link to the CAWI questionnaire was sent by e-mail to each of the SMEs representatives. In case of lack of answer, it was then confirmed by telephone. This procedure was repeated in the absence of a reply. It was also possible to complete the questionnaire by means of a telephone interview (CATI) conducted by research assistant. The survey was conducted as part of a policy research project (Mazovia 2.0) carried out in cooperation with Mazovia regional authorities, about which the respondents were informed when they were asked to fill in the questionnaires. The questionnaire presented in Table 2 was targeted at SMEs managers or owners.

Table 1. SMEs population, number of surveyed entities, and margin error by region and subregion.

Region/Subregion	Number of Surveyed Entities	General Population	Margin Error (Significance Level = 99%)
Mazovia	1233	28,776	3.59
Warsaw metropolis	631	21,086	5.05
city of Warsaw	405	15,318	6.31
Warsaw East	100	2480	12.62
Warsaw West	126	3288	12.68
Mazovia-region	602	7690	5.04
subregion Ciechanów	100	1004	12.22
subregion Płock	101	1305	12.31
subregion Radom	101	2057	12.50
subregion Siedlce	100	1360	12.40
subregion Żyrardów	100	955	12.19
subregion Ostrołęka	100	1009	12.22

Table 2. Survey questionnaire.

Question	Possible Answers	Interpretation
Does your company have clients in another country?	Yes/No	Answer "Yes" indicates forward links in international value chains
Does your company have suppliers in another country?	Yes/No	Answer "Yes" indicates backward links in international value chains
Does your company have clients in . . . ?	Mazovia: Yes/No Warsaw Metropolis: Yes/No Mazovia-region: Yes/No	Answer "Yes" indicates forward links in intraregional domestic value chains (with specified subregion).
Does your company have suppliers in . . . ?	Mazovia: Yes/No Warsaw Metropolis: Yes/No Mazovia-region: Yes/No	Answer "Yes" indicates backward links in intraregional domestic value chains (with specified subregion).
Does your company have clients in . . . ?	For all NUTS2 regions in Poland excluding Mazovia: Yes/No	Answer "Yes" indicates forward links in interregional domestic value chains (with specified subregion).
Does your company have suppliers in . . . ?	For all NUTS2 regions in Poland excluding Mazovia: Yes/No	Answer "Yes" indicates backward links in interregional domestic value chains (with specified subregion).

Data on total population, its structure, and margin errors for all surveyed area parts of the Mazovia are presented in Table 1. The number of SMEs (companies employing from 10 to 259 persons) in the Mazovia reaches 28,776, of which 21,086 are enterprises from the Warsaw metropolis and 7698 from the Mazovia region. When structuring the sample by region, we wanted to achieve a relatively even and proportional distribution of the sample by region and sub-region. The margin of error data show that the results obtained for the entire Mazovia are characterized by a relatively low margin of error (3.59 at significance level 99%). There are also low margin errors for two Mazovia regions—the Warsaw metropolis (5.05 at significance level 99%) and Mazovia region (5.04 at significance level 99%). The results in individual subregions have higher margin errors, therefore they should be more cautious.

The survey questionnaire and interpretation of answers are presented in Table 2. Questions concern the existence of clients or suppliers of interviewed firms in another country, region, or subregion. In all cases, the location of the interviewed firm is defined at the level of subregion. This approach allowed for the identification of geographical relations along the value chain, i.e., forward and backward links in value chains between specific subregions and other countries, regions, and subregions. A database of answers was created, and the final results were elaborated by dividing the number of "Yes" answers by the total number of respondents in the analyzed subregion.

The above-described methods allowed us to reveal some challenges in a sub-regional dimension of research. It turned out the responders could not be expected to point to specific sub-regions of Mazovia where their clients and contractors are localized, due to a lack of common knowledge about this level of statistical and administrational division of region. Therefore, a different approach was accepted in order to identify sub-regional relations back and forward between the value chains. CATI respondents were more likely to point to specific towns or counties as locations of their business partners. Additionally, the Warsaw metropolis proved to be a recognizable administration unit for potential respondents. The survey was built using this observation and several techniques were used to limit this challenge for the respondents, without lowering the quality of the received answers and reaching the research goal of mapping the regional and subregional value chains in Mazovia. First of all, a question was asked about relations with Warsaw metropolis and locations outside of it in order to analyse and assess the importance of Warsaw metropole and compare it to the whole region's role. Separately, a detailed question was asked about business relations within the Warsaw metropolis, where respondents could choose from having business partners in Warsaw, units neighboring with Warsaw but still within the metropolitan area (to the east or to the west of the capital), or whole Warsaw metropolis. Finally, stakeholders were allowed to point to specific towns or counties within the region as location of their clients and/or contractors. These answers were then mapped according to NUTS division logic. As a consequence, the limitation of a lack of common knowledge about the administrational division of region was eliminated.

4. Results and Discussion

4.1. Location of Companies

More detailed descriptions of the share of Warsaw in global value chains can be found in data on foreign investment in the capital city and in the entire Warsaw metropolis (metropolis). By examining these data (Table 3), we can see that Warsaw metropolis is an attractive and often selected location to foreign investors. Interesting conclusions can be drawn from the analysis of data for concrete locations and the concentration of investors in sub-regions and counties. The first is visible already after a superficial analysis of both the number of economic entities in the subregions of the Warsaw metropolis as well as the value of invested capital.

Data showing the number of economic actors and their location suggest a clear dominance of Warsaw metropolis compared to the rest of the region and a significant concentration of such actors in Warsaw. Over the period covered by the study, around 97% of foreign investors who chose Mazovia as the location for their investment planned activities within the Warsaw metropolis, mostly in Warsaw itself; the city is the seat to almost 88% of headquarters of multinational enterprises that have invested in Mazovia. An even higher concentration can be seen from the analysis of the value of invested capital where Warsaw represents over 88% of the total for the region and its share has been growing over the analyzed period.

Table 3. Entities with foreign capital in Warsaw metropolis, its sub-regions and counties: the number of entities, foreign capital, 2016, 2018, 2020.

Territorial Unit	Number of Entities			Foreign Capital (In Millions of PLN)		
	2016	2018	2020	2016	2018	2020
Poland	26,015	27,902	23,998	207,834.1	203,636.0	224,759.3
Mazovia	9821	11,244	9875	99,721.8	92,607.7	104,886.7
Warsaw metropolis	9525	10,853	9593	94,935.6	88,010.6	100,156.0
City of Warsaw	8153	9461	8682	86,575.6	81,284.5	92,835.8
Warsaw East	139	179	171	556.8	616.1	619.2
Warsaw West	1233	1213	740	7803.2	6110.0	6701.0
Mazovia-region	296	391	282	4786.5	4597.3	4730.7
Poland = 100						
Mazovia	37.8	40.3	41.1	48.0	45.5	46.7
Warsaw metropolis	36.6	38.9	40.0	45.7	43.2	44.6
city of Warsaw	31.3	33.9	36.2	41.7	39.9	41.3
Warsaw East	0.5	0.6	0.7	0.3	0.3	0.3
Warsaw West	4.7	4.3	3.1	3.8	3.0	3.0
Mazovia region	1.1	1.4	1.2	2.3	2.3	2.1
Mazovia = 100						
Warsaw metropolis	97.0	96.5	97.1	95.2	95.0	95.5
city of Warsaw	83.0	84.1	87.9	86.8	87.8	88.5
Warsaw East	1.4	1.6	1.7	0.6	0.7	0.6
Warsaw West	12.6	10.8	7.5	7.8	6.6	6.4
Mazovia region	3.0	3.5	2.9	4.8	5.0	4.5

Note: The above-presented data disregard entities offering banking, brokerage, or insurance services as well as investment and retirement schemes, National Investment Funds, universities, agricultural households, as well as independent public healthcare establishments and the institutions of culture which are judicial person. Source: Own calculations based on the Local Data Bank of the Statistics Poland.

Aside from the Warsaw subregion and its dominance, the second most popular location for foreign investment in the Warsaw metropolis is the Warsaw West subregion. It was chosen by 7.5% of foreign investors (in 2020) but its share is decreasing. The share of invested resources compared to the value for the entire region also dropped from 7.9% in 2016, 6.6% in 2018, to 6.4% in 2020. Given the fact that the population of investors and the value of capital invested in Warsaw East subregion remain at a similar (low) level, one may conclude that the decreasing popularity of the Warsaw West subregion works in favor of the capital city of Warsaw.

The distribution and concentration of commercial law companies with foreign capital (Figure 2) directly reveals a high disproportion between the east and west subregions of Warsaw, in favor of the Warsaw West subregion. Few companies choose locations east of Warsaw. In the Warsaw West subregion, three municipalities can be distinguished: Lesznowola, Raszyn, and Piaseczno, which are leaders in attracting foreign investors. Grodzisk Mazowiecki also performs quite well.

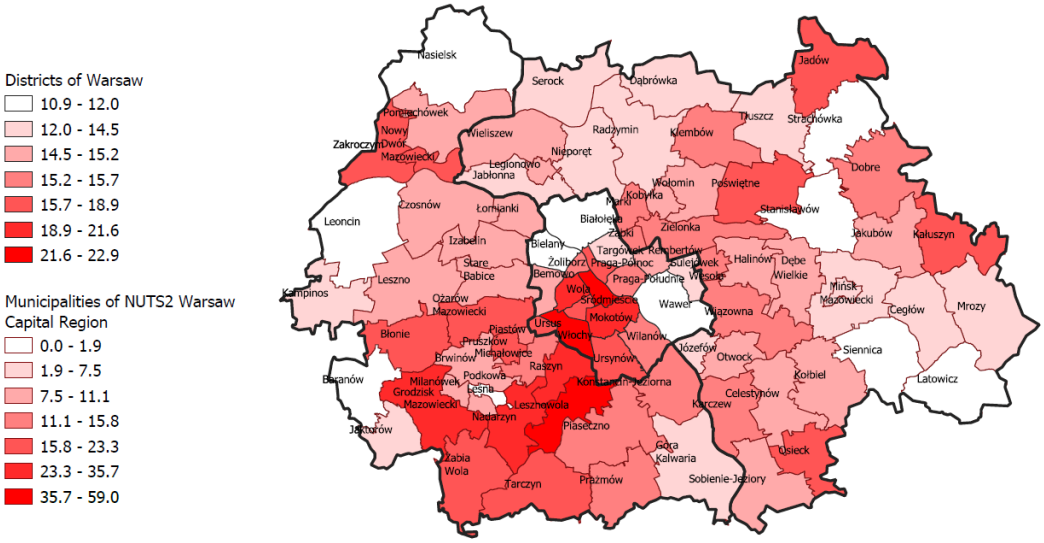

Figure 2. Commercial law companies with foreign capital, total by districts of Warsaw and municipalities of Warsaw metropolis, 2019.

The analysis of the indicator showing the share of commercial law companies with foreign capital in the total population of companies allows us to identify other locations for which foreign investors are rather important (Figure 3). In Warsaw, the biggest number of commercial law companies with foreign capital are based in the following districts: Śródmieście, Wola, Mokotów, and Włochy. Interesting data are reported for the east subregion of Warsaw where the highest number of enterprises with foreign capital can be found in municipalities: Jadów, Kałuszyn, Poświętne, and Osieck. It is hard to identify leading industries that dictate specialties for these municipalities. Other sites in the east subregion of Warsaw do not host any bigger clusters of enterprises with foreign capital in their business structure. On the other hand, using the same criterion, in the west subregion of Warsaw we can distinguish municipalities such as: Raszyn, Lesznowola, Nadarzyn, or Grodzisk Mazowiecki, i.e., the south-west axis traditional for the distribution of business activities outside of Warsaw. In addition, there is a large proportion of commercial law companies with foreign capital in Nowy Dwór Mazowiecki and Zakroczym.

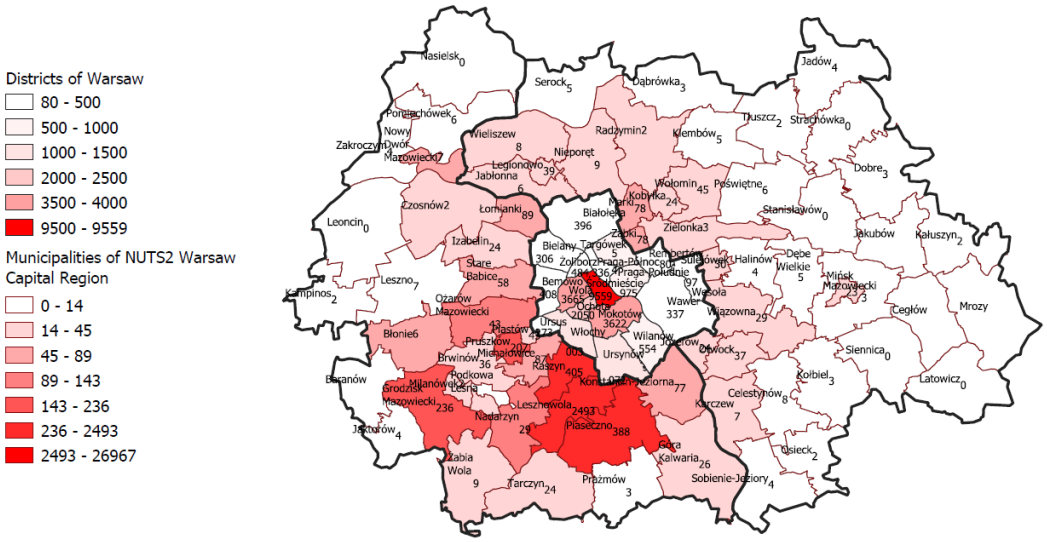

Figure 3. Commercial law companies with foreign capital, total (as % of the total population of companies) by districts of Warsaw and municipalities of Warsaw metropolis, 2019.

4.2. Warsaw Metropolis and Mazovia-Region in Global Value Chains

The intensity of linkages of Warsaw metropolis with global value chains can be presented through data describing the forward and backward links in value chains in Warsaw metropolis and its components against the backdrop of links for the entire Mazovia region together with its regions and subregions. Data concerning these processes can be found in Figure 4. Its analysis shows that enterprises based in the Warsaw metropolis much more often declared having foreign clients or suppliers than the total of enterprises in the region and in the rest of it, 42 and 49.1% responses, respectively. It means that their linkages upstream and downstream the value chain were stronger than within the whole region. At the same time, enterprises which declared having foreign suppliers outnumbered the population of enterprises declaring to have foreign customers by 7.1 p.p.—this is indicative of stronger linkages downstream rather than upstream the value chain. On the other hand, enterprises from Mazovia-region area exhibit much weaker linkages downstream and upstream the value chain. Referring the above to our first hypothesis, we can confirm that Warsaw metropolis is more strongly linked to international markets than the rest of Mazovia. This may be a consequence of the high concentration of foreign investments in that location, which we described earlier.

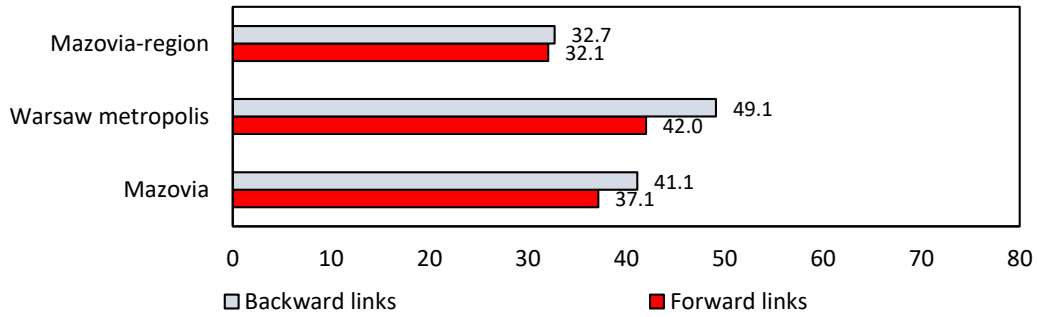

Figure 4. Forward and backward links in international value chains of enterprises from the Mazovia, Warsaw metropolis, and Mazovia region.

The above-mentioned differences in the intensity of links downstream and upstream the value chain between regions of the Mazovia region were also reflected at subregional level. Data concerning the issue are presented in Figure 5. Their analysis shows that the highest shares of enterprises that declare having foreign customers and suppliers can be found in different subregions of the Warsaw metropolis. The Warsaw West subregion stands out here since as many as 51.6% of enterprises participating in the survey declared having foreign customers and suppliers. In the capital city (subregion Warsaw), 51.4% of enterprises declared having foreign suppliers and (only) 39.3% confirmed having foreign customers. In the Warsaw East subregion, these responses represented, respectively, 37% and 41%. In subregions from outside of the metropolitan region of the Mazovia region, in most cases, lower shares were reported of answers that would suggest linkages down or upstream the value chain. This confirms our hypothesis of uneven distribution of GVC connection throughout the region also at subregional level, adding to the dominance of Warsaw metropolis in this respect.

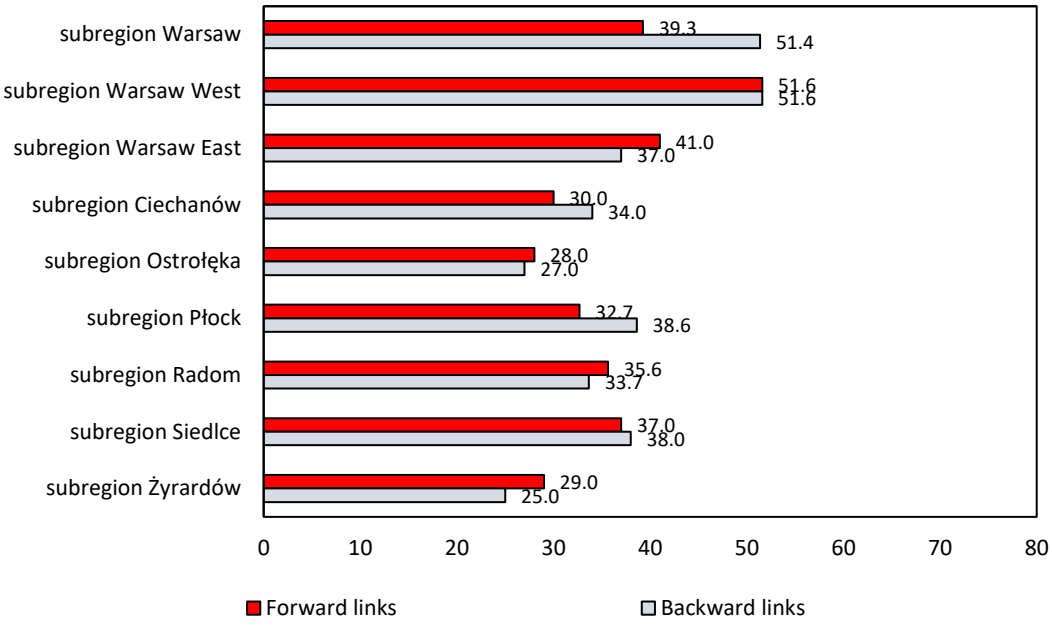

Figure 5. International links of enterprises from subregions of Mazovia down and upstream the value chain.

4.3. Warsaw Metropolis and Mazovia-Region in Domestic Value Chains

It is worth juxtaposing the above-mentioned links of Warsaw metropolis downstream and upstream global value chains with its participation in domestic value chains. Data on the differentiation of linkages downstream and upstream the value chains in regions and subregions of the Mazovia are presented in Figures 6 and 7.

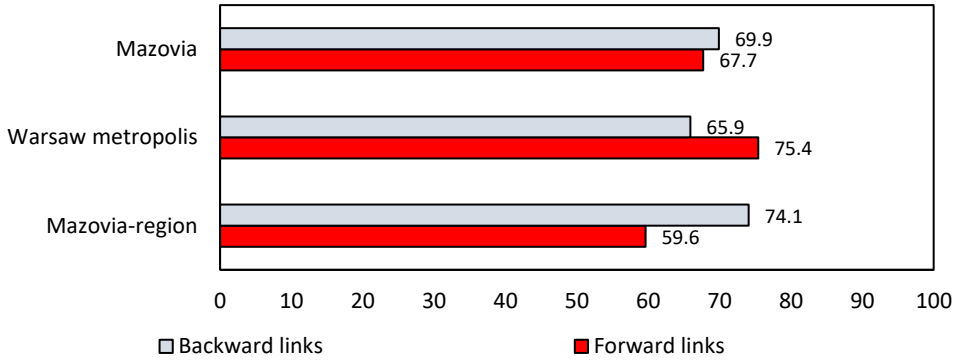

Figure 6. Interregional domestic links downstream and upstream the value chain of enterprises from Mazovia and its regions.

The analysis of data presented in Figure 6 shows that in regions of Mazovia, the intensity of domestic links with other regions in Poland downstream and upstream the value chain is stronger than for international links. Noteworthy, Warsaw metropolis exhibits stronger interregional domestic links downstream the value chain (75.4% responses) than upstream (65.9% responses). The situation is the opposite in Mazovia regional where interregional domestic linkages upstream the value chain are stronger (74.1% responses) than downstream the chain (59.6% responses).

These results confirm our second hypothesis and shed more light on the nature of relations in value chains between Warsaw metropolis, other regions in Poland, and the global economy. Warsaw metropolis has strong ties with GVC, but within them it buys more than sells. However, the Warsaw metropolis has even stronger links with domestic value chains where it in turn sells more. This means that the mediating role of the Warsaw

metropolis relates to MNCs located in the capital. Within it, the metropolis plays the role of an intermediary in servicing the domestic market for MNCs.

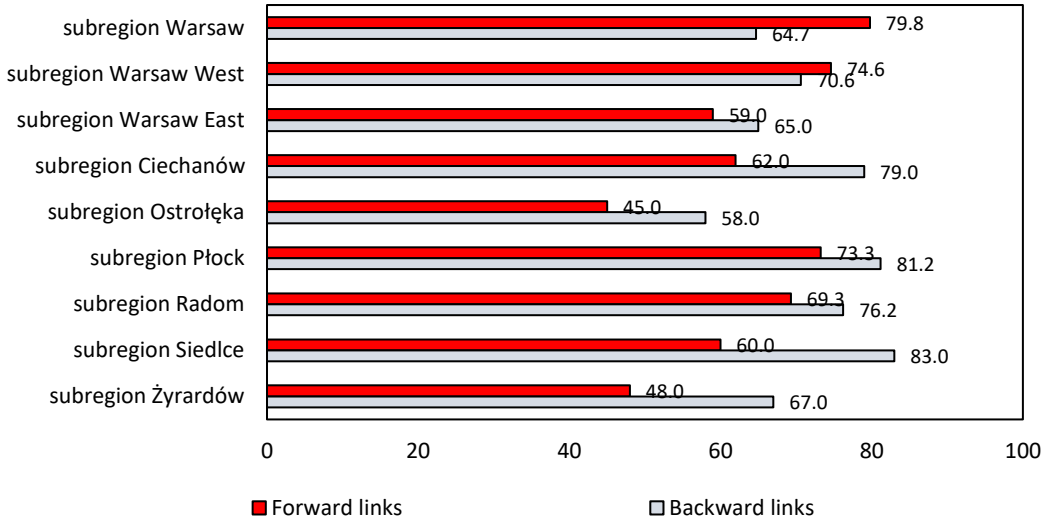

Figure 7. Interregional domestic links downstream and upstream the value chain of enterprises from the subregions of the Mazovia.

The above observations were reflected at the level of subregions of Mazovia. Data on interregional domestic links upstream and downstream the value chain in subregions are presented in Figure 7. Their analysis demonstrates that strong interregional domestic links downstream the value chain in Warsaw metropolis result mainly from powerful linkages reported by subregion Warsaw (79.8% responses) and Warsaw West subregion (74.6% responses). Links downstream the value chain in Warsaw East subregion are much weaker and close to values typical of Mazovia regional (59% responses). Interregional domestic upstream links in value chains in subregions of the Warsaw metropolis are not so much differentiated. Interestingly, the Warsaw subregion has got a similar indicator of such links (64.7% responses) as Warsaw East subregion (65% responses). Slightly stronger interregional domestic links upstream the value chain are observed for Warsaw West subregion (70.6% responses). The situation of individual subregions of Mazovia region was more differentiated. Despite this differentiation, all subregions of the abovementioned reported higher indicators of interregional domestic links upstream the value chain compared to downstream.

4.4. Intraregional Value Chain Links in Mazovia

The analysis of the data presented in Figure 8 allows for the assessment of intraregional links in Mazovia. It shows that Warsaw metropolis is the most closely related internally (to itself). As many as 79.9% of respondents participating in the survey indicated the existence of downstream links within the metropolis. A slightly lower percentage, but high, reaching 64%, indicated the existence of upstream links. Thus, the metropolis is itself an area that satisfies a huge portion of its supply and demand. The links of Warsaw metropolis with the rest of Mazovia are weaker. However, upstream connections prevail in these relations. They were indicated by 54.8% of the respondents, whereas downstream links were indicated by only 40.7%. This means that the relations of the Warsaw metropolis with the rest of Mazovia are similar to those with other regions in the country. Thus, the mediating role of the Warsaw metropolis between GVC and Mazovia regional—mentioned in hypothesis 3—has a similar character as in the case of hypothesis 2 and concerns mediation in servicing regional sales markets for MNCs. It should also be noted that the upstream and downstream value chains of Mazovia region are more balanced than in the case of the Warsaw metropolis. The existence of internal upstream links was indicated by 40.9% of respondents from this region, whereas upstream links were

indicated by 41.9%. Interestingly, the Mazovia region is more closely connected with the Warsaw metropolis than with itself. However, the flows within the value chains are quite balanced here: 51.8% of respondents indicated upstream links, whereas 51.3% indicated downstream links. The Warsaw metropolis constitutes a more important market for the Mazovia region (both supply and sales) than the Mazovia region for itself, whereas the Warsaw metropolis is the most important market for itself.

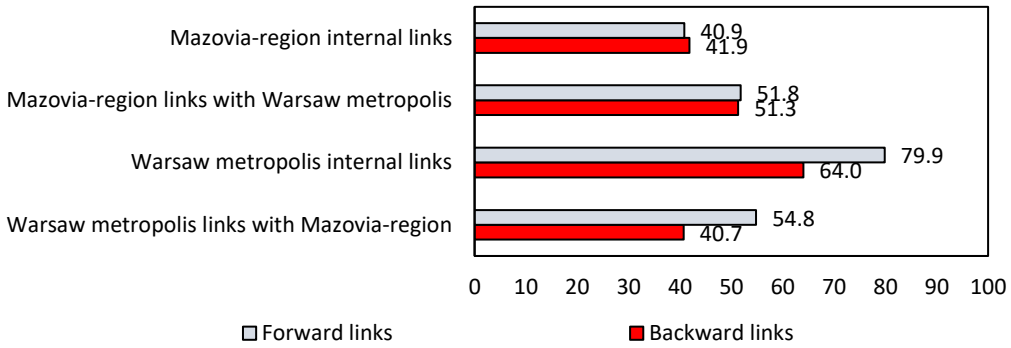

Figure 8. Intraregional value chain links in the Mazovia and its regions.

Summing up, it can be pointed out that the mediating role of the Warsaw metropolis between GVC and Mazovia regional consists mainly in mediating sales for MNCs, but at the same time, the metropolis is an important sales and supply market for the Mazovia region. However, the Mazovia region itself, as indicated earlier, is characterized by stronger links with other regions in the country than with the Warsaw metropolis, as shown in Figure 6. Thus, hypothesis 3 is only partially confirmed. We can confirm that the Warsaw metropolis plays a mediating role between the Mazovia region and global value chains. However, our research did not confirm that there are strong backward links between firms located in the Warsaw metropolis and in the Mazovia region. Nonetheless, for enterprises located in the Mazovia region, Warsaw metropolis constitutes an important market for both sales and supply.

4.5. Warsaw Metropolis and Mazovia-Region Multi Level Value Chains: Summary Results

The empirical results of the entire study presented in this article against the study logic are shown on Figure 9. It summarizes a three-layer analysis of Warsaw metropolis and Mazovia region links in value chains at international, domestic, and intraregional level. In this figure, the strength of the declared forward or backward links within value chains (with indicated percentage values) corresponds to the thickness of the arrows.

In the case of metropolis, the strongest forward and backward links are with the metropolis itself and the rest for the national economy. They are followed by forward links with the Mazovia region and backward links with GVC. In the case of the Mazovia region, the strongest backward and forward links are with the national economy followed by backward links with metropolis.

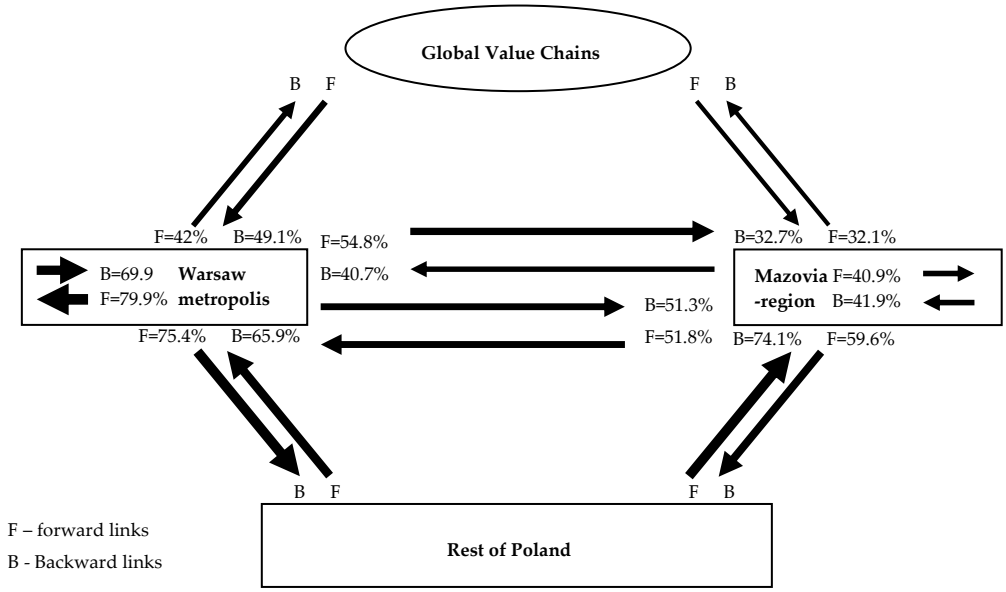

Figure 9. Research results.

5. Discussion

5.1. Theoretical Contributions

Relating the above results to the existing body of literature, we can confirm that the Warsaw metropolis provides the agglomeration advantages for companies, which choose this location as their natural step in development [19,27,28]. Providing externalities coming from a clustering of similar entities in the industry and proximity from other activities in the value chain result in this choice of location and treating Warsaw as a key node in the network. Moreover, the choice of Warsaw by MNCs comes from the global characteristics of the city and its economy. This adds to existing observations of MNCs' particular interest in global cities and location choices based on urban level distinct environment analysis [32,35].

The results provided by our research also add to the literature [42,43], suggesting that MNCs gain advantage from location in global cities, building on their unique economic, institutional, and cultural environments. By giving the regional level of analysis in terms of metropolis value chain connections, we could add to the studies proving that metropolises are chosen by MNCs not based on country-specific advantages but that of a local city character. Our research shows the importance of national value chains for the metropolis in which it plays a mediating role between GVC or MNCs and the domestic market. This result confirms earlier conclusions presented by Parnreiter [50]. We go deeper in the analysis, focusing not only on the global dimension of metropolis connection to GVCs but also its regional level, combining the two layers of economy (global and regional). We also explore the direction of research suggested by Chakravarty [13] by investigating the role of global cities and MNCs in shaping GVCs in emerging markets (in CEEC).

5.2. Managerial and Policy Implications

The results of our study have great implications for urban and regional management. Skillful management of attracting foreign investments can create opportunities for local enterprises to join global value chains, especially those located in metropolis. At the same time, the existence of a metropolis creates opportunities for neighboring sub-regions to take advantage of this inclusion. For this, however, it is necessary to carry out an appropriate policy related to value chains at the regional and sub-regional level, in order to strengthen local value chains and retain values in sub-regions. Such a policy and management of regional development may counteract polarization and the phenomenon of the metropolis detaching itself from the development of a given region in which it is located.

Orientation on value chains in city and regional management is necessary to consolidate endogenous development as a result of constant demand for goods and services produced in it, including those from less developed regions and subregions. Such demand is a source of income for enterprises that finance wage growth and the profits of business owners, and it finances further investments in the region. At the same time, the orientation towards value chains stimulates the transformation of enterprises and may move them up value chains. In this sense, it can accelerate their advancement in value chains, which leads to higher wages, profits, and, consequently, prosperity in the city and region.

6. Conclusions

Summing up the above analyses, we need to conclude that the Warsaw metropolis is a pole which attracts foreign enterprises as a location for their activities in Poland, with the biggest concentration in Warsaw and Warsaw West subregion. That bears consequences for the power of links of the Warsaw metropolis in global value chains and for much stronger orientation of these two subregions on these chains compared to the Warsaw East subregion. The Warsaw metropolis takes advantage of the power of agglomeration and its position of a pole attracting enterprises to the metropolis which includes the latter in the global circulation of goods and services. In addition, one needs to stress that in the international perspective, the Warsaw metropolis links the Mazovia with global value chains, both backward and forward through the chain. The Mazovia region is less incorporated into global value chains.

Combining research on GVCs with the role of metropolises comes with certain limitations, which were indicated throughout the paper. First of all, data describing the structure of value chains regarding regional level, especially those concerning the intensity of flows, are scarce. We approximated flows in value chains using a survey method with all its limitations. The second limitation comes from the fact that we used the Mazovia region and Warsaw as samples for our analysis, which might not be representative globally, and research results might not be fit to generalize universally. Our study also skips the industrial or product and service structure of value chains which may influence the outcomes. However, the latter obstacle may be further researched in future analysis.

In conclusion, we need to stress that at the interregional domestic level, the power of downstream and upstream links in the value chain is bigger than in the international perspective for both the metropolis and the rest of the region. It means that interregional domestic value chains are vital for the building of sustainable demand for enterprises in regions and subregions of Mazovia.

Thus, creating conditions that promote links between global entrepreneurs from the Warsaw metropolis may lead to the advancement of Warsaw in the value chains. For this, however, support is necessary for factors that improve the attractiveness of the city, such as hard and soft location factors, with special attention paid to the latter whose significance increases in areas of high value added (e.g., innovation activities).

Author Contributions: Conceptualization, M.-J.R. and E.S.-P.; Formal analysis, M.-J.R. and E.S.-P.; Methodology, M.-J.R. and E.S.-P.; Writing—original draft, M.-J.R. and E.S.-P.; Writing—review & editing, M.-J.R. and E.S.-P. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by National Centre for Research and Development (NCBR), grant number Gospostrateg1/388207/9/NCBR/2018. The publication was funded by The Ministry of Science and Higher Education, grant number DKN/SP/464115/2020.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Datasets concerning number and location of enterprises analyzed during the current study are available in the Local Data Bank Poland (https://bdl.stat.gov.pl/bdl/start). The data concerning value chains presented in this study are available on request from the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Radło, M.-J. *Offshoring, Outsourcing and Production Fragmentation: Linking Macroeconomic and Micro-Business Perspectives*; Palgrave Macmillan: Basingstoke, UK, 2016.
2. Gereffi, G. Global value chains and international development policy: Bringing firms, networks and policy-engaged scholarship back in. *J. Int. Bus. Policy* **2019**, *2*, 195–210. [CrossRef]
3. Taglioni, D.; Winkler, D. *Making Global Value Chains Work for Development*; World Bank: Washington, DC, USA, 2014.
4. UNCTAD. *Global Value Chains: Investment and Trade for Development*; UNCTAD: New York, NY, USA; Geneva, Switzerland, 2013.
5. Buckley, P.J. Internalisation thinking: From the multinational enterprise to the global factory. *Int. Bus. Rev.* **2009**, *18*, 224–235. [CrossRef]
6. Gereffi, G.; Sturgeon, T. Global value chain-oriented industrial policy: The role of emerging economies. In *Global Value Chains in a Changing World*; Elms, D., Low, P., Eds.; WTO Publications: Geneva, Switzerland, 2013; pp. 329–360.
7. Radosevic, S.; Ciampi Stancova, K. Internationalising Smart Specialisation: Assessment and Issues in the Case of EU New Member States. *J. Knowl. Econ.* **2018**, *9*, 263–293. [CrossRef]
8. Brennan, L.; Rakhmatullin, R. *Global Value Chains and Smart Specialisation Strategy*; Joint Research Centre: Luxembourg, 2015.
9. Giuliani, E.; Pietrobelli, C.; Rabellotti, R. Upgrading in Global Value Chains: Lessons from Latin American Clusters. *World Dev.* **2005**, *33*, 549–573. [CrossRef]
10. Miroudot, S.; Rouzet, D.; Spinelli, F. *Trade Policy Implications of Global Value Chains: Case Studies*; OECD Trade Policy Papers; OECD Publishing: Berlin, Germany, 2013; Volume 161.
11. Benedek, J. The Role of Urban Growth Poles in Regional Policy: The Romanian Case. *Procedia-Soc. Behav. Sci.* **2016**, *223*, 285–290. [CrossRef]
12. Simmie, J. Innovation and Urban Regions as National and International Nodes for the Transfer and Sharing of Knowledge. *Reg. Stud.* **2003**, *37*, 607–620. [CrossRef]
13. Chakravarty, D.; Goerzen, A.; Musteen, M.; Ahsan, M. Global cities: A multi-disciplinary review and research agenda. *J. World Bus.* **2021**, *56*, 101182. [CrossRef]
14. Welfe, W.; Świeczewska, I.; Florczak, W.; Karp, P. *Rozwój Regionalny—Ujęcie Ekonometryczne*; Społeczna Wyższa Szkoła Przedsiębiorczości i Zarządzania w Łodzi: Łódź, Poland, 2008.
15. Torój, A. Regional economic impact assessment with missing input-output data: A spatial econometrics approach for Poland. *Cent. Eur. J. Econ. Model. Econom.* **2016**, *8*, 61–91.
16. Godyń, I. Analiza wykorzystania zasobów wodnych województwa śląskiego z wykorzystaniem modelowania input-output. *Czas. Techniczne. Środowisko* **2012**, *109*, 69–85.
17. Zawalińska, K.; Rok, J. Wojewódzkie tablice przepływów międzygałęziowych dla Polski: Konstrukcja i interpretacja. *Stud. Reg. I Lokal.* **2017**, *3*, 29–53.
18. World Economic Forum. *Competitive Cities and Their Connections to Global Value Chains*; WEF: Geneva, Switzerland, 2016.
19. Belderbos, R.; Sleuwaegen, L.; Somers, D.; De Backer, K. *Where to Locate Innovative Activities in Global Value Chains: Does Co-location Matter? OECD Science, Technology and Industry Policy Papers*; OECD Publishing: Paris, France, 2016; Volume 30.
20. Jacobs, J. *Cities and the Wealth of Nations: Principles of Economic Life*; Vintage Books: New York, NY, USA, 1984.
21. Porter, M. *Clusters and the New Economics of Competition*; Harvard Business Review: Boston, MA, USA, 1998.
22. Marshall, A. *Principles of Economics*, 8th ed.; Macmillan: London, UK, 1920.
23. Taylor, P.J. *World City Network. A Global Urban Analysis*; Routlege: London, UK, 2004.
24. Sassen, S. *The Global City*; Princeton University Press: Princeton, NJ, USA, 2001.
25. Sassen, S. *Teritory, Authority, Rights: From Medieval to Global Assemblages*; Princeton University Press: Princeton, NJ, USA, 2006.
26. Wei, D.; Liao, F. The embeddedness of transnational corporations in Chinese cities: Strategic coupling in global production networks? *Habitat Int.* **2013**, *40*, 82–90. [CrossRef]
27. Goerzen, A.; Asmussen, C.G.; Nielsen, B.B. Global cities and multinational enterprise location strategy. *J. Int. Bus. Stud.* **2013**, *44*, 427–450. [CrossRef]
28. Jain, N.K.; Kothari, T.; Kumar, V. Location Choice Research: Proposing New Agenda. *Manag. Int. Rev.* **2016**, *56*, 303–324. [CrossRef]
29. Meyer, K.E.; Mudambi, R.; Narula, R. Multinational Enterprises and Local Contexts: The Opportunities and Challenges of Multiple Embeddedness. *J. Manag. Stud.* **2011**, *48*, 235–252. [CrossRef]
30. Hutzschenreuter, T.; Matt, T. MNE internationalization patterns, the roles of knowledge stocks, and the portfolio of MNE subsidiaries. *J. Int. Bus. Stud.* **2017**, *48*, 1131–1150. [CrossRef]
31. Jacobs, A.J. The City as the Nexus Model: Bridging the State, Market, Societal, and Geospatial Contexts. *Cities* **2016**, *51*, 84–95. [CrossRef]
32. Alfasi, N.; Fenster, T. A tale of two cities: Jerusalem and Tel Aviv in an age of globalization. *Cities* **2005**, *22*, 351–363. [CrossRef]
33. Coe, N.M.; Hess, M.; Yeung, H.W.; Dicken, P.; Henderson, J. "Globalizing" regional development: A global production networks perspective. *Trans. Inst. Br. Geogr.* **2004**, *29*, 468–484. [CrossRef]
34. Coe, E.; Hess, M. Local and regional development: A global production network approach. In *Handbook of Local and Regional Development*; Pike, A., Rodríguez-Pose, A., Tomaney, J., Eds.; Routhlege Handbooks; Routlege: London, UK; New York, NY, USA, 2010; pp. 128–138.

35. Bretagnolle, A.; Pumain, D. Simulating urban networks through multiscalar space-time dynamics (Europe and United States, 17th–20th centuries). *Urban Stud.* **2010**, *47*, 2819–2839. [CrossRef]
36. Liu, X.; Derudder, B. Analyzing urban networks through the lens of corporate networks: A critical review. *Cities* **2013**, *31*, 430–437. [CrossRef]
37. Mitchelson, R.L.; Wheeler, J.O. The Flow of Information in a Global Economy: The Role of the American Urban System in 1990. *Ann. Assoc. Am. Geogr.* **1994**, *84*, 87–107. [CrossRef]
38. Taylor, P.J. Hierarchical tendencies amongst world cities: A global research proposal. *Cities* **1997**, *14*, 323–332. [CrossRef]
39. KPMG Global Cities Investment Monitor: New Rankings, Trends and Criteria. Available online: https://assets.kpmg/content/dam/kpmg/fr/pdf/2018/07/fr-global-investment-monitor.pdf (accessed on 27 July 2022).
40. Izumi, P.K.; Burnier, P.C.; Ogasavara, M.H.; de Figueiredo, J.C.B. Attributes of Foreign Subsidiaries and the Location Strategy of Multinational Firms in Global Cities in Latin America. *Lat. Am. Bus. Rev.* **2017**, *18*, 273–294. [CrossRef]
41. Dunning, J.H. Location and the Multinational Enterprise: A Neglected Factor? *J. Int. Bus. Stud.* **1998**, *29*, 45–66. [CrossRef]
42. Nachum, L. Liability of foreignness in global competition? Financial service affiliates in the city of London. *Strat. Mgmt. J.* **2003**, *24*, 1187–1208. [CrossRef]
43. Nachum, L. When Is Foreignness an Asset or a Liability? Explaining the Performance Differential Between Foreign and Local Firms. *J. Manag.* **2010**, *36*, 714–739. [CrossRef]
44. Beaverstock, J.V.; Doel, M.A.; Hubbard, P.J.; Taylor, P.J. Attending to the world: Competition, cooperation and connectivity in the World City network. *Glob. Netw.* **2002**, *2*, 111–132. [CrossRef]
45. Friedland, R.; Palmer, D.; Stenbeck, M. The geography of corporate production: Urban, industrial, and organizational systems. *Sociol. Forum* **1990**, *5*, 335–359. [CrossRef]
46. Lüthi, S.; Thierstein, A.; Goebel, V. Intra-firm and extra-firm linkages in the knowledge economy: The case of the emerging mega-city region of Munich. *Glob. Netw.* **2010**, *10*, 114–137. [CrossRef]
47. Jacobs, W.; Ducruet, C.; De Langen, P. Integrating world cities into production networks: The case of port cities. *Glob. Netw.* **2010**, *10*, 92–113. [CrossRef]
48. Hesse, M. Cities, material flows and the geography of spatial interaction: Urban places in the system of chains. *Glob. Netw.* **2010**, *10*, 75–91. [CrossRef]
49. Vind, I.; Fold, N. City networks and commodity chains: Identifying global flows and local connections in Ho Chi Minh City. *Glob. Netw.* **2010**, *10*, 54–74. [CrossRef]
50. Parnreiter, C. Global cities in Global Commodity Chains: Exploring the role of Mexico City in the geography of global economic governance. *Glob. Netw.* **2010**, *10*, 35–53. [CrossRef]
51. Brown, E.; Derudder, B.; Parnreiter, C.; Pelupessy, W.; Taylor, P.J.; Witlox, F. World City Networks and Global Commodity Chains: Towards a world-systems' integration. *Glob. Netw.* **2010**, *10*, 12–34. [CrossRef]
52. Parnreiter, C.; Fischer, K.; Imhof, K. The missing link between global commodity chains and global cities: Financial services in Mexico City and Santiago de Chile. *Eure* **2007**, *33*, 135–148.
53. Rossi, E.; Beaverstock, J.; Taylor, P.J. Transaction links through cities: 'Decision cities' and 'service cities' in outsourcing by leading Brazilian firms. *Geoforum* **2007**, *38*, 628–642. [CrossRef]