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How the three Ds affect firm pricing, markups and productivity

Home country effects of multinational network restructuring in times of deglobalization: evidence from European MNEs

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Home Country Effects of Multinational Network Restructuring in Times of Deglobalization: Evidence for European MNEs

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Abstract

This paper documents a trend towards deglobalization in European-based multinational networks for the period 2010-2019. In the second half of the decade, the number of foreign contraction episodes shows an increasing trend, while the number of foreign expansions decreased substantially. Foreign expansions also increasingly resulted in a reduced geographic scope of networks (nearshoring) and a higher concentration of activity in geopolitically aligned host countries (friendshoring). We estimate home-country effects of foreign network restructuring by analyzing the number of domestic affiliates and different outcomes for parents and domestic affiliates. We find no evidence of increased home country activity in the wake of foreign contraction episodes, but foreign expansion yields benefits for the domestic economy both along the domestic extensive and intensive margins. A reduced geographic scope and geopolitical reorientation do not induce systematic differences in the home-country effects neither for expansion nor for contraction episodes.

Keywords: International Organization of Production, Multinational Networks, Restructuring, Home Country Effects, Deglobalization.

JEL Codes: F14, F23, F44.

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1 Introduction

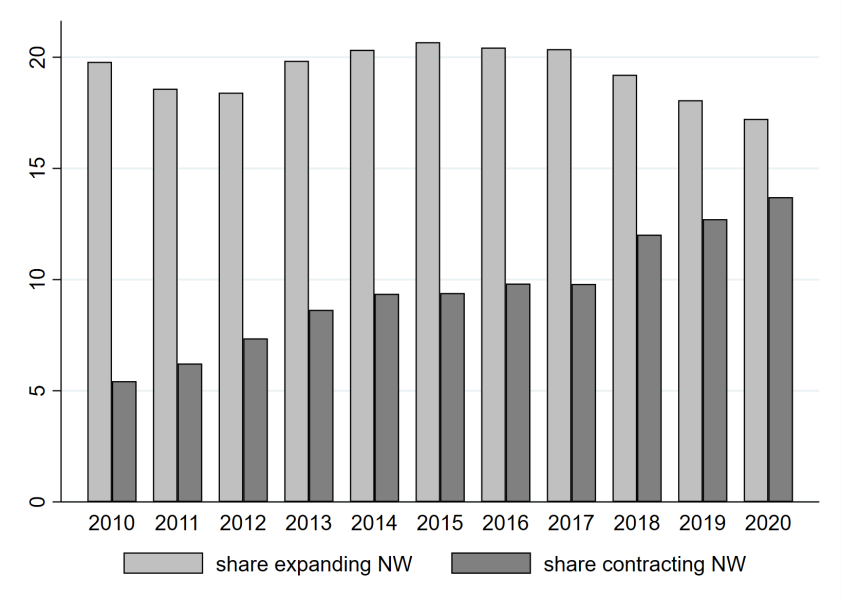
Since the late 2000s, shocks and crises of various types have put an end to the rapid economic globalization of previous decades. Trade growth slowed down substantially, merely keeping pace with growth in global production from 2010 onwards, and growth in foreign direct investment even fell below that level (UNCTAD, 2020). This has led to a change in the perspective taken on globalization. The focus has shifted away from efficiency gains offered by global production towards the risks and the reconfiguration of it (Baldwin and Freeman, 2022) and popular concerns about the negative impact on the domestic economy of increased foreign activity of multinationals and offshoring have given way to hopes for employment creation through activities brought back home. The analyses of deglobalization have been almost exclusively based on trade flows (see e.g. Antràs, 2020; Antràs et al., 2023; Alfaro and Chor, 2023; Fajgelbaum and Khandelwal, 2022; Gong et al., 2022) and an investigation of deglobalization from the perspective of the multinational enterprise (MNE) has been largely absent. Since according to UNCTAD (2013) MNEs are involved in 80 percent of global trade and, more recently, according to Miroudot and Rigo (2022) they account for almost two-thirds of world exports, an analysis of these trends and their consequences from the perspective of the multinational enterprise appears timely.

In this paper, we analyze multinational network dynamics to derive a set of stylized facts on the extent and type of foreign network restructuring by multinational enterprises between 2010 and 2020. We further investigate the home country effects of foreign restructuring in times of deglobalization. For this purpose, we use a rich micro-level dataset on parents and worldwide affiliates of European-based MNE networks (see Merlevede and Theodorakopoulos, 2024).

Figure 1 provides a first indication of the relevance of analyzing deglobalization trends in MNE networks. It shows, for our panel of European MNEs, that the share of networks reducing their number of affiliates has been on the rise between 2010 and 2020 and that the share of expanding networks has started to decline in the second half of the decade. These trends for MNE networks in our dataset are very much in line with the deglobalization trends observed with trade data. To further add to the relevance of our analysis of home country effects of foreign restructuring, we also document large premia for MNE parents compared to parents of purely domestic networks for a range of performance indicators. This confirms the potential of MNEs to generate meaningful aggregate effects in the domestic economy.

We first use our data to present a detailed analysis of network restructuring. In terms of net annual changes in the number of affiliates, many MNE networks are continuously restructuring over several years. To accommodate this fact, we put forward a novel conceptualization of foreign network restructuring that goes beyond annual changes in the extensive margin of the network. We define restructuring as an episode that may cover a single year or span multiple years during which the number of foreign affiliates changes until the network becomes stable

Figure 1: Trends in the shares of expanding and contracting networks over 2010-2020



Note: Expanding and contracting network status based on the change in the number of affiliates between $t-5$ and t.

at the extensive margin for at least one year. We find that 60% of the 41,485 networks in our sample go through at least one foreign restructuring episode (38% exactly one episode and 22% two or more episodes). A quarter of the episodes we identify last more than one year.

Based on the net change over the entire time span of such foreign restructuring episodes, we classify networks that restructure as expanding, reshuffling, or contracting. The latter category includes both networks that maintain at least one affiliate and networks that dissolve, i.e. networks that have dropped all affiliates by the end of the episode and for which the parent continues as an individual firm. By explicitly considering the possibility of network contraction, we provide micro-based insights into deglobalization trends from the perspective of MNE networks, thereby adding to existing trade-based evidence. Our more elaborate episode-based analysis confirms the trend from Figure 1, providing evidence of a change in the nature of foreign restructuring. Expansions account for 68% of all foreign restructuring episodes between 2010 and 2016, against 26% for contractions. By 2019 however, the share of contraction episodes has risen to 66.0%, while the share of expansion episodes is down to 26.5%.

Having defined restructuring episodes, we analyze the effects of the different types of episodes on economic activity in the parent's home country. In an approach akin to an event study difference-in-difference set-up, we estimate outcomes for all MNE networks going through a foreign restructuring episode compared to MNE networks that do not restructure, for a period extending from five years before the start of the episode to five years after the end of the episode. In terms of outcomes, we use real value-added, employment, wages, operating revenue, total

assets, and total factor productivity for both parents and domestic affiliates in the network. In addition, we estimate the effect on the size of the domestic network. The aim is to reflect popular home country fears and hopes associated with investment abroad such as the destruction and creation of activity and jobs, or changes in efficiency and wages.

We find significant increases in parent activity (value-added, employment, operating revenue, and total assets) in expanding networks before, during, and in the first years after the end of a foreign restructuring episode. These results are suggestive of a scale effect related to the expansion. In addition, foreign expansion episodes are also significantly associated with an increase in the number of domestic affiliates before, during, and in the first years after the episode. By contrast, the activity of domestic affiliates in expanding networks is mostly unaffected by the foreign restructuring episode.

Foreign contraction episodes are mostly associated with a decrease in home-country activity. Parent value-added and employment fall after the end of the episode for all contracting networks. The same also holds for total assets, operating revenue, and wages of contracting networks that dissolve. There is mostly no significant trend in outcomes for parents before the start of a contraction episode. In addition, we do not find a significant effect on the number of domestic affiliates for foreign contraction episodes, neither during the episode nor before or after the episode. For domestic affiliates of contracting networks, we find a significant and continuous decrease in value-added, employment, and operating revenue before, during, and after the episode.

These results show that contrary to popular hope, foreign contraction episodes are not followed by growth in activity or employment of domestic affiliates. Foreign network contraction is rather associated with a reduction in domestic affiliate activity. If anything, it is foreign network expansion that entails a potential for gains in home country activity, both along the extensive and intensive margin. This parallels earlier findings for the US that firms investing abroad simultaneously expand rather than reduce their domestic activities (see Desai et al., 2009). It is also consistent with the fact that despite fears of employment losses due to offshoring, there is little evidence of a negative impact of offshoring on total employment (Crinò, 2009).

In the final part of our paper, we analyze whether and how restructuring episodes in our sample relate to the increasingly popular notions of 'nearshoring' and 'friendshoring'. For this purpose, we calculate indicators of the average physical and geopolitical distance of the affiliate network vis-'a-vis the parent and consider restructuring episodes that result in a lower average physical or geopolitical distance as characterized by 'nearshoring' or 'friendshoring' respectively. There have been restructuring episodes characterised by nearshoring or friendshoring in all years from 2010 to 2019 but their share has started to rise fast from 2016 onwards, nearly doubling to almost 50% by 2019. This is driven by two separate trends: on the one hand, the share of foreign expansion episodes characterized by nearshoring or friendshoring is on the rise, and, on the other hand, the number of foreign contraction episodes, which are more likely to be

characterised by nearshoring or friendshoring, is increasing. Finally, our test of heterogeneity in the home-country effects of foreign restructuring between networks for which restructuring episodes are characterized by nearshoring or friendshoring and networks for which this is not the case reveals no significant differences for our period of analysis.

Related literature Our paper relates to different strands of literature. First, it is most closely related to the literature on home country effects of MNEs' foreign operations. In times of rapid globalization, this literature responded to the popular concern that the expansion of foreign activities would come at the expense of home-country activities, based on a zero-sum game view of domestic and foreign investment. Several authors have invalidated this concern, using different approaches and datasets. Desai et al. (2009) analyze for the period 1982-2004 how foreign activity of US manufacturing firms affected domestic activity. They find that MNEs expanding abroad actually increased home country activity rather than reducing it.

In the same vein, Yamashita and Fukao (2010) produce evidence that overseas operations of Japanese MNEs do not lower home employment. They rather show that foreign expansion helped to maintain the level of home employment. More recently, Goldbach et al. (2019) find a positive relationship between foreign and home investment in real capital using German data, and Kovak et al. (2021) find that increases in affiliate employment drive increases in employment at US parent firms. Other authors have highlighted potential heterogeneity in the effects on home-country employment. For South Korean firms that become multinationals, Debaere et al. (2010) find that investment in less-advanced countries decreases home employment growth whereas investment in more-advanced countries does not affect home employment growth. Harrison and McMillan (2011) show for US-based MNEs that offshoring to low-wage countries substitutes for domestic employment, but that foreign and domestic employment are complements for firms that perform different tasks at home and abroad. Crinò (2009) concludes from a literature review that there is some substitutability between domestic and foreign labour within MNEs, but that it is too weak to pose a serious threat to national employment in the home country. We contribute to this literature by explicitly analyzing the home-country effects of foreign contraction by multinational networks.

Second, our work is related to the more recent literature on supply chain resilience and reshoring. The slowdown of economic globalization since 2010 has spurred hopes for reshoring of previously offshored activity. However, early studies did not find much evidence of such an effect (see De Backer et al., 2016). Since the second half of the 2010s, a combination of the faltering of international political cooperation, events such as the US-China trade war, the Russian invasion of Ukraine, and systemic issues such as the Covid-19 pandemic and the climate crisis have led to a rethinking of global supply chains to enhance their resilience (Javorcik et al., 2024; Baldwin and Freeman, 2022). In this context, relationships with partners in countries that share the same values have become more important than efficiency concerns and are increasingly

affecting trade and investment patterns (Alfaro and Chor, 2023; Kleinman et al., 2024). Javorcik et al. (2024) quantify the economic costs of friendshoring using the model developed by Baqaee and Farhi (2024) and find that friendshoring may lead to real GDP losses of up to 4.7% of GDP. Aiyar et al. (2024) also find an economically significant role for geopolitical alignment in driving new foreign direct investment through greenfield and M&A operations. More widely, our work is related to the literature on home country effects of offshoring and import competition in general. Crinò (2009) and Autor et al. (2016) provide surveys of these respective literature strands. We add to this literature by examining reshoring trends and their home-country consequences for our microdata on Europe-based multinational networks.

Finally, our work yields novel facts that are relevant to the theoretical literature on MNE networks. This literature has mainly analyzed the geographical structure of these networks but much less their dynamics. The general equilibrium models in Ramondo and Rodríguez-Clare (2013), Tintelnot (2017), Head and Mayer (2019), and Oberfield et al. (2024) account for a rich geography and export platform structures, but do not allow for MNE dynamics. In terms of network dynamics, Fillat and Garetto (2015) do focus on MNE expansion and its relationship with asset prices, and Gumpert et al. (2020) analyze the life-cycle dynamics of exporters and MNEs as alternative ways of serving a foreign market. More recently, Garetto et al. (2019) extend Fillat and Garetto (2015) to account for export platform structures. However, all of these papers explicitly model network expansion, while our paper shows the increasing importance of network contraction in times of deglobalisation.

The remainder of this paper is organized as follows. Section 2 discusses our rich dataset on multinational networks with European parents and estimates MNE premia. Section 3 motivates our episodes-approach of foreign restructuring and presents trends in restructuring for the period 2010-2019. Section 4 analyzes home country effects of foreign restructuring along the intensive margin for parents and domestic affiliates and along the extensive margin of domestic affiliates. Section 5 introduces our definitions of nearshoring and friendshoring and relates them to foreign restructuring and its home country effects. Section 6 concludes.

2 A Dataset on Multinational Networks

Construction For the purpose of our analysis, we construct a panel of multinational networks with parents located in European countries. We use raw information from the Amadeus database (Orbis Europe) by Bureau van Dijk (BvDEP), which contains, for each European parent firm, a list of worldwide affiliates with information on the affiliate's location and the ownership share of the parent. Merlevede and Theodorakopoulos (2024) and Merlevede et al. (2015) provides full detail on the construction of the dataset which we briefly summarize below. A subset of this dataset has already been used e.g. by Basco et al. (2024) to analyze the impact of the Great Recession on multinational networks and by Konings et al. (2022) to analyze the

effect of the introduction of the notional interest deduction in Belgium on employment and investment of foreign affiliates in Belgium.

In order to create a network panel, we retrieve the parent-affiliate links listed under the 'subsidiaries'-heading from annual versions of the Amadeus/Orbis database and retain affiliates for which the parent holds more than 10 percent of the shares.[1] This covers parents from 26 European countries.[2] Then, we integrate firms that own affiliates but are themselves an affiliate of another parent, into their parent's network. In terms of industry scope, we only retain parents active in the business economy[3] and exclude those in agriculture and financial and non-market services. We do include all their affiliates in the dataset, irrespective of their industry classification. The result is a parent-affiliate-year dataset, into which we add financial and other relevant information for both parents and affiliates from their own entries in the Amadeus database.[4] In practice, our dataset consists of a panel in the affiliates-year dimension with full information on the parent side attached to each affiliate-year entry. We retain both parents reporting consolidated and unconsolidated accounts, but restrict the data to unconsolidated accounts when analyzing parent-specific financial outcomes.

Overall, the final network dataset contains 4,368,016 affiliate-parent-year observations for 145,055 MNE parents, i.e. networks, and 844,260 affiliates over the years 1995-2020. Observations for any network (parent) start in the year in which its first affiliate is reported and ends when the network dissolves, i.e. when the parent ceases to own affiliates. For our analysis, we further retrieve financial information for 'former' parents that became stand-alone firms after their network had been dissolved.[5] Since it identifies full MNE *networks* at the detailed micro level, our dataset differs from the standard foreign affiliates statistics (FATS) collected by most European countries that are focused on country-pair aggregates. Our dataset is ideally suited for (i) monitoring foreign restructuring of MNE networks at the extensive network margin and (ii) analyzing the home-country effects of foreign restructuring through the domestic extensive and intensive margins.

Data facts To monitor deglobalisation trends in MNE networks, we focus on the period 2010-2020. For this decade, our database contains observations on 98,749 unique networks.

[1] We use annual September/October versions from 1999 to 2021. It happens that a parent-affiliate link is reported in the year $t-1$ and $t+1$ issues of the database but not in the year t issue. In these cases (less than 5% of the observations), we fill the gap by making the assumption that the link existed in t as well.

[2] We have networks with parents in the following countries: Austria, Belgium, Bulgaria, Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, Greece, Croatia, Hungary, Ireland, Italy, Lithuania, Latvia, the Netherlands, Poland, Portugal, Romania, Sweden, Slovenia, Slovakia, Norway and the UK. Among European Union countries, we have no data for Cyprus, Malta, Luxembourg. See also Table A.2 in Appendix.

[3] NACE Rev.2 2-digit codes 5-82 except 64-66 (financial services).

[4] Information on location and the ownership share is available for all affiliates worldwide through the parent's entry in the Amadeus database. However, financial information (balance sheet, profit and loss account) is only available for European affiliates that are covered as separate entries in Amadeus (identified by a unique ID number).

[5] We do not retrieve information from Amadeus on parents as stand-alone firms before establishing their first affiliate as our interest lies in home country effects of foreign network restructuring for *existing* networks.

Table 1: Network size distribution with parents reporting consolidated accounts included

	2020		All years	
	No.	%	No.	%
Panel A - Number of affiliates in network				
1	30,908	45.6	289,558	45.9
2	13,411	19.8	124,251	19.7
3	7,177	10.6	65,658	10.4
4	4,201	6.2	39,227	6.2
5	2,808	4.1	24,846	3.9
6 to 10	5,528	8.2	51,055	8.1
11 and more	3,722	5.5	36,138	5.7
Total	67,755	100.0	630,733	100.0
Panel B - Number of host country-2-digit industry combinations in network				
1	33,411	49.3	316,115	50.1
2	14,734	21.7	136,496	21.6
3	7,645	11.3	68,752	10.9
4	4,202	6.2	37,984	6.0
5	2,442	3.6	21,485	3.4
6 to 10	3,800	5.6	34,531	5.5
11 and more	1,521	2.2	15,370	2.4
Total	67,755	100.0	630,733	100.0

Source: MNE.dta; dataset is limited to parent firms in the business economy that report either unconsolidated or consolidated accounts in the period 1995-2020; 89,662 affiliate observations with missing industry codes were dropped from the dataset to obtain the statistics in panel B. The numbers in the table refer to network(-year) observations.

Table 2: Parent summary statistics 2010-20 (parent-year observations)

	No.	Mean	St.Dev.	p10	Median	p90
lnVA	143,639	14.4	2.1	11.5	14.6	17.0
lnL	275,790	2.4	1.8	0.0	2.3	4.9
lnW	189,027	10.5	0.9	9.4	10.7	11.5
lnY	264,816	14.0	2.9	10.3	14.3	17.4
lnTA	510,808	14.7	2.6	11.6	14.9	17.6
lnTFP	111,986	7.1	1.0	5.8	7.1	8.2
age	514,374	19.5	17.3	5.0	15.0	37.0
# affs.	646,073	4.4	21.4	1.0	2.0	7.0
# affs. crossborder	646,073	2.0	13.8	0.0	1.0	2.0
# activities	646,073	2.6	4.2	1.0	1.0	5.0
# country-industry	646,073	2.7	6.6	1.0	1.0	5.0

Sample excludes observations for parents after networks dissolve. Parents reporting consolidated accounts included for network extensive margin numbers. For parent characteristics only parents reporting unconsolidated accounts are considered. Financial variables winsorized at 1st and 99th percentile.

Table 3: MNE parents versus parents with a domestic network

	(1) # aff.	(2) lnVA	(3) lnL	(4) lnW	(5) lnY	(6) lnTA	(7) lnTFP
MNE	0.270***	0.727***	0.383***	0.185***	0.730***	0.628***	0.287***
	[0.001]	[0.006]	[0.002]	[0.002]	[0.005]	[0.003]	[0.003]
# aff.		0.593***	0.271***	0.162***	0.557***	0.923***	0.210***
		[0.003]	[0.001]	[0.001]	[0.003]	[0.002]	[0.002]
Observations	7,149,810	1,170,104	2,452,616	1,294,614	2,256,101	5,790,361	802,844
R-squared	0.083	0.369	0.532	0.465	0.388	0.271	0.411
C×I×Y FE	Y	Y	Y	Y	Y	Y	Y

Sample of parents of both multinational and domestic networks that are active in the business economy and report unconsolidated accounts. Multinational networks have at least one cross-border affiliate at some point in time; domestic networks never have a cross-border affiliate. About 9% of observations in the estimation samples refer to MNE networks with slight variations across columns. Sample period is 2010-2020. All dependent variables are in logs. Dependent variables are indicated in column headings. # aff.: number of affiliates in the network, VA: real value-added (real operating revenue minus real material costs, double deflated by separate industry-level output and material deflators), L: number of employees, W: real average wage (real total costs of employees divided by the number of employees), Y: real operating revenue, TA: parent real total assets, TFP: total factor productivity (Wooldridge-Levinsohn-Petrin technique). Variables are winsorized at the first and 99th percentile. All specifications include country×NACE 4-digit industry×year fixed effects. Standard errors in brackets; *** p<0.01, ** p<0.05, * p<0.1.

The number of networks in our dataset rises gradually from almost 45,000 to more than 65,000 (see Table A.1 in Appendix), which is in line with increases found in FATS-data. The bulk of these MNE networks is small and very large networks are an exception. As reported in panel A of Table 1, 46% of parents have a single affiliate, 20% have two affiliates, while only 6% have more than 10 affiliates. These shares remain almost unchanged when collapsing affiliates to the host country 2-digit industry level (Panel B of Table 1). Among the countries in our dataset, those with the biggest number of parents are the UK, the Netherlands, Italy, and Germany (see Table A.2 in Appendix). Table 2 shows summary statistics on the performance of network parents filing unconsolidated accounts. The number of observations varies as not all parents report on all financial variables. Total assets is the most widely available financial variable, total factor productivity estimated using the Wooldridge-Levinsohn-Petrin methodology the least (see Levinsohn and Petrin, 2003; Wooldridge, 2009). The summary statistics on numbers of affiliates in the bottom rows refer to parents filing consolidated and unconsolidated accounts.

Multinational vs. domestic network parents Given our interest in the impact of foreign restructuring by MNE networks on their national economies, we compare multinational parents to parents of purely domestic networks. We do so by estimating the MNE premium for a number of outcomes according to specification (1).

$$outcome_{pict} = \beta_1 MNE_{pict} + \gamma_1 \#aff_{pict} + \delta_{ict} + \epsilon_{pict} \quad (1)$$

In this specification, $outcome_{pict}$ is an outcome for parent p in industry i located in country

c and observed at time t. As outcomes, we consider the number of affiliates and a range of indicators of real and financial performance (value-added, employment, wages, operating revenue, total assets and total factor productivity). MNE_{pict} is a dummy variable taking the value of 1 when the parent has at least one cross-border affiliate at time t. The specification controls for network size through the log of the number of affiliates in the network, except for the specification with the number of affiliates as outcome. To estimate (1) we use our sample of multinational parents complemented with similar data on parents of purely domestic networks.[6] Thus, β_1 in (1) estimates the MNE-premium by comparing outcomes for MNE parents with the outcomes for parents of purely domestic networks within tight country-4-digit-NACE-industry-year cells while controlling for network size.

The results in table 3 highlight the importance of MNE parents in terms of value-added, employment, and productivity for the domestic economy. Column 1 shows that MNE networks are on average 27% larger in terms of the number of affiliates. The other columns reveal large and statistically highly significant MNE parent premia. Multinational network parents generate 72.7% more value-added than domestic network parents (column 2), employ 38.3% more workers (column 3) and pay 18.5% higher wages (column 4). They have 73% higher operating revenue (column 5) and 62.8% higher value of total assets (column 6) than their domestic counterparts. Finally, column 7 shows that they are on average 28.7% more productive. These results confirm the relevance of investigating the effects of foreign restructuring by MNE networks on their home country.

3 Foreign network restructuring: year-on-year changes vs episodes

Our dataset of networks of European MNE parents allows us to explore the extent and direction of network restructuring over time. Ultimately, we are interested in the impact of foreign restructuring on home-country outcomes for these networks. Given the nature of the data, we define restructuring as a change in the number of foreign affiliates of a network, i.e. a change at the extensive network margin.[7] We apply this definition only to existing networks, i.e. we do not consider the set-up of a cross-border network as restructuring. Restructuring may imply an increase in the number of affiliates (expansion) or a decrease (contraction). As discussed above, Figure 1 shows that a considerable share of networks have been restructuring over 2010-2020, either expanding or contracting and that the share of contracting networks has been rising. This result is obtained by taking simple five-year differences in the total number of affiliates, both domestic and foreign. In this section, we motivate and introduce a more specific definition of

[6] Data on purely domestic networks are constructed in the same way as the multinational networks (see discussion above). The full dataset with MNE and purely domestic networks contains a total of 1,688,508 parents (of which 145,055 MNE parents) that own 3,960,837 affiliates (of which 844,260 MNE affiliates) (see Merlevede and Theodorakopoulos, 2024).

[7] The data do not contain information on the intensive margin (e.g. in terms of value-added or employment) for affiliates outside Europe.

Table 4: Distribution of networks by the number of year-on-year changes in the number of foreign affiliates.

	(1)		(2)	(3)		(4)		(5)	
	foreign affiliates							*all aff.*	
	# changes		**NW size**	**# increases**		**# decreases**		**# changes**	
	No.	%	# aff.	No.	%	No.	%	No.	%
0	13,307	19.1	1.3	26,855	38.6	30,769	44.2	11,045	15.9
1	27,063	38.9	1.8	28,790	41.4	30,332	43.6	15,216	21.9
2	15,384	22.1	2.8	7,370	10.6	5,481	7.9	11,069	15.9
3-5	10,151	14.6	4.5	4,971	7.1	2,658	3.8	19,696	28.3
6-10	2,789	4.0	14.3	1,300	1.9	354	0.5	9,671	13.9
11 or more	906	1.3	57.4	314	0.5	6	0.0	2,903	4.2

Total : Cleaned sample of 69,600 networks, period 2000-2020, parents reporting consolidated accounts included. Network (NW) size is calculated as the average number of foreign and domestic affiliates over the period during which the network is observed.

foreign restructuring to document trends and estimate the home-country effects of restructuring in the next section.

Year-on-year changes Table 4 shows the distribution of networks by the number of year-on-year changes in the number of foreign affiliates over 2000-2020. The share of MNE parents without any change in the number of foreign affiliates during this period amounts to 19.1%, while 38.9% of MNE parents modify the extent of their foreign network in a single year and 42.0% in more than one year (column 1). The frequency of changes in the number of affiliates is positively associated with network size (column 2). Larger networks restructure their foreign activities more often, with big multinational networks changing the foreign part of the network almost continuously. In columns 3 and 4, the annual changes in the number of foreign affiliates are separated into increases and decreases. Although increases are somewhat more common than decreases, more than half of all networks experience at least one year of decrease in the number of foreign affiliates. For completeness, column 5 reports the distribution of changes in the total number of affiliates, both domestic and foreign. More than 60% of MNE parents change the extent of their entire network in more than one year between 2000 and 2020.

Such findings are not in line with the idea of network restructuring as a one-time event. They rather suggest that network restructuring can be a process that takes several years and that large MNE networks even continuously optimize a portfolio of affiliates. An empirical strategy relating year-on-year changes in the number of foreign affiliates to home-country outcomes will thus not adequately capture the time span of the restructuring process, precisely because this process is not necessarily limited to a single year and because many MNE parents set up new affiliates and close down existing ones over several years. Taking longer differences will not solve this issue. For estimating home country outcomes before and after restructuring, it is crucial

to identify when network restructuring starts and when it ends, i.e. determine the time span of the event.

Episode approach Therefore we adopt an alternative approach to capture network restructuring, which we refer to as an 'episode' approach. In this approach, we define a foreign restructuring episode as a period of *consecutive* year-on-year changes in the number of foreign affiliates. For any multinational network, the year t marks the beginning of a restructuring episode if the number of foreign affiliates changes in year t but did not change in the previous year $t-1$. The episode continues in the following years $(t+1, t+2, \dots)$ as long as the number of foreign affiliates in the network changes in these years. It ends in year $t+x$ if there is no change in the number of foreign affiliates in the following year $t+x+1$. For episodes lasting a single year, x is zero. Our definition excludes the set-up of a network, i.e. we focus on restructuring in existing networks.

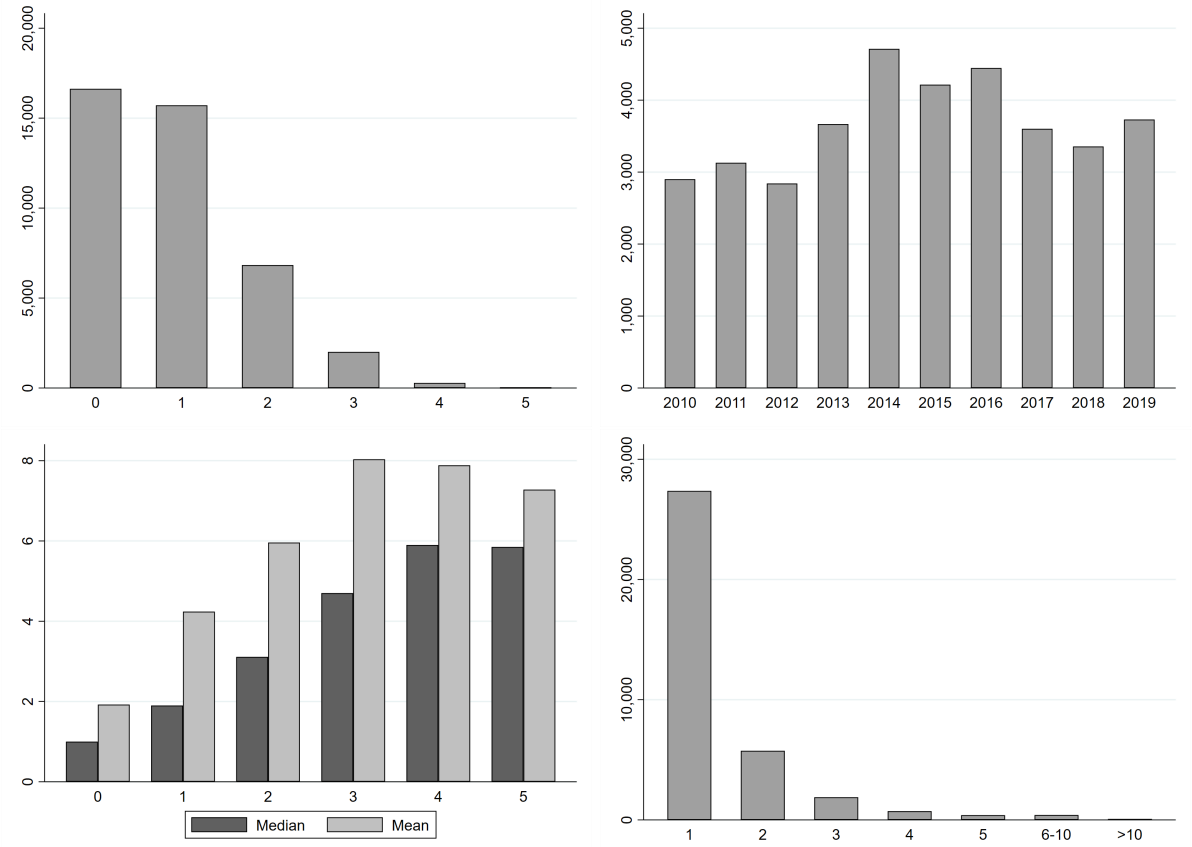
To meaningfully identify foreign network restructuring episodes, we discard some types of networks: (i) short-lived networks which correspond to parents that have affiliates (foreign and/or domestic) for less than five years overall (this implies that we also discard all networks set up after 2015), (ii) networks with more than ten years of zero affiliates, i.e. networks that dissolve before 2010 but whose former parent remains active, and (iii) a limited number of –on average very small– networks that are dissolved and restarted later. To show the evolution of the number of episodes over time, we assign the end-year to an episode as its timestamp and focus on episodes ending in the deglobalisation period, 2010-2019.[8] This implies that the results include multiple-year episodes that start earlier than 2010. For example, an episode starting in 2008 and ending in 2011 will show up in our 2010-2019 analysis. In addition, we cannot determine whether or not an episode ends in 2020 since this is the last year in our dataset. Therefore, we restrict our set of episodes to those ending between 2010 and 2019. This leaves us with 340,089 network-year observations for 41,485 unique multinational networks. Most of these networks are observed for the entire period 2010-2019 (47.5%). A limited amount of networks is observed for less than five years (5.1%). These are networks that existed before 2010 but were dissolved by 2013. Networks with five to nine years of observations (47.3%) either dissolved during the period or only entered after 2010 (but before 2015).

Out of these 41,485 networks, 16,633 (40.1%) do not have any foreign restructuring episode, whereas 24,852 (59.9%) have at least one such episode. The histogram of parents by the number of episodes (upper left panel of Figure 2) shows that among the latter there are 15,715 (37.8%) networks with a single episode, 6,832 (16.4%) with two episodes, and 2,305 (5.5%) with three to five episodes.[9] The total number of foreign restructuring episodes that we identify for these

[8] Restricting the coverage to later years also deals with lower coverage in the early 2000s for some countries in Amadeus.

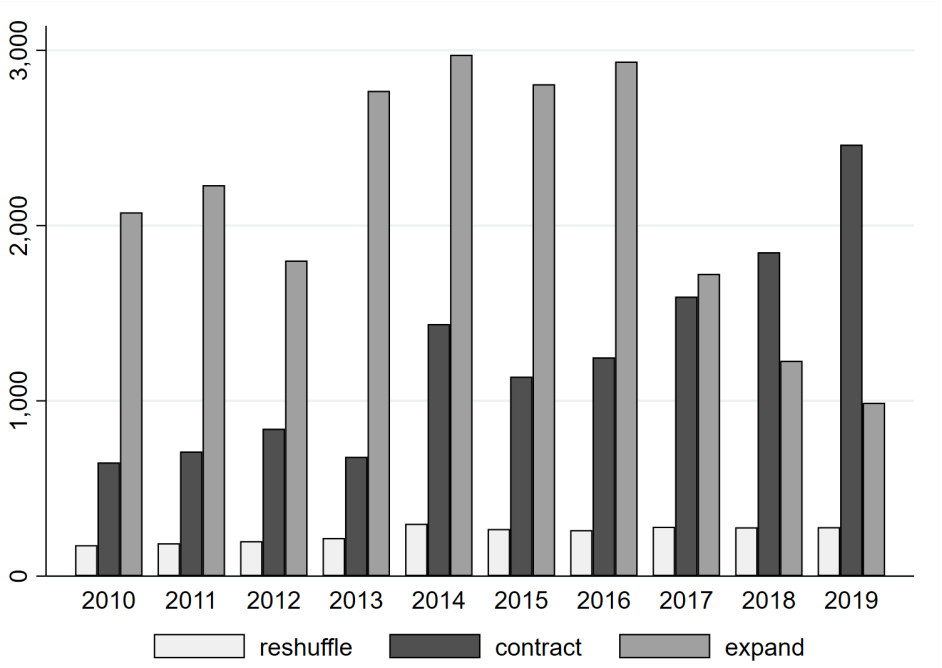
[9] By construction and as intended, there are less networks with multiple episodes than networks with multiple year-on-year changes in the number of foreign affiliates (see Table 4).

Figure 2: Summary statistics on foreign network restructuring episodes: histogram of networks by number of episodes (upper left panel); number of episodes per year (upper right panel); mean and median network size by number of episodes (lower left panel); number of episodes by episode length in years (lower right panel)



Note: In the upper left panel, the horizontal axis indicates the number of foreign restructuring episodes of a network. Given the definition of episodes, the maximum of episodes is 5 for any network over the period 2010-2019. The vertical axis indicates numbers of networks. In the upper right, the vertical axis measures numbers of foreign restructuring episodes. The bottom left panel reports mean and median size of networks by the number of foreign restructuring episodes on the horizontal axis. Network size is measured as the average number of affiliates over the time span of a network. The bottom right panel reports numbers of foreign restructuring episodes on the vertical axis by episode length in years on the horizontal axis.

Figure 3: Type of episode evolutions in number of episodes ending in the indicated year



networks amounts to 36,606. There are 3000-4000 of such restructuring episodes ending each year between 2010 and 2019 (upper right panel of Figure 2). There is a positive association between network size and the number of episodes (bottom left panel of Figure 2), but this is much weaker than for year-on-year changes (see Table 4). Further, many of the foreign restructuring episodes last a single year (27,369 or 74.7%) or two years (5,749 or 15.7%), longer episodes are an exception (bottom right panel of Figure 2). Finally, we also find that restructuring episodes tend to be longer in larger networks and that longer episodes are more likely to be associated with a larger change in the number of foreign affiliates (Figure A.1 in the Appendix).

Episode types Foreign network restructuring episodes can be classified into three categories based on the sign of the net change in the number of foreign affiliates over the episode: 'expansion' (positive net change), 'contraction' (negative net change), and 'reshuffling' (zero net change). Figure 3 shows the evolution in the number of these three types of foreign restructuring episodes over the period 2010-2019. Between 2010 and 2016, expansions represent the the vast majority of foreign restructuring episodes, accounting on average for 68.2% of all episodes against 25.6% for contractions. From 2017 onwards, the number of expansion episodes decreases substantially, whereas the number of contraction episodes rises strongly. In 2019, the share of contraction episodes is 66.0% while the share of expansion episodes is down to 26.5%.[10] Finally,

[10] As shown in Figure A.3 in the Appendix, these results still hold when we aggregate the data to foreign country-2-digit industry combinations and focus on changes therein (rather than the total number of foreign

reshuffling represents a bit more than 5% of all foreign restructuring episodes per year over the entire period 2010-2019.[11]

These results point to a relatively strong trend towards 'deglobalisation' in recent years, with more foreign contracting than foreign expanding. This trend goes hand in hand with a fall in the total number of foreign restructuring episodes after the peak years 2014-2016 (see upper right panel of Figure 2). The timing is also consistent with the findings of Campos et al. (2023) and Aiyar et al. (2024) who document an increase in 'geoeconomic fragmentation', i.e. the fragmentation of global trade and investment along geopolitical lines due to growing international political tensions (*cf. infra*).

4 Home country effects of foreign network restructuring

Does foreign network restructuring affect the activity of multinationals in their home country? Earlier work by Desai et al. (2009) has analyzed home country effects of the expansion of the foreign activity of US multinationals in the 1980s, 1990s, and early 2000s, i.e. in times of rapid economic globalization, finding indications of a positive rather than a negative relation between foreign and domestic activity (see also e.g. Yamashita and Fukao, 2010; Goldbach et al., 2019; Kovak et al., 2021, for similar results). We address this question for European multinationals for the period 2010-2019, during which growth in international trade and investment has been slow, fuelling worries about deglobalization. Therefore, we do not only look at the home country effects of foreign network expansion but we also specifically focus on foreign network contraction. Our identification of restructuring episodes has indeed revealed a trend toward foreign network contraction. To obtain a full picture of home country effects, we do not only look at changes in real value-added and employment before and after restructuring episodes for both multinational parents and domestic affiliates but also consider effects in terms of efficiency, wages, operating revenue, total assets, and domestic network size.

4.1 Empirical Framework

Our empirical strategy is mainly based on an event study difference-in-difference design to estimate the home-country effects of foreign restructuring.[12] We consider three 'treatments' in terms of the categories of foreign network restructuring episodes: expand, contract, and reshuffle; and we use specification (2) to estimate domestic intensive margin effects for multinational

affiliates) to reconstruct episodes based on this metric.

[11] Based on the episode approach, we also find that expanding networks are on average somewhat larger than contracting ones (left panel of Figure A.2 in Appendix). In terms of length, there is no substantial difference between expanding and contracting episodes (right panel of Figure A.2 in Appendix). By definition, reshuffling episodes require at least two years of changes. This is reflected in the value of the median and mean reshuffling episode length (respectively two years and a little more than two years).

[12] Recent work by e.g. Amiti et al. (2024) and Konings et al. (2022) relies on a similar set-up to estimate 'superstar'-spillovers and tax effects within multinationals.

parent i in industry j in country c at time t.

$$
\begin{aligned}
Y_{ijct} \;=\; & \alpha_i + \sum_{\tau=t_{start}-5}^{t_{end}+5} \beta_{1\tau} \times Expd_i \times \mathbb{1}(t=\tau) + \sum_{\tau=t_{start}-5}^{t_{end}+5} \beta_{2\tau} \times Rshfl_i \times \mathbb{1}(t=\tau) \\
& + \sum_{\tau=t_{start}-5}^{t_{end}+5} \beta_{3\tau} \times Ctrct_i \times \mathbb{1}(t=\tau) + \sum_{\tau=t_{start}-5}^{t_{end}+5} \beta_{4\tau} \times Dslv_i \times \mathbb{1}(t=\tau) + \delta_{jct} + \varepsilon_{ijct},
\end{aligned} \tag{2}
$$

where $Expd_i$, $Ctrct_i$, and $Rshfl_i$ are dummy variables set to one for the entire period for networks with respectively an expansion episode, a contraction episode and a reshuffling episode. To make this unambiguous, we restrict the analysis to networks going through a single foreign restructuring episode and compare these to networks that do not restructure. We normalize outcomes relative to the year before the restructuring episode starts such that coefficients $\beta_{x\tau}$ can be interpreted as differences relative to the level of outcome Y one year before the start of the episode started which is measured by the fixed effect α_i. The indicator function $\mathbb{1}(.)$ captures year-specific effects from five years before the start of the episode to five years after the end of the episode. The time index $t = 0$ corresponds to the end year of the episode. For episodes that last more than one year, we retain only the last year of the episode in the estimation sample and label it with time index $t = 0$. The year $t = -1$ is the year before the start of the episode with respect to which outcomes are normalized. The coefficient estimated for $t = 0$ will then reflect the effect at the end of the episode relative to the year before the episode.

We additionally introduce the dummy $Dslv_i$ in (2) to separate contracting networks that dissolve, i.e. reduce the number of affiliates to zero during the episode, from contracting networks that reduce the number of foreign affiliates but continue to exist as a network, i.e. retain at least one domestic or foreign affiliate at the end of the episode. Thus, $\beta_{3\tau} + \beta_{4\tau}$ measures the effects for networks that dissolve, and $\beta_{3\tau}$ measures the effects for networks that contract without dissolving. Finally, δ_{jct} is a set of parent industry-country-year interaction fixed effects.

We estimate (2) for the following set of outcomes: real value-added, employment, wages, operating revenue, real total assets, and total factor productivity (TFP). Real value-added is determined as real operating revenue minus real material costs (double deflated by separate industry-level output and material deflators), the average wage rate is obtained as real total costs of employees divided by the number of employees. TFP is obtained using the coefficients from an industry-level estimation with country-fixed effects of a production function using the Wooldridge-Levinsohn-Petrin technique (see Levinsohn and Petrin, 2003; Wooldridge, 2009) for a large sample of European firms.[13] Our choice of variables is aimed at producing evidence related to popular home country fears and hopes associated with investment abroad, offshoring

[13]This is an updated version of Merlevede et al. (2015)

and reshoring, such as the destruction and creation of activity and jobs, or changes in efficiency and wages.

To fully capture home country effects, we also estimate (2) for domestic 'stayer'-affiliates, i.e. domestic affiliates present before ànd after the foreign restructuring. Subscript i in (2) then refers to such a domestic affiliate rather than a network parent, and so do the fixed effects α_i and δ_{jct}. We exclude dissolving networks from this estimation since, by definition, these networks do not have any remaining affiliates after the episode ends.

To complement this analysis of the intensive margin of parents and domestic affiliates, we also estimate specification (2) with the number of domestic affiliates as a dependent variable, again excluding dissolving networks from the estimation. Finally, we also provide estimates for total domestic outcomes calculated as the sum or average of outcomes Y for a network parent and all its domestic affiliates, allowing domestic affiliates to be added or dropped from the network to affect the outcome total. For these estimations, the parent and all domestic affiliates must report the outcome. This reduces the number of observations that we can use considerably, which is why we restrict the estimations to three years before and after the restructuring episode instead of five years.

All estimations are run on a sample of firms filing unconsolidated accounts. The number of observations differs between the outcome variables. When estimating (2) with real value-added as parent outcome, we have an estimation sample of 44,781 observations.[14] Among these, 47.2% refer to networks without any foreign restructuring episode, 33.2% to networks that expand, 17.5% to networks that contract (8.7% contract and dissolve and 6.5% contract without dissolving), and 2.1% to reshuffling networks. End-of-episode years represent 7.0% of observations, and the years before and after the episode account for respectively 6.7% and 6.2% of observations. The number of observations is smaller for years further away from the episode. Nevertheless, about 2.6% of observations refer to five years after the end of the episode and another 2.7% to five years before the start of an episode. These shares are very similar for other parent outcomes.

4.2 Results

Below, we present the results on home country effects of foreign network restructuring episodes in three sets: a first one based on outcomes for parents, a second one based on outcomes for domestic affiliates both at the extensive and the intensive margin, and a third one based on outcomes for the entire domestic network. The result figures report point estimates and associated 90% confidence intervals of the dynamic coefficients based on specification (2) for the outcome variables discussed above. We focus on results for expanding and contracting

[14] The sample is small for real value-added compared to most of the other outcome variables because its calculation requires not only data on operating revenue but also on material cost, which is reported by fewer firms in Amadeus.

networks. Results for reshuffling networks are given in the Appendix.[15]

Parent level Figures 4 and 5 show the results for parents of respectively expanding networks and contracting networks. For parents of expanding networks, there is an increase in real value-added, employment, operating revenue, and total assets before and during the episode (Figure 4). In the first years after the end of the expansion episode, there is a further increase, which then levels off. These results suggest that parents prepare for foreign expansion through an increase in activity and assets. Neither parent wages nor total factor productivity increase before or after the expansion episode. Hence, the growth in activity and assets appears to be a pure scale effect.

In the results on parent outcomes for contracting networks, we separate between networks that do not dissolve and those that do (respectively dots and diamonds in Figure 5). For both types, parent real value-added and employment decrease after the end of a foreign restructuring episode. The results also show a fall in total assets, operating revenue, and wages after the end of the episode, but this is significant only for networks that dissolve. There is mostly no significant trend in outcomes for parents before the start of a contraction episode. The only exceptions are the significant pre-episode decreases in total assets and employment for parents of networks that dissolve. Total factor productivity does not seem to be affected by contraction episodes, except for a significant decrease in the first years after the restructuring episode for parents that have dissolved their foreign network.

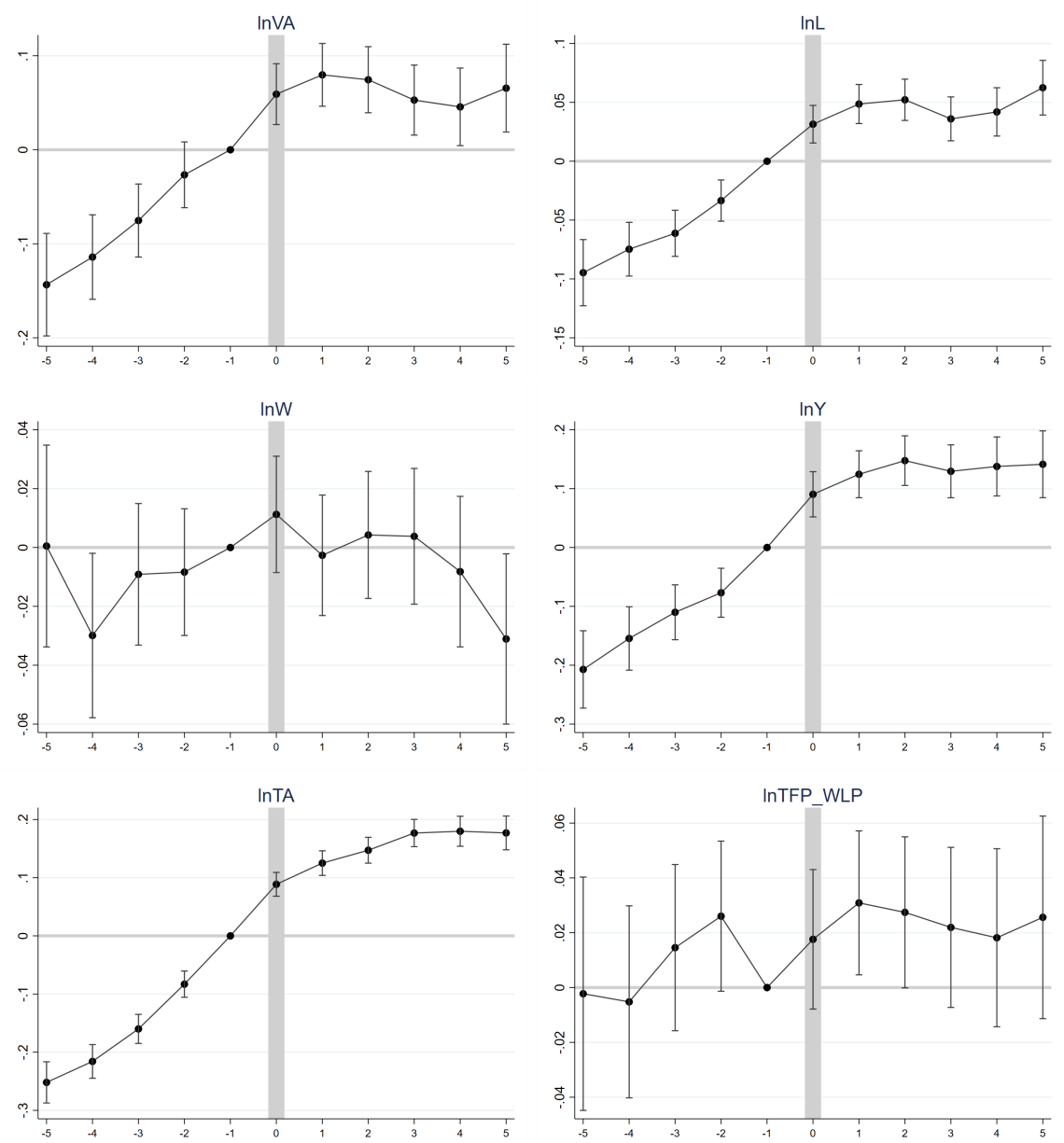
Affiliate level In addition to the parent level, home countries may also be affected by foreign network restructuring episodes at the level of the networks' domestic affiliates. These effects may materialize both at the extensive and intensive margin, i.e. through a change in the number of domestic affiliates or through a change in the activity of existing domestic affiliates.

To provide insights on the effect of foreign network restructuring on domestic network expansion or contraction at the extensive margin, we estimate (2) with the number of domestic affiliates as dependent variable for an estimation sample that excludes dissolving networks. Foreign expansion episodes are significantly associated with domestic expansion at the extensive margin, before the episode, and in the first year after the end of the episode (left panel of Figure 6). From the second year after the episode onwards, this turns into a domestic network contraction at the extensive margin relative to the peak one year after the episode. The domestic network does, however, remain significantly larger than before the episode. By contrast, foreign contraction episodes are associated with an increase in the number of domestic affiliates five and four years before the episode[16] but with no other significant change in the extent of

[15] Only 2.1% of the data refer to reshuffling episodes. Figure B.1 shows results for parent outcomes, Figure B.2 for the number of domestic affiliates, and Figure B.3 for outcomes for domestic affiliates. These results reveal no significant pre and post-episode effects for reshuffling networks.

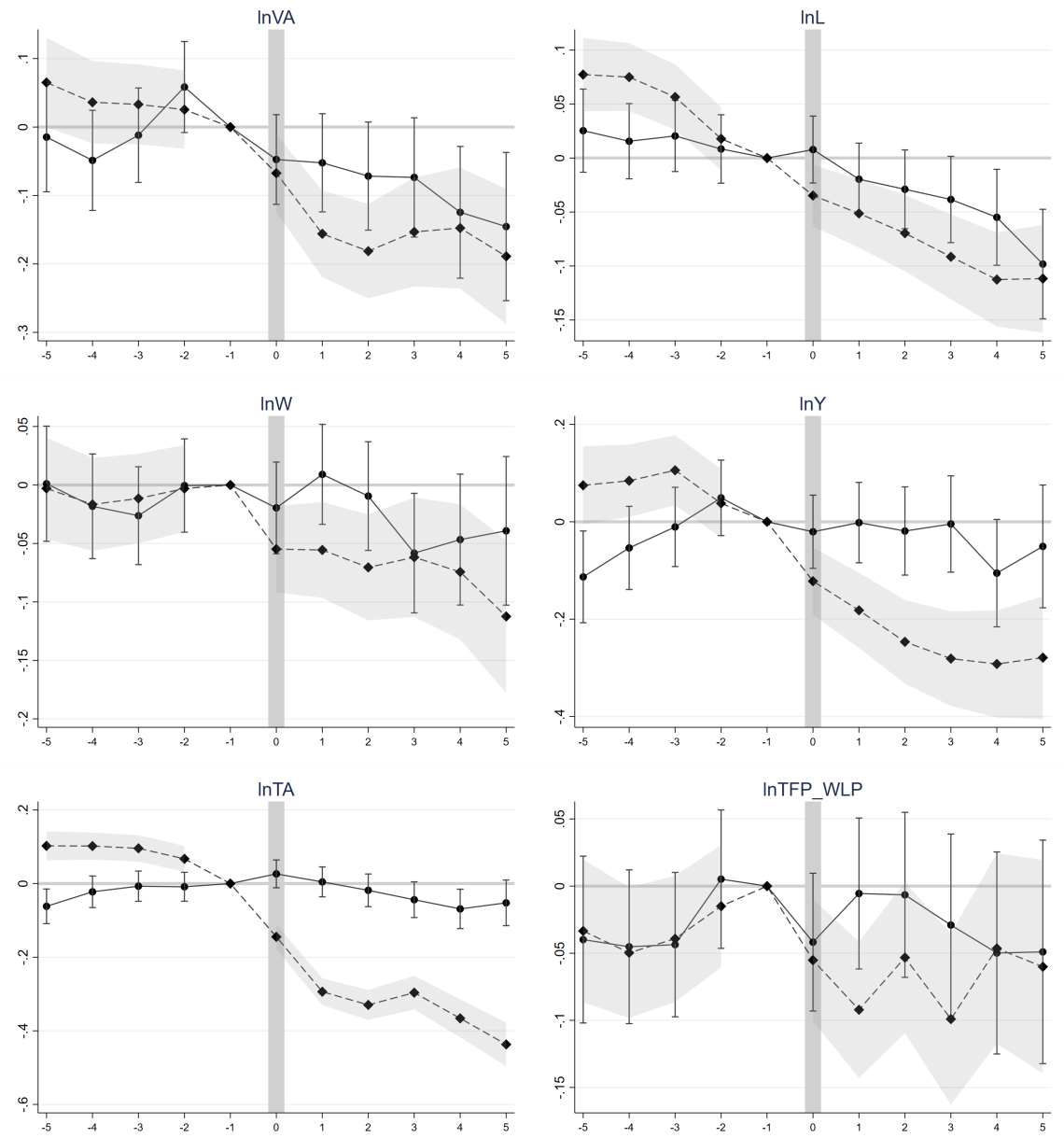
[16] Note that the estimates for these years are based on a smaller number of observations than those for years closer to the restructuring episode.

Figure 4: Dynamic parent performance pre and post expansion episodes.



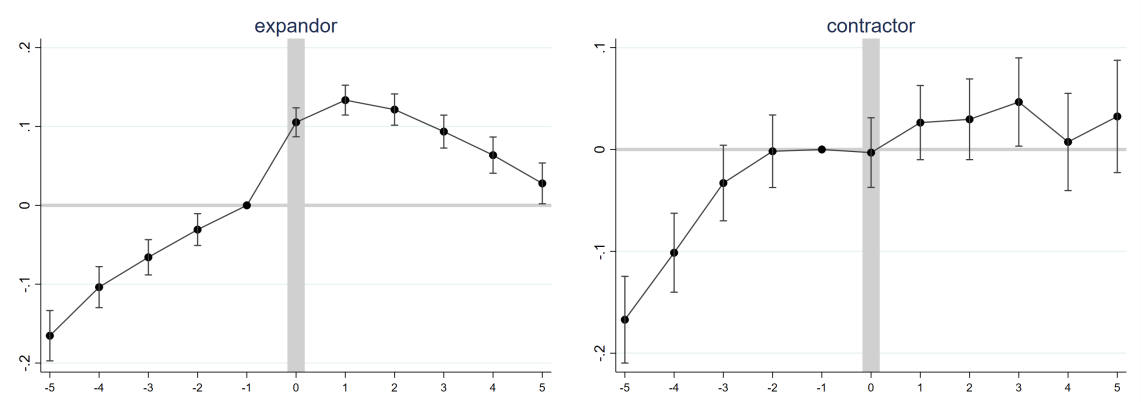
Note: Panel headings refer to the outcome considered in the subfigures. The horizontal axis marks the time relative to the episode-end which is labelled 0. The vertical shaded area around time zero highlights the episode. Note that the length of an episode can be more than one year. In that case, only the end-year of the episode is used in the estimation sample. Coefficients are normalized relative to the year before the episode starts (timestamp '-1'). Point estimates are indicated by dots and 90% confidence intervals are given by vertical lines with caps. The number of observations in the estimation samples for different outcome variables is: 44,781 (lnVA); 94,959 (lnL); 63,221 (lnW); 88,602 (lnY); 186,803 (lnTA); and 39,907 (lnTFP).

Figure 5: Dynamic parent performance pre and post contraction episodes.



Note: Panel headings refer to the outcome considered in the subfigures. The horizontal axis marks the time relative to the episode-end which is labelled 0. The vertical shaded area around time zero highlights the episode. Note that the length of an episode can be more than one year. In that case, only the end-year of the episode is used in the estimation sample. Coefficients are normalized relative to the year before the episode starts (timestamp '-1'). In specification (2), the *contract* coefficient corresponds to the effect for networks that contract but do not dissolve and the sum of the *contract* and *dissolve* coefficients corresponds to the effect for contracting networks that do dissolve. For the former, point estimates are indicated by the dots connected by full lines, and 90% confidence intervals are given by vertical lines with caps. For the latter, point estimates are indicated by the diamonds connected by dashed lines with the light grey-shaded areas giving the 90% confidence intervals. The number of observations in the estimation samples for different outcome variables is: 44,781 (lnVA); 94,959 (lnL); 63,221 (lnW); 88,602 (lnY); 186,803 (lnTA); and 39,907 (lnTFP).

Figure 6: Pre- and post episode number of domestic affiliates.



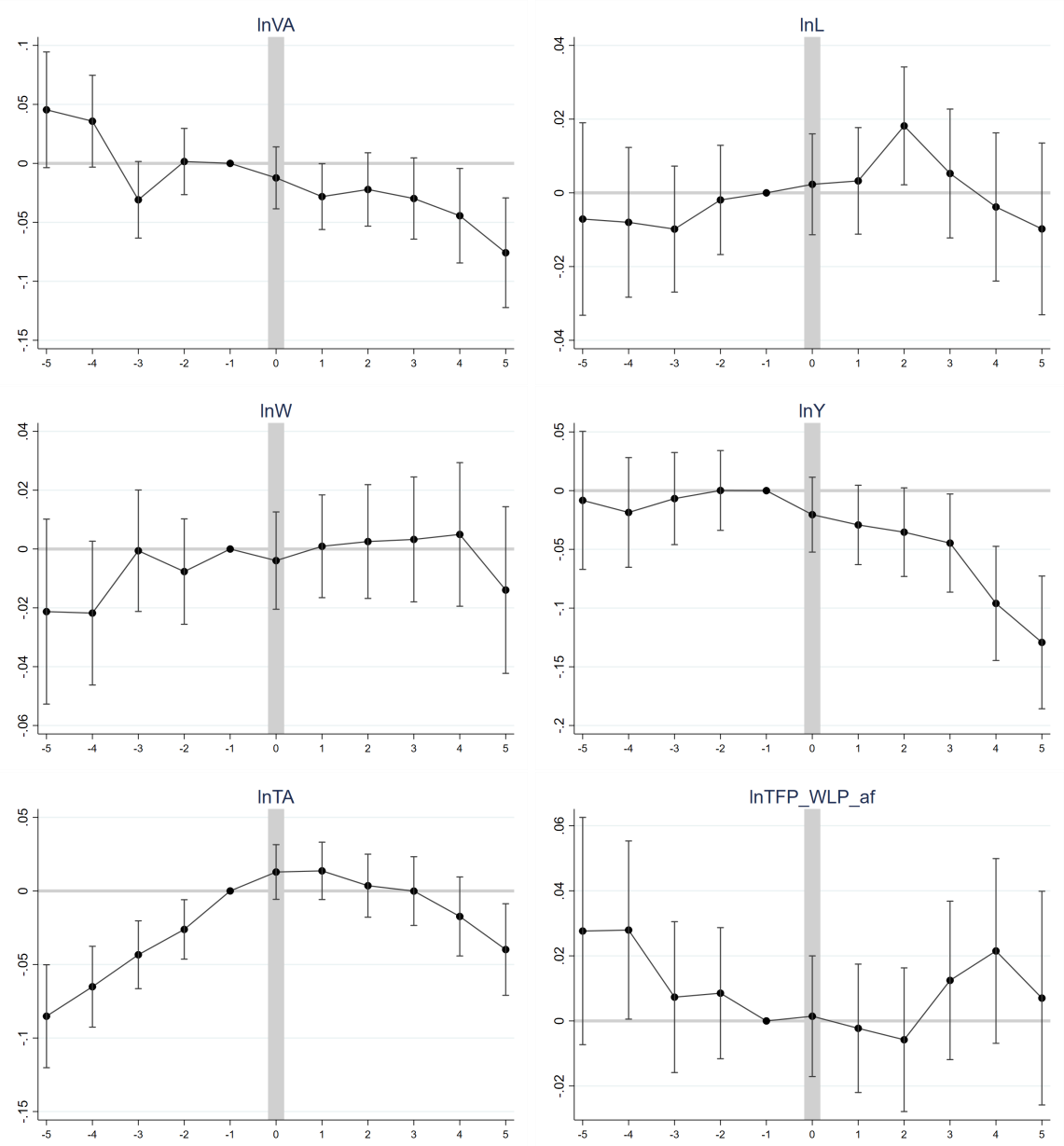
Note: Panel headings refer to the type of networks (expanding, contracting or reshuffling) considered in the subfigure. Dissolving networks are excluded from the estimation sample. The horizontal axis marks the time relative to the episode-end which is labelled 0. The vertical shaded area around time zero highlights the episode. Note that the length of an episode can be more than one year. In that case, only the end-year of the episode is used in the estimation sample. Coefficients are normalized relative to the year before the episode starts (timestamp '-1'). Point estimates are indicated by dots and 90% confidence intervals are given by vertical lines with caps. The number of observations in the estimation sample is 164,341.

the domestic network in any other year (right panel of Figure 6). Hence, we find no evidence of domestic network expansion at the extensive margin during or after a foreign contraction episode, or even in the years just before the foreign contraction. In other words, multinational networks that reduce their number of foreign affiliates do not seem to bring activity back to the home country in the form of opening new domestic affiliates.

Effects of foreign restructuring episodes on domestic affiliates may also materialize at the intensive margin, i.e. through an increase or decrease in the activity of existing domestic affiliates. To test for such effects along the intensive margin, we estimate (2) for a sample of (i) domestic affiliates of multinationals that do not restructure their foreign network and (ii) domestic affiliates of multinationals that do restructure their foreign network (single episode). We require these domestic affiliates to be part of the multinational network before and after the episode and we refer to these as *'stayer'-affiliates*. By definition, the estimation sample thus excludes dissolving episodes. For these domestic affiliates, we consider the same outcome variables as for parents above. Figures 7 and 8 show the results for, respectively, domestic affiliates of expanding networks and domestic affiliates of contracting networks.

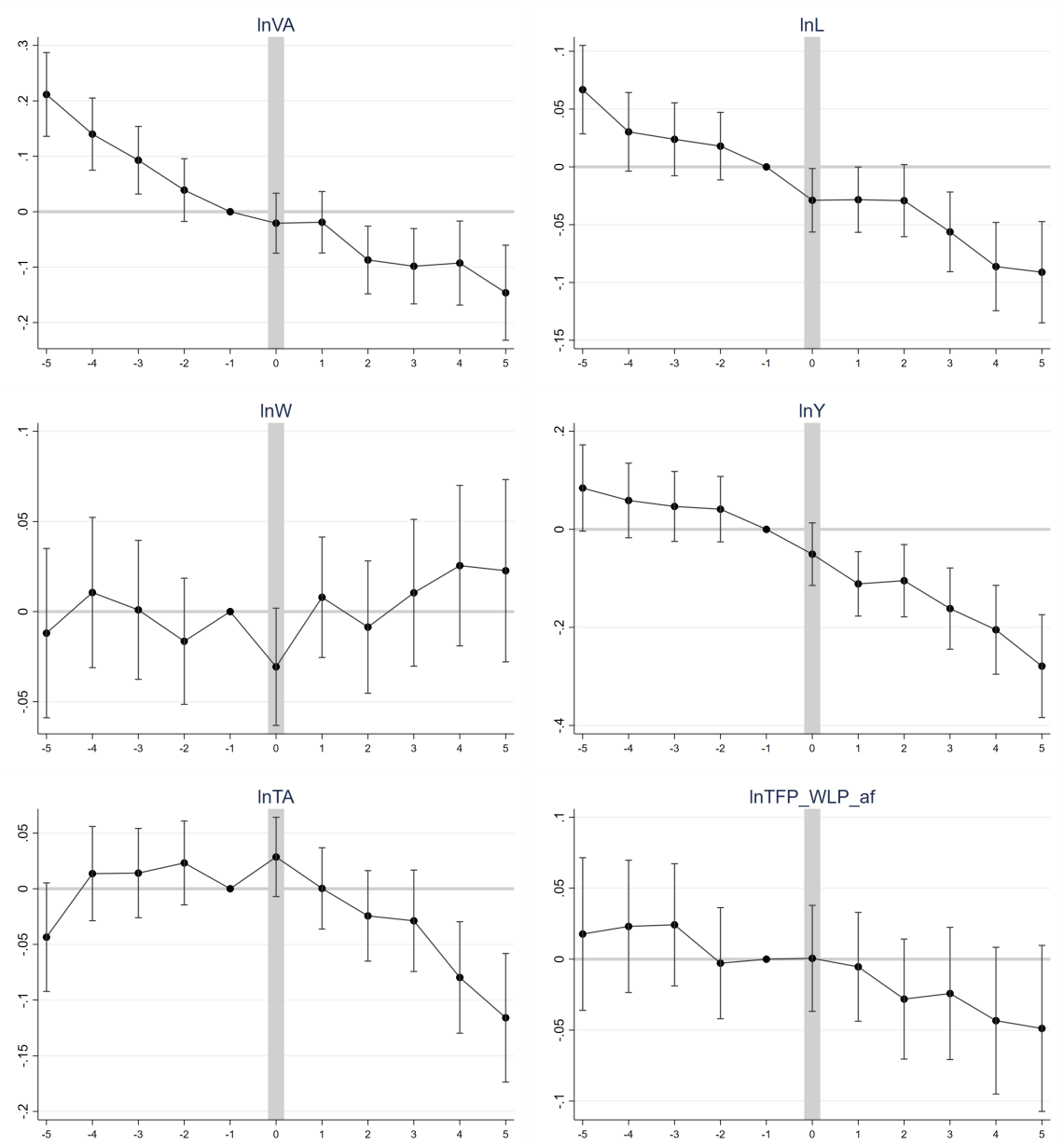
Overall, there is not much evidence in the results of a significant effect of foreign network restructuring on domestic 'stayer'-affiliates in expanding networks. In Figure 7 we only find their value-added, operating revenue, and total assets to be significantly lower four to five years after the end of the expansion episode. In addition, their assets appear to be significantly growing before the episode. We find no significant effects for employment, wages, or total

Figure 7: Dynamic domestic affiliates' performance pre and post-expansion episodes.



Note: The estimation sample comprises all domestic 'stayer'-affiliates, i.e. domestic affiliates that are observed before and after the episode. The procedure de facto excludes affiliates from dissolving networks. Panel headings refer to the outcome considered in the subfigures. The horizontal axis marks the time relative to the episode-end which is labelled 0. The vertical shaded area around time zero highlights the episode. Note that the length of an episode can be more than one year. In that case, only the end-year of the episode is used in the estimation sample. Coefficients are normalized relative to the year before the episode starts (timestamp '-1'). Point estimates are indicated by dots and 90% confidence intervals are given by vertical lines with caps. The number of observations in the estimation samples for different outcome variables is: 66,809 (lnVA); 102,825 (lnL); 75,110 (lnW); 118,263 (lnY); 204,951 (lnTA); and 45,208 (lnTFP).

Figure 8: Dynamic domestic affiliates' performance pre and post-contraction episodes.



Note: The estimation sample comprises all domestic 'stayer'-affiliates, i.e. domestic affiliates that are observed before and after the episode. The procedure de facto excludes affiliates from dissolving networks. Panel headings refer to the outcome considered in the subfigures. The horizontal axis marks the time relative to the episode-end which is labelled 0. The vertical shaded area around time zero highlights the episode. Note that the length of an episode can be more than one year. In that case, only the end-year of the episode is used in the estimation sample. Coefficients are normalized relative to the year before the episode starts (timestamp '-1'). Point estimates are indicated by dots and 90% confidence intervals are given by vertical lines with caps. The number of observations in the estimation samples for different outcome variables is: 66,809 (lnVA); 102,825 (lnL); 75,110 (lnW); 118,263 (lnY); 204,951 (lnTA); and 45,208 (lnTFP).

factor productivity. Thus, our results indicate a difference in response between parents and domestic affiliates of expanding networks: the activity of the parents grows with the foreign expansion episode whereas that of domestic affiliates is either unaffected or shows a negative trend. The latter may be an indication that these networks expanding abroad shift activity from their domestic affiliates to their new foreign affiliates, without a change in employment in the domestic affiliates, however.

For domestic 'stayer'-affiliates of contracting networks, we find a significant and continuous decrease in value-added, employment, and operating revenue that is neither altered nor interrupted by the episode in Figure 8. In addition, total assets and total factor productivity of these affiliates are falling after the restructuring episode, although these results are not significant for total factor productivity. There is no real trend nor a significant effect for wages. We draw two conclusions from these results. First, contrary to popular hopes, foreign contraction episodes are not followed by growth in activity or employment of domestic affiliates. Foreign network contraction is rather associated with a reduction in domestic affiliate activity. Second, these results complement our findings for the activity of parents of dissolving networks. These networks significantly reduce their parent activity in the wake of restructuring episodes (see Figure 5 above). This was not the case for contracting networks that do not dissolve. But these networks reduce the activity of their domestic affiliates after foreign restructuring episodes. Hence, it seems that contracting networks that do not dissolve adjust at the intensive domestic affiliate margin, while dissolving networks adjust at the extensive domestic affiliate margin and the intensive parent margin.

Total domestic activity To complete the analysis, we have also estimated specification (2) for aggregate domestic outcomes of networks by pooling outcomes for parents and domestic affiliates (if any). The estimations provide a global view of the effects of foreign network restructuring on the networks' domestic activity, whatever the channel through which these effects materialize, and they allow for potential offsetting effects between parents and domestic affiliates. The calculation of aggregate outcomes brings several issues. First, aggregate outcomes are influenced not only by changes at the intensive margin for parents and domestic affiliates but also by changes in the composition of domestic networks from one year to another, i.e. when domestic affiliates are added or dropped from the network. Second, we cannot calculate aggregate outcomes for total factor productivity but only for labor productivity. Finally, the most important drawback is that we can only retain observations for which we have full information on the domestic network outcome, which implies that the parent and all domestic affiliates must report the outcome in a given year. This reduces the number of observations and introduces a bias against larger networks since the likelihood that we do not observe a given outcome for all entities is higher for larger networks. Given the lower number of observations, we also restrict the estimations to three rather than five years before and after the episode.

The results corroborate our earlier findings (see Figures C.1 and C.2 in Appendix). On the one hand, foreign contraction episodes are not associated with an increase in domestic activity. There is no significant aggregate effect on the domestic network before or after the episode for contracting networks that do not dissolve, while dissolving networks significantly reduce their domestic activity both before and after the episode. On the other hand, foreign expansion episodes are associated with increases in domestic value-added, employment, operating revenue, and total assets. In line with the separate results for parents and domestic affiliates, wages and efficiency (measured here as labor productivity) remain unaffected.

5 Geographic and geopolitical trends in foreign network restructuring

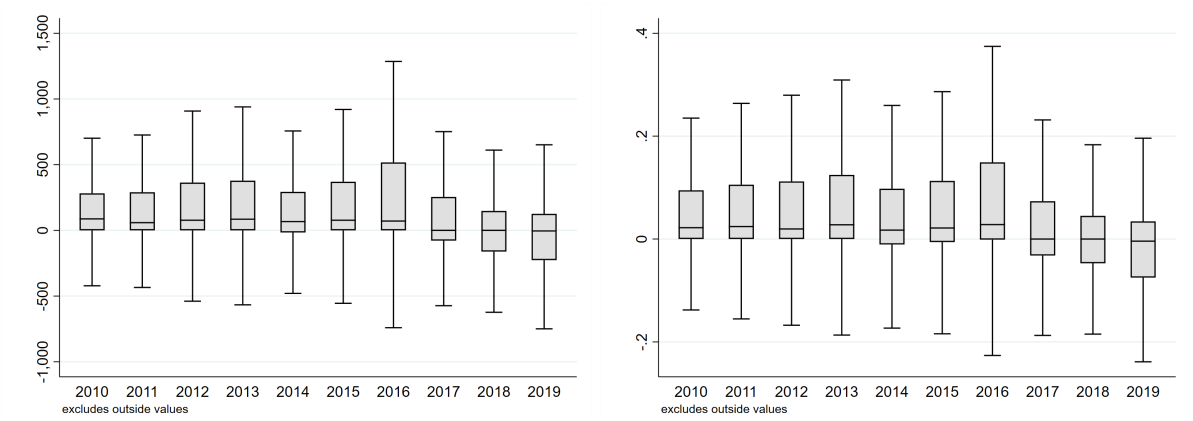
Although a growing number of multinationals have been downsizing their foreign network between 2010 and 2019, our estimation results show that foreign network contraction has not been associated with increases in home-country activity. This is true at the extensive and the intensive margin: we found neither the number of domestic affiliates nor the domestic activity of parents or affiliates of contracting networks to be on the rise. These results imply that there is no evidence of so-called 'backshoring' within multinational networks.

Amidst rising geopolitical tensions and in the aftermath of the COVID-crisis, attention to exposure to geopolitical rivals and access to critical raw materials has sparked interest in identifying supply chain resilience and vulnerabilities (see e.g. Baldwin and Freeman, 2022, for an overview). 'Nearshoring' and 'friendshoring' have become popular notions to refer to alternative supply chain reorganization strategies with respect to backshoring. In this section, we analyze to what extent restructuring episodes in our sample are consistent with 'nearshoring' and 'friendshoring'. To this end, we define and calculate the average physical and geopolitical distance within networks and determine how these change during episodes of foreign restructuring. We consider foreign restructuring episodes that result in a lower average physical distance to be characterised by 'nearshoring', and those that result in a lower average geopolitical distance to be characterised by 'friendshoring'.

Definitions For each network-year combination, we define *Physdist* as the average within-network *physical* distance to the home country, i.e. the country in which the parent is located. We calculate *Physdist* by taking a simple unweighted average of affiliates' distances to the parent. For this purpose, we combine the information on the country of location of affiliates from our dataset[17] with data on geographical distances between countries from the CEPII gravity dataset (see Conte et al., 2022). Given our focus on home-country effects of foreign

[17]Recall this information is available for all affiliates in our MNE network dataset

Figure 9: Boxplots by year of the change over an episode in average physical distance (left panel) and average geoplitical distance (right panel)



restructuring, we set within-country distances to zero and do not take into account the within-country distances that are available from the CEPII dataset.[18]

Similarly, we define *Geodist* as the average within-network *geopolitical* distance to the home country of the network parent by taking a simple unweighted average of the geopolitical distance between each affiliate's country of location and the parent's home country. For measuring geopolitical distance, we use the updated dataset on bilateral ideal point differences from Bailey et al. (2017).[19] Based on voting patterns in the UN General Assembly (UNGA), Bailey et al. (2017) estimate countries' foreign political preferences which they label 'ideal points'. The absolute value of the difference between two countries' ideal points is then taken as an indicator of geopolitical distance.[20] Although the data are time-varying, we create a time-invariant version by taking averages for 2020-2022 to reflect current post-Covid views on bilateral geopolitical differences. This will allow us to evaluate how foreign network restructuring has evolved in terms of current geopolitical views. Importantly, average within-network geopolitical distance will in this case only change as a result of restructuring, not as a result of changes in bilateral geopolitical distance.

Trends For each episode of foreign network restructuring, we calculate the implied *change* in average physical (*Physdist*) and geopolitical distance (*Geodist*). The boxplots in Figure 9 show the distribution of these changes over episodes for all years between 2010 and 2019. There are restructuring episodes characterized by a decrease in physical or geopolitical distance in all years. Since 2016, the number of episodes with a decrease in physical or geopolitical

[18] This also rules out that networks with similar domestic structures have different distances depending on whether they are based in a small or a large country.

[19] This dataset is available at: https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/LEJUQZ.

[20] Bailey et al. (2017) show that ideal points capture the position of countries vis-à-vis the US-led liberal order.

distance is on the rise. We take such decreases in *Physdist* and in *Geodist* as an indication of respectively nearshoring and friendshoring. More generally, we also refer to a decrease in either or both as 'reshoring'. Nearshoring and friendshoring are not mutually exclusive: 19.9% of episodes are characterized by a decrease in both metrics. Nevertheless, 6.7% of episodes are pure 'friendshoring'-episodes and 4.7% pure 'nearshoring'-episodes.

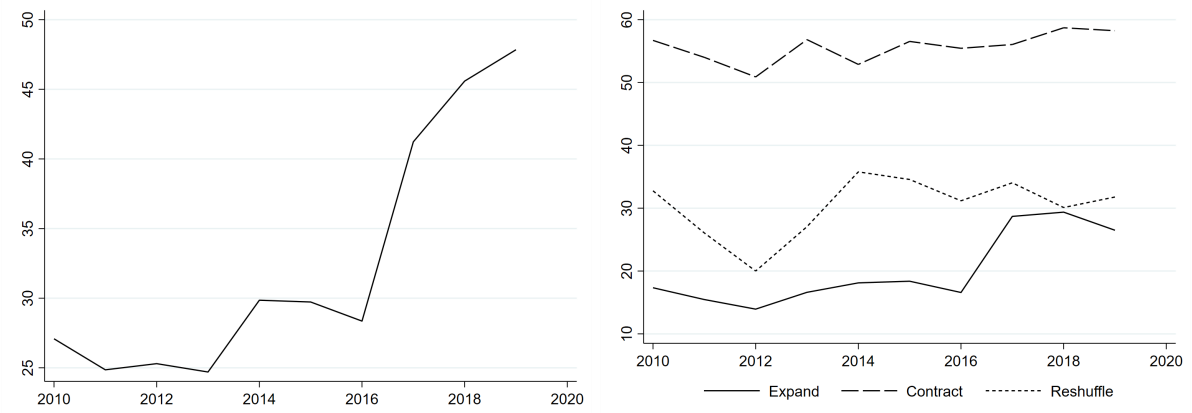
The share of foreign restructuring episodes characterised by some form of 'reshoring' starts to rise from 2016 onwards, from a level just below 30% to almost 50% in 2019 (left panel of Figure 10). There are two major drivers of this aggregate trend. On the one hand, there is an increase in the share of contraction episodes in total episodes (see Figure 3 above). Given that a greater share of contracting episodes are characterised by reshoring (right panel of Figure 10), this leads to an increase in the total share of episodes characterised by reshoring. On the other hand, expanding episodes may also be characterized by nearshoring or friendshoring when new affiliates are set up closer to home or in politically more aligned host countries. The share of expansion episodes characterised by reshoring has indeed risen since 2016 (right panel of Figure 10), which explains part of the rise in the total share of episodes characterised by reshoring.

The strong rise from 2016 onwards suggests that Brexit may have played a role in these results. However, Figure A.4 in Appendix shows that these results are not driven by UK-based multinationals that account for almost 4,000 episodes.[21] In line with findings of increased geo-economic fragmentation based on aggregated data (see e.g. Campos et al., 2023; Aiyar et al., 2024), our data thus indicate that since 2016 foreign restructuring episodes of European-based multinational networks increasingly show a broad-based tendency towards 'reshoring' in the form of nearshoring and friendshoring.

Home country effects We also test whether there is heterogeneity in the home country effects of foreign restructuring between networks for which restructuring episodes are characterised by nearshoring or friendshoring and networks for which this is not the case. For this purpose, we define the dummy variable R_i that is equal to one for multinationals i that restructure their foreign network in such a way that the network's physical distance, geopolitical distance, or both decrease. Networks for which R_i is equal to one are necessarily networks that go through an episode. Therefore, we can simply include interaction effects with the dummy R_i into specification (2) and ignore the level effects of the dummy (which would otherwise result in a perfect linear combination). This yields specification (3), which allows to test whether the home country effects are different for networks that go through restructuring episodes characterised by reshoring.

[21] These results are neither driven by multinationals from other countries than the UK that are orienting their network away from the UK.

Figure 10: 'Reshoring' episodes as a share of total episodes (left panel) and as a share of expansion, contraction and reshuffling episodes (right panel).



Note: 'Reshoring' episodes are episodes that result in a decrease in a network's average physical distance, a network's average geopolitical distance, or both. The timestamp of an episode corresponds to its end year.

$$
\begin{aligned}
Y_{ijct} \quad = \quad & \sum_{\tau=t_{start}-5}^{t_{end}+5} \gamma_{1\tau} \times Expd_i \times \mathbb{1}(t=\tau) + \sum_{\tau=t_{start}-5}^{t_{end}+5} \gamma_{1\tau}^{R} \times Expd_i \times R_i \times \mathbb{1}(t=\tau) \qquad (3) \\
& + \sum_{\tau=t_{start}-5}^{t_{end}+5} \gamma_{2\tau} \times Rshfl_i \times \mathbb{1}(t=\tau) + \sum_{\tau=t_{start}-5}^{t_{end}+5} \gamma_{2\tau}^{R} \times Rshfl_i \times R_i \times \mathbb{1}(t=\tau) \\
& + \sum_{\tau=t_{start}-5}^{t_{end}+5} \gamma_{3\tau} \times Ctrct_i \times \mathbb{1}(t=\tau) + \sum_{\tau=t_{start}-5}^{t_{end}+5} \gamma_{3\tau}^{R} \times Ctrct_i \times R_i \times \mathbb{1}(t=\tau) \\
& + \alpha_i + \delta_{jct} + \varepsilon_{ijct}
\end{aligned}
$$

The dummy variables $Expd_i$, $Ctrct_i$, and $Rshfl_i$ again characterise restructuring episodes by type. As before, we normalise with respect to the year before the episode starts. $\gamma_{x\tau} + \gamma_{x\tau}^{R}$ captures the dynamic effects for networks of a given type that 'reshore', and $\gamma_{x\tau}$ captures the effects for networks that go through a similar type of episode but without 'reshoring' aspects. We estimate (3) for the same set of outcomes as before (value-added, employment, wages, operating revenues, real total assets, and total factor productivity), separately for parents and domestic 'stayer'-affiliates. Finally, α_i are parent or affiliate fixed effects and δ_{jct} is a set of parent or affiliate industry-country-year interaction fixed effects. All estimations are run on samples of parents and domestic affiliates that report unconsolidated accounts and that are part of networks experiencing at most one episode. Episodes of dissolving networks are excluded from the estimations.

The full results are available in Figures D.1 to D.4 in Appendix D, here we summarize the

main findings.[22] Among expanding networks, point estimates of post-episode effects for parents are typically higher for those going through episodes characterised by reshoring, but none of the differences are statistically significant (Figure D.1). For effects on domestic affiliates, we do not find significant differences between expanding networks that reshore and those that do not reshore either (Figure D.2). The same holds for contracting networks: differences between reshorers and non-reshorers in the home country effects are significant neither for parents (Figure D.3) nor for domestic affiliates (Figure D.4).

Given that nearshoring and friendshoring start to pick up strongly near the end of our sample period, it could be that that our dataset stops too early to pick up any systematic differences. Determining whether the home country effects become different in later years requires an extension of the sample period. The underlying data for such an extension are not available to us at this stage. Therefore, we leave this for future research.

6 Conclusion

Since the financial crisis of 2008 dealt a blow to economic globalization, further shocks and crises of various types unfolding in the 2010s and 2020s have slowed down the process of international economic integration. However, analyses of deglobalisation and its consequences from the perspective of multinational networks are scarce.

In this paper, we use a rich dataset containing micro-level information on parents and worldwide affiliates of European-based multinational networks to analyze the dynamics of multinational networks in times of deglobalisation. We document a set of facts on the extent, type, and trends of foreign network restructuring by multinational enterprises between 2010 and 2020 and analyze the potential home-country effects of foreign restructuring. To do so, we propose an 'episode'-approach to analyze foreign restructuring where an episode is a series of consecutive annual changes in the number of foreign affiliates in the network. 60% of the 41,485 networks in our sample go through at least one episode. A quarter of the episodes we identify lasts longer than one year. Based on the net change in the number of foreign affiliates over the episode, we classify restructuring networks as either expanding, reshuffling, or contracting. The contracting category includes both networks that maintain a strict positive number of affiliates and networks that dissolve, i.e. by the end of the episode all affiliates have been dropped from the network.

By explicitly documenting and analyzing network contraction, we provide micro-based insights into deglobalization trends from the perspective of MNE networks, adding to the existing trade-based evidence. Expansions account for 68% of all episodes between 2010 and 2016, against 26% for contractions. By 2019 however, the share of contraction episodes rises to 66.0% while the share of expansion episodes is down to 26.5%, indicating a change in the nature of for-

[22] Effects for reshuffling networks shown in Figures D.5 and D.6 are again insignificant and not discussed here.

eign restructuring. Reshuffling episodes, defined by a zero net change in the number of affiliates, are scarce.

We then employ an event study difference-in-difference set-up where we estimate outcomes for all multinational networks going through a single restructuring episode from five years before the start of the episode to five years after the end of it, and compare them to multinational networks that do not restructure. We focus on outcomes that reflect the popular home country fears and hopes associated with foreign investment such as the destruction and creation of activity and jobs, or changes in efficiency and wages. We provide estimates of the dynamic effects for both parents and domestic affiliates in the network and also analyze the number of domestic affiliates.

For parents of expanding foreign networks, our results are suggestive of a scale effect as we find increases in real value-added, employment, output, and total assets by the end of the episode that are sustained afterward. It seems parents have been 'preparing' for expansion as these outcomes were rising before the episode as well. Foreign expansion episodes are further significantly associated with an increase in the *number* of domestic affiliates after the episode, which also is a trend that started before the episode. It is unclear whether the increase is sustained long after the episode. We find that –in contrast to parents– *outcomes* of domestic affiliates are either unaffected or show a mild negative trend.

For parents whose foreign network contracts or dissolves, we find a decrease in value-added and employment after the episode. Total assets, operating revenue, and wages also decrease but mostly for parents of dissolving networks. Most outcomes do not show a significant trend before the episode, only employment and total assets at parents of dissolving networks seem to be declining. For foreign contraction episodes, we do not find a significant effect on the *number* of domestic affiliates, neither at the end of the episode nor before or after the episode. At the *intensive* margin, domestic affiliates observed before and after the episode neither provide any positive signs for home-country activity: value-added, employment, and operating revenue show a significant, continuously decreasing trend that is not changed, nor interrupted by the episode. Total assets and total factor productivity also start a decreasing trend after the end of the episode. Thus, while parents of dissolving networks are more likely to be on a downward trend in terms of most outcomes themselves, it is rather along the intensive margin of domestic affiliates that the reaction manifests itself for contracting networks that do not dissolve.

In the final part of our paper, we analyze whether and how restructuring episodes in our sample relate to the increasingly popular notions of 'nearshoring' and 'friendshoring'. For this purpose, we calculate indicators of the average physical and geopolitical distance of the affiliate network vis-'a-vis the parent and consider restructuring episodes that result in a lower average physical or geopolitical distance as characterized by 'nearshoring' or 'friendshoring' respectively. There have been restructuring episodes characterised by nearshoring or friendshoring in all years from 2010 to 2019 but their share has started to rise quickly from 2016 onwards, nearly

doubling to almost 50% by 2019. This is driven by two separate trends: on the one hand, the share of foreign expansion episodes characterized by nearshoring or friendshoring is on the rise, and, on the other hand, the number of foreign contraction episodes, which are more likely to be characterised by nearshoring or friendshoring, is increasing. Finally, we find no no significant differences in the home-country effects of foreign restructuring between networks for which restructuring episodes are characterized by nearshoring or friendshoring and networks for which this is not the case.

Overall our results testify of a deglobalisation trend for European-based multinational networks in the form of increasing contraction and decreasing expansion episodes in the second half of the 2010-2019 decade. Our results do not provide indications that these trends have been accompanied by bringing back activity to the home country. If anything, based on our results foreign expansion seems to entail a bigger potential gain for the domestic economy than foreign contraction, both along the domestic extensive and intensive margins. This parallels earlier findings for the US and other countries that –during the upward trend in globalization– firms increasing their activities abroad simultaneously expand rather than reduce their domestic activities (see Desai et al., 2009; Yamashita and Fukao, 2010; Goldbach et al., 2019; Kovak et al., 2021). It is also consistent with the fact that despite fears of employment losses due to offshoring, there is little evidence of a negative impact of offshoring on total employment (see Crinò, 2009, for a review of this literature).

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A Additional Tables and Figures

Table A.1: Number of networks (parent-year observations)

	No.	%
2010	43,760	5.0
2011	47,847	5.5
2012	49,737	5.7
2013	54,456	6.2
2014	57,308	6.6
2015	60,580	6.9
2016	64,049	7.3
2017	66,532	7.6
2018	67,126	7.7
2019	66,923	7.7
2020	67,755	7.8

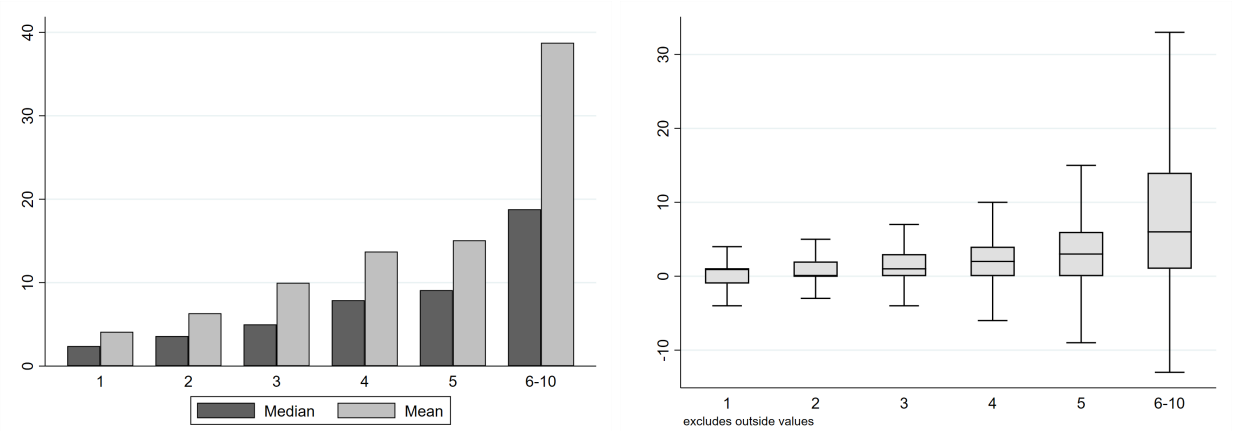
Note:

Table A.2: Parent country location frequency (unique networks)

	No.	%
GB	13,183	13.4
NL	11,395	11.5
IT	9,815	9.9
DE	9,594	9.7
BE	7,710	7.8
ES	6,051	6.1
DK	5,098	5.2
AT	4,409	4.5
FR	4,286	4.3
SE	3,857	3.9
CZ	2,865	2.9
NO	2,374	2.4
FI	2,275	2.3
SK	2,254	2.3
IE	2,061	2.1
HU	1,924	1.9
PT	1,699	1.7
EE	1,602	1.6
PL	1,289	1.3
SI	1,120	1.1
LV	768	0.8
HR	754	0.8
RO	751	0.8
BG	624	0.6
LT	599	0.6
GR	392	0.4

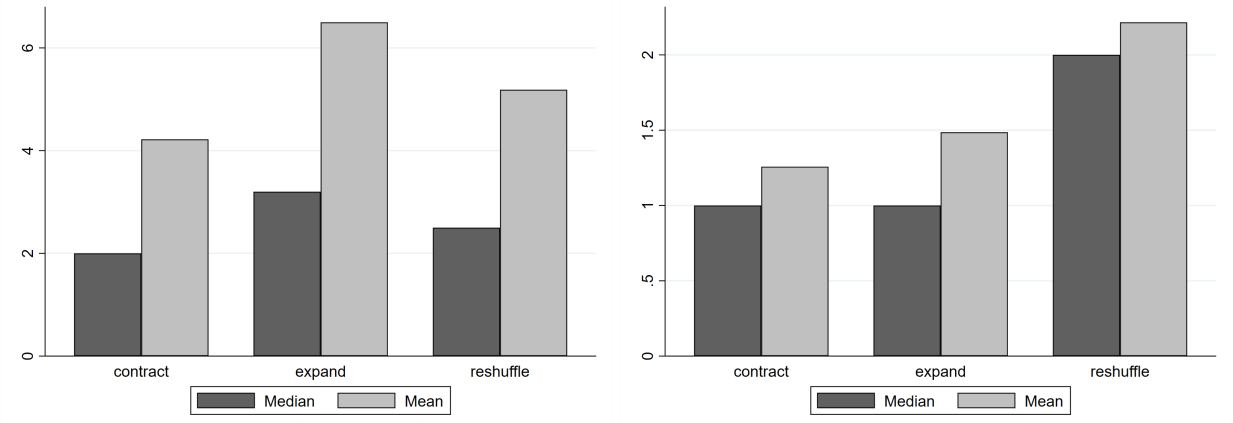
Source: MNE.dta

Figure A.1: Additional summary statistics on foreign network restructuring episodes: network size by episode length (left panel) and boxplot of the net change in the number of foreign affiliates by episode length (right panel)



Note: Both panels have categories of episode length on the horizontal axis. Bars in the left panel indicate the mean and the median of network size for networks belonging to a given length category. Network size is measured as the average number of affiliates over the time span of a network. The vertical axis in the right panel measures the net change in the number of foreign affiliates. The boxplot summarizes the distribution over episodes of a given length.

Figure A.2: Network size (left panel) and episode length (right panel) by type of network



Note: The left panel reports the mean and the median of network size by type of network. Network size is measured as the average number of affiliates over the time span of a network. The right panel reports mean and median episode length in years by type of network. A reshuffling epsiode requires a minimum of two years.

Figure A.3: Number of episodes per year by type of episode based on the number of foreign affiliates (left panel) and based on foreign country-industry combinations (right panel)

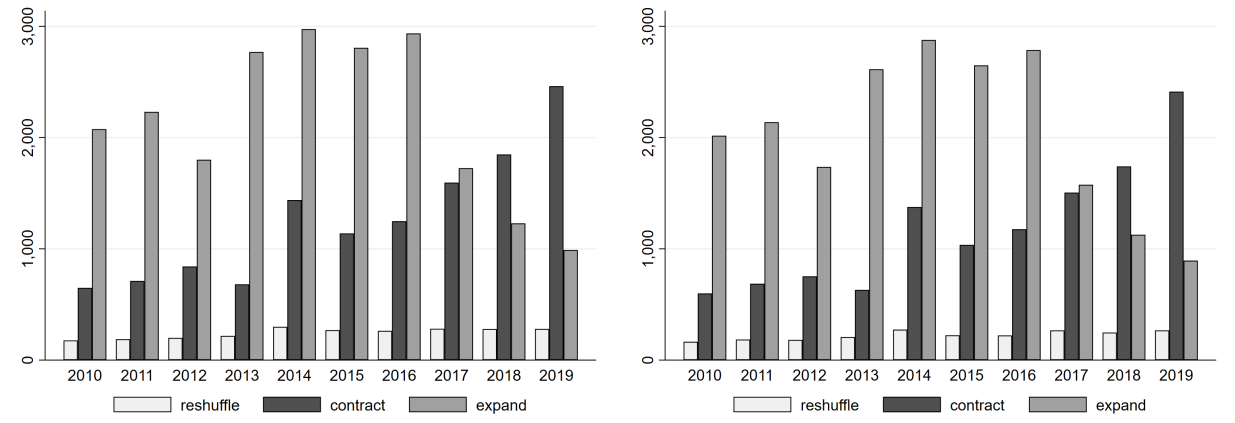
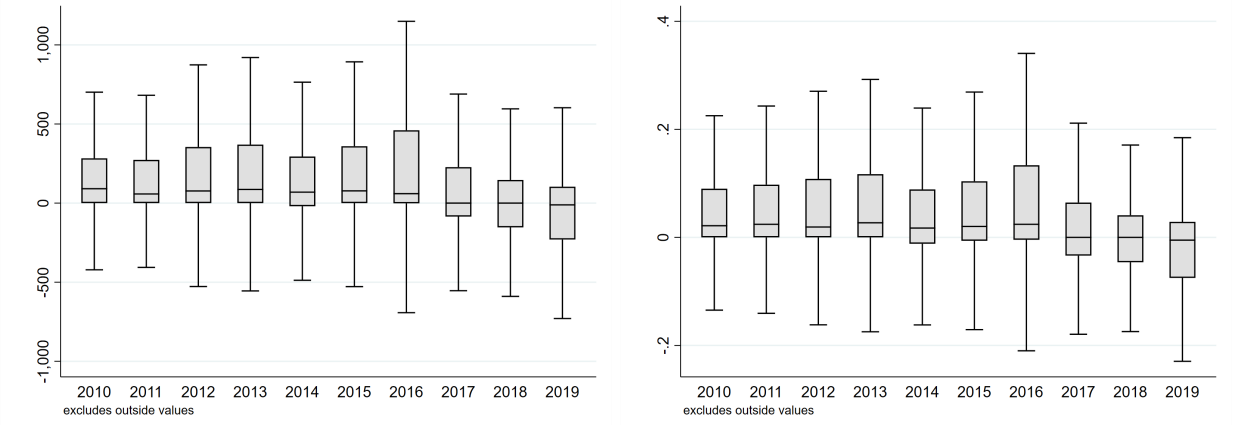
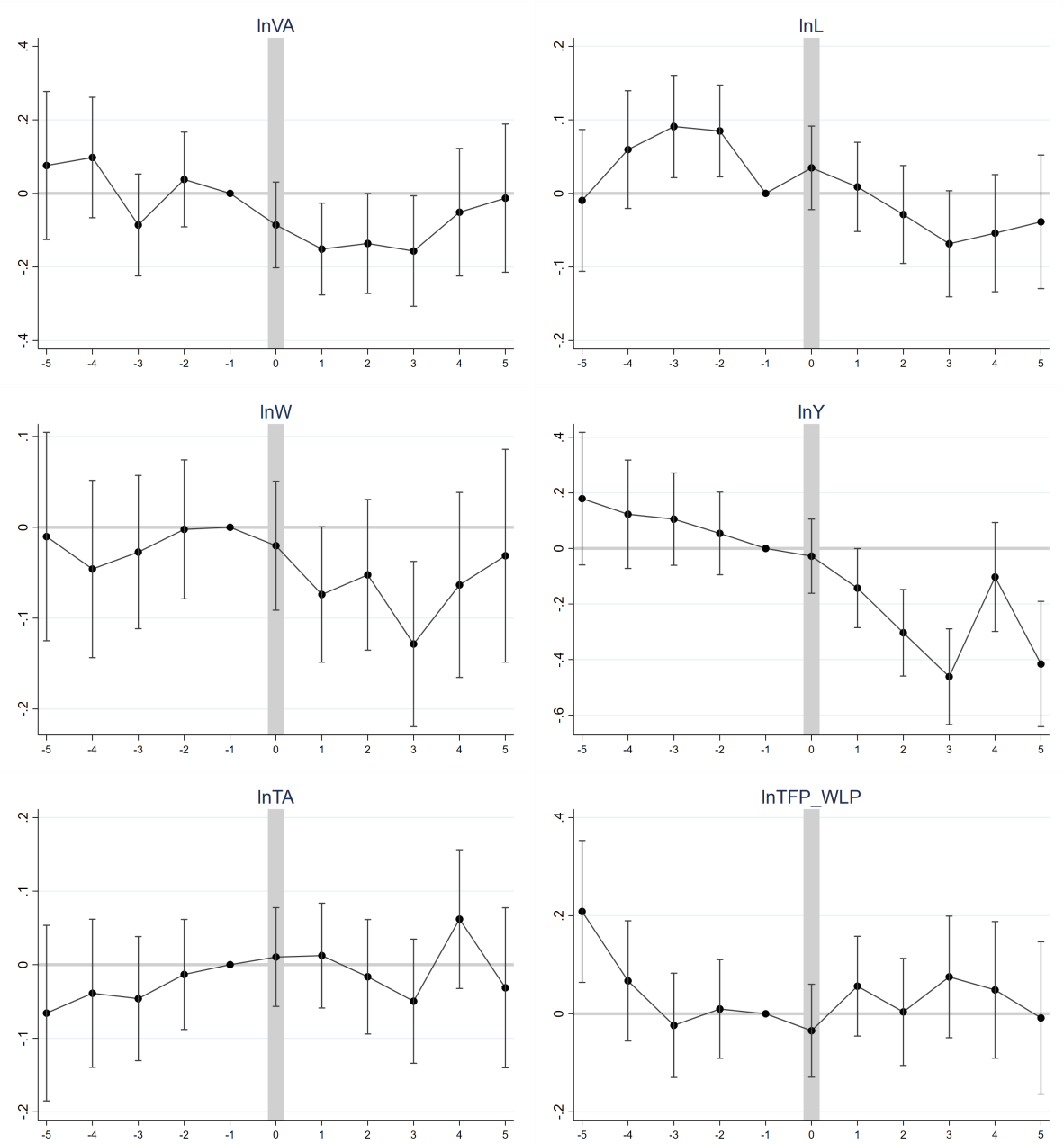


Figure A.4: Boxplots by year of the change over an episode in i) average physical distance (left panel); ii) average geoplitical distance (right panel) for a sample excluding UK-based parents



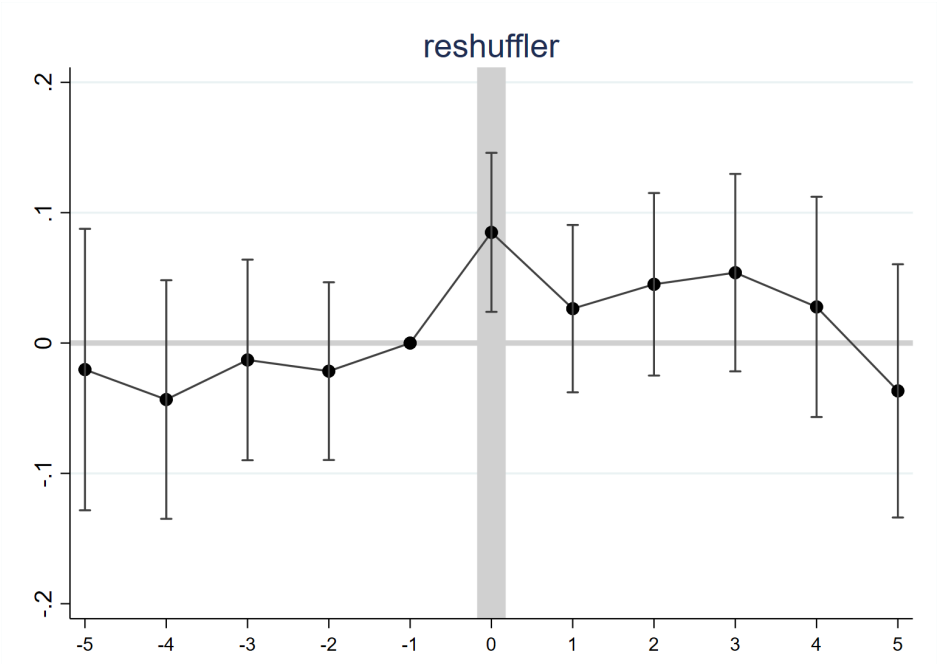
B Results for reshuffling networks

Figure B.1: Pre- and post episode performance: parent reshuffler.



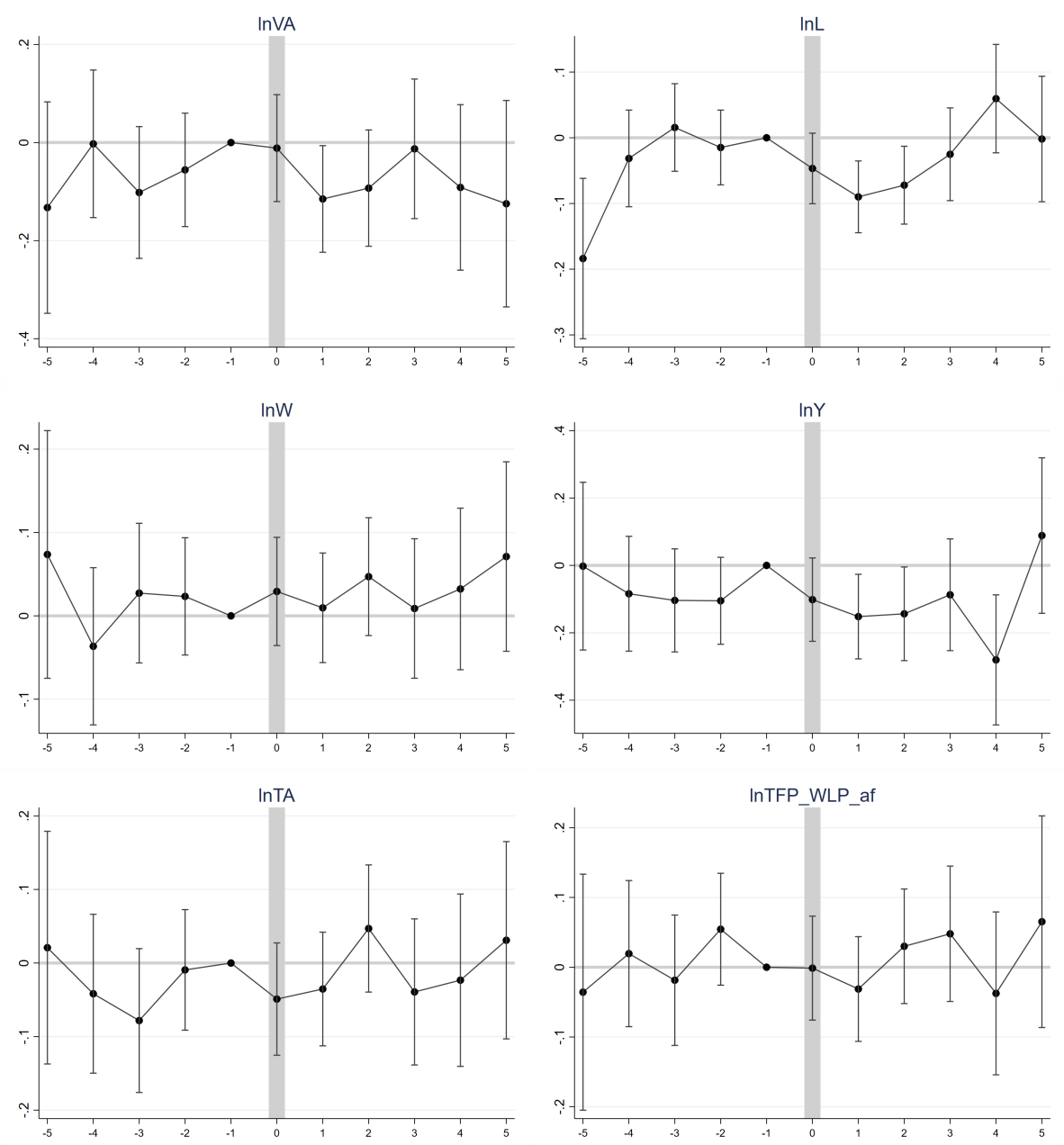
Note: Panel headings refer to the outcome considered in the subfigures. The horizontal axis marks the time relative to the episode-end which is labelled 0. The vertical shaded area around time zero highlights the episode. Note that the length of an episode can be more than one year. In that case, only the end-year of the episode is used in the estimation sample. Coefficients are normalized relative to the year before the episode starts (timestamp '-1'). Point estimates are indicated by dots and 90% confidence intervals are given by vertical lines with caps. The number of observations in the estimation samples for different outcome variables is: 44,781 (lnVA); 94,959 (lnL); 63,221 (lnW); 88,602 (lnY); 186,803 (lnTA); and 39,907 (lnTFP).

Figure B.2: Pre- and post episode number of domestic affiliates of reshuffling networks



Note: Panel headings refer to the type of networks (expanding, contracting or reshuffling) considered in the subfigure. Dissolving networks are excluded from the estimation sample. The horizontal axis marks the time relative to the episode-end which is labelled 0. The vertical shaded area around time zero highlights the episode. Note that the length of an episode can be more than one year. In that case, only the end-year of the episode is used in the estimation sample. Coefficients are normalized relative to the year before the episode starts (timestamp '-1'). Point estimates are indicated by dots and 90% confidence intervals are given by vertical lines with caps. The number of observations in the estimation sample is 164,341.

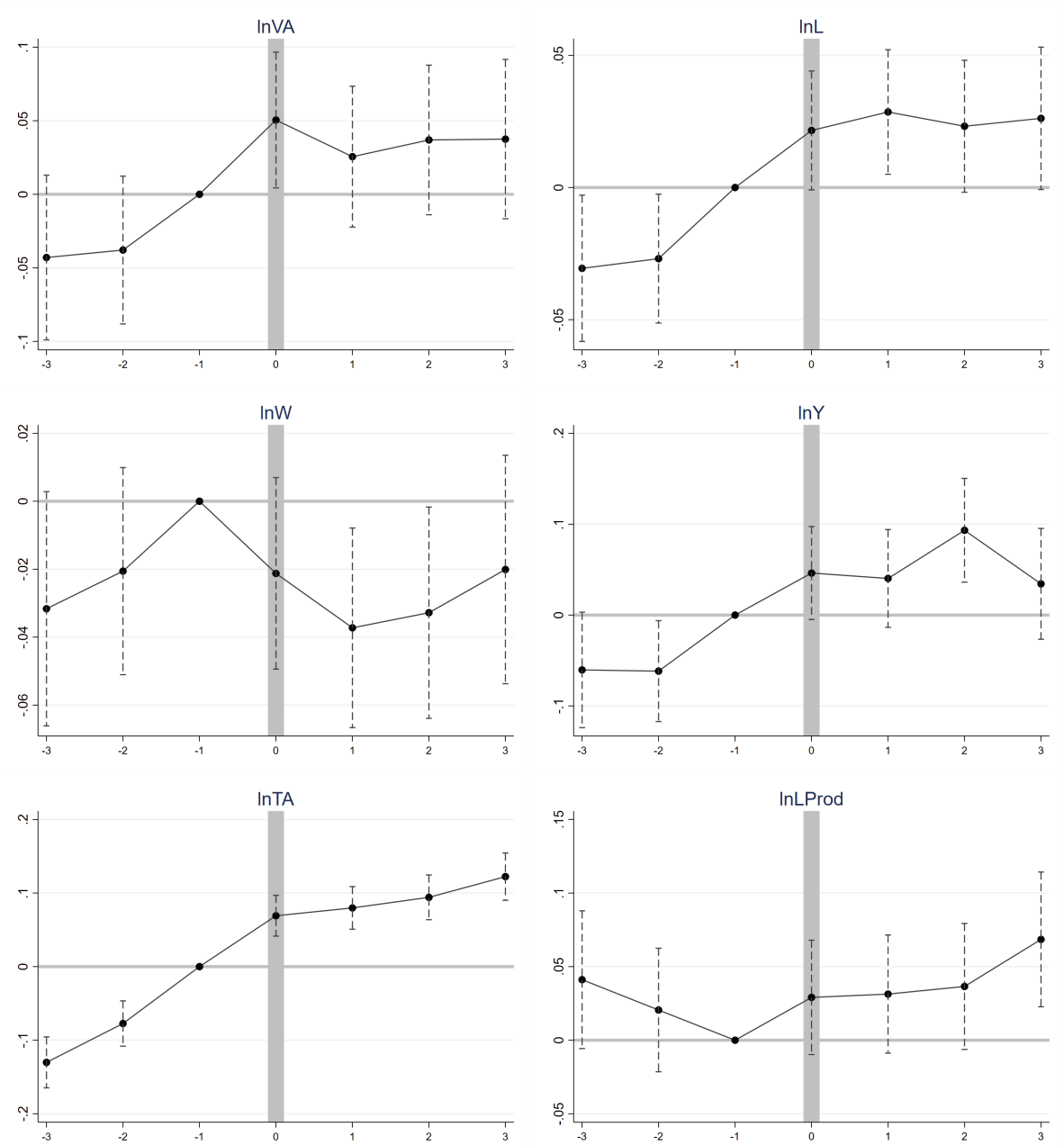
Figure B.3: Pre- and post episode performance: affiliate reshuffler.



Note: The estimation sample comprises all domestic 'stayer'-affiliates, i.e. domestic affiliates that are observed before and after the episode. The procedure de facto excludes affiliates from dissolving networks. Panel headings refer to the outcome considered in the subfigures. The horizontal axis marks the time relative to the episode-end which is labelled 0. The vertical shaded area around time zero highlights the episode. Note that the length of an episode can be more than one year. In that case, only the end-year of the episode is used in the estimation sample. Coefficients are normalized relative to the year before the episode starts (timestamp '-1'). Point estimates are indicated by dots and 90% confidence intervals are given by vertical lines with caps. The number of observations in the estimation samples for different outcome variables is: 66,809 (lnVA); 102,825 (lnL); 75,110 (lnW); 118,263 (lnY); 204,951 (lnTA); and 45,208 (lnTFP).

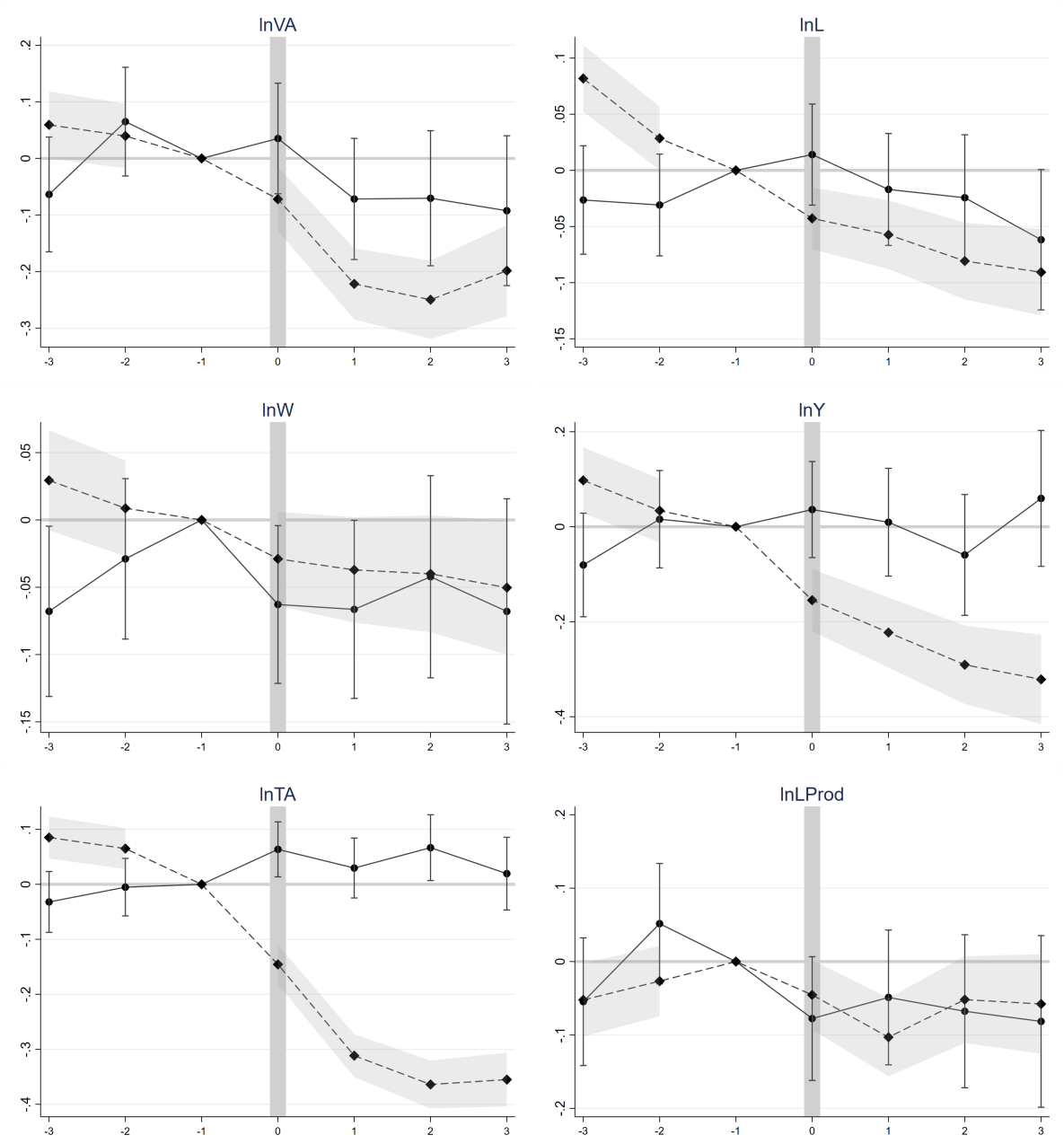
C Results for total domestic activity

Figure C.1: Total domestic performance pre and post-expansion episodes.



Note: Panel headings refer to the outcome considered in the subfigures. The horizontal axis marks the time relative to the episode-end which is labelled 0. The vertical shaded area around time zero highlights the episode. Note that the length of an episode can be more than one year. In that case, only the end-year of the episode is used in the estimation sample. Coefficients are normalized relative to the year before the episode starts (timestamp '-1'). Point estimates are indicated by dots and 90% confidence intervals are given by vertical lines with caps. The number of observations in the estimation samples for different outcome variables is: 29,295 (lnVA); 55,378 (lnL); 34,306 (lnW); 53,078 (lnY); 129,892 (lnTA); and 23,366 (lnLProd).

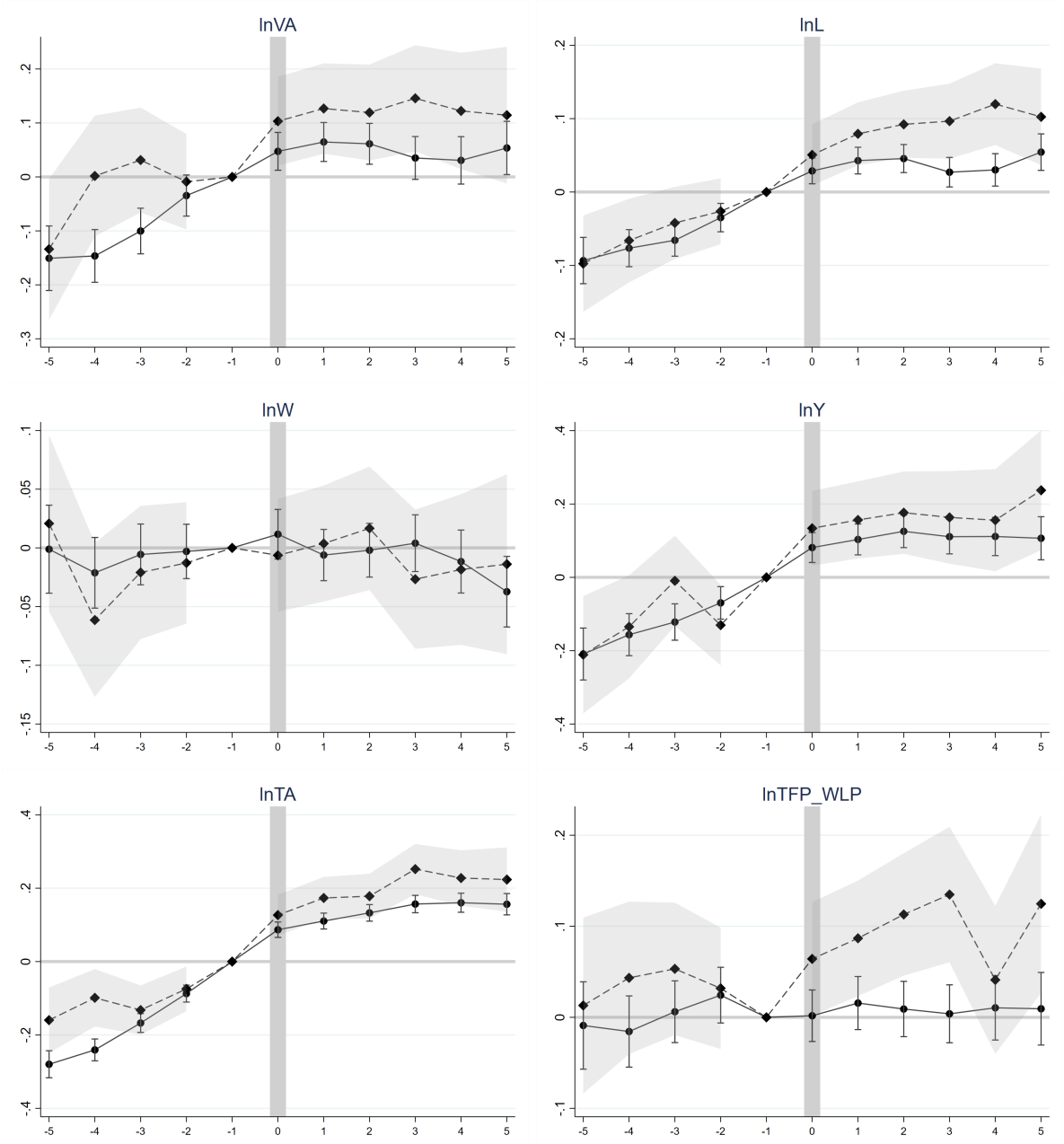
Figure C.2: Total domestic performance pre and post-contraction episodes.



Note: Panel headings refer to the outcome considered in the subfigures. The horizontal axis marks the time relative to the episode-end which is labelled 0. The vertical shaded area around time zero highlights the episode. Note that the length of an episode can be more than one year. In that case, only the end-year of the episode is used in the estimation sample. Coefficients are normalized relative to the year before the episode starts (timestamp '-1'). In specification (2), the *contract* coefficient corresponds to the effect for networks that contract but do not dissolve and the sum of the *contract* and *dissolve* coefficients corresponds to the effect for contracting networks that do dissolve. For the former, point estimates are indicated by the dots connected by full lines, and 90% confidence intervals are given by vertical lines with caps. For the latter, point estimates are indicated by the diamonds connected by dashed lines with the light grey-shaded areas giving the 90% confidence intervals. The number of observations in the estimation samples for different outcome variables is: 29,295 (lnVA); 55,378 (lnL); 34,306 (lnW); 53,078 (lnY); 129,892 (lnTA); and 23,366 (lnLProd).

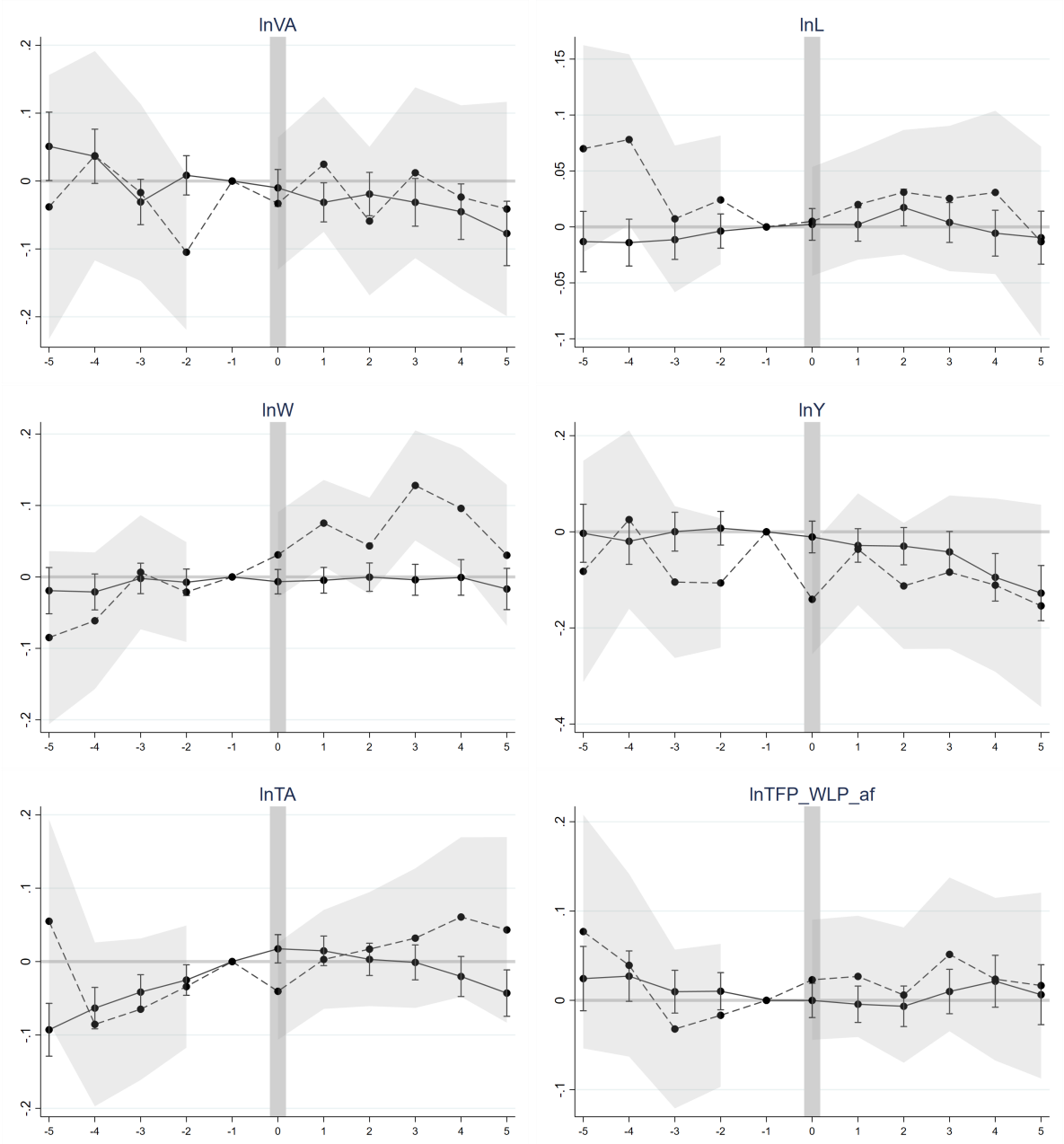
D Full results for reshoring

Figure D.1: Pre- and post episode performance: parent expandor and reshoring interaction



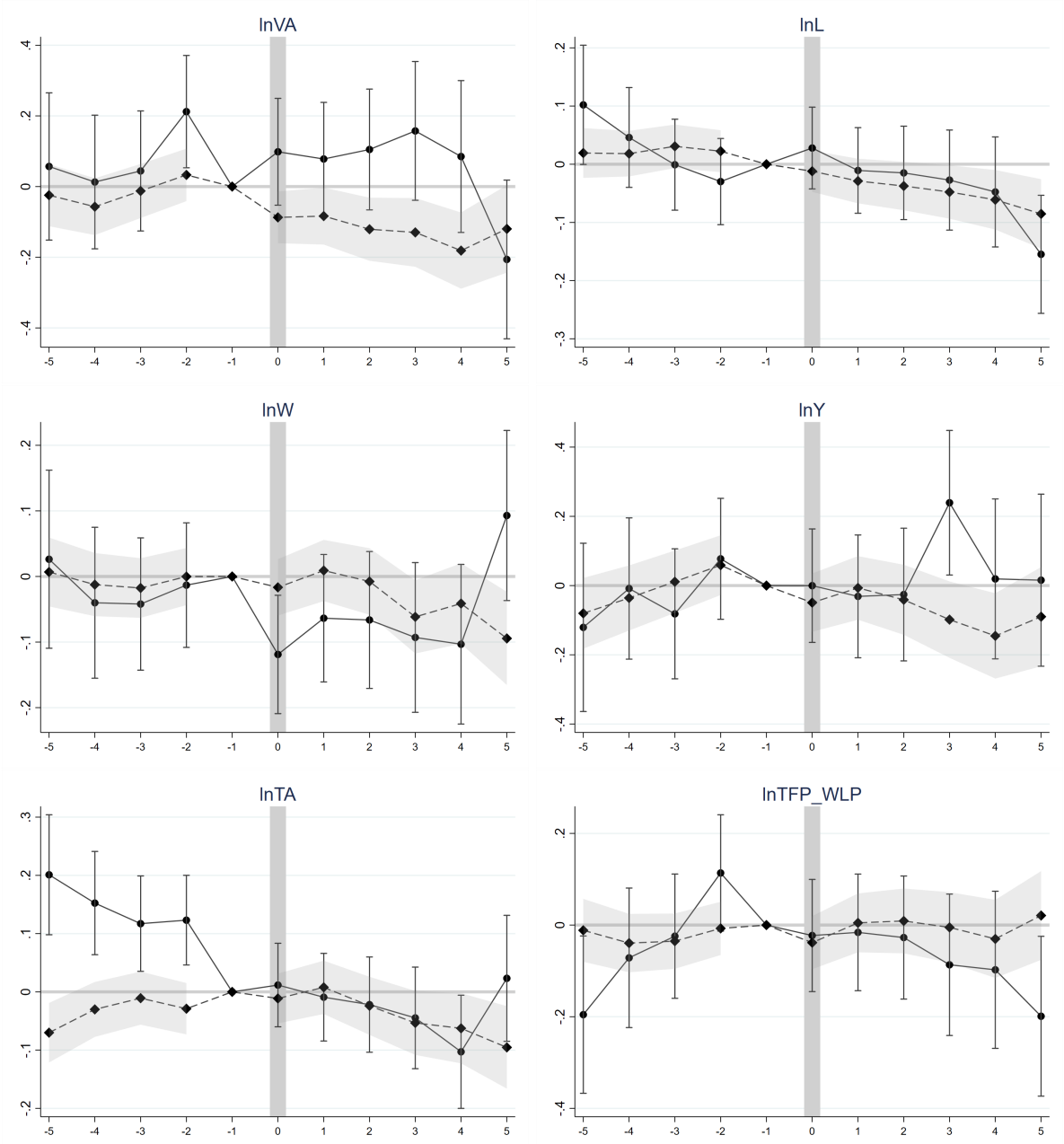
Note: Sample includes contracting networks but excludes dissolving networks. Panel headings refer to the outcome considered in the subfigures. The horizontal axis marks the time relative to the episode-end which is labelled 0. The vertical shaded area around time zero highlights the episode. Note that the length of an episode can be more than one year. In that case, only the end-year of the episode is used in the estimation sample. Coefficients are normalized relative to the year before the episode starts (timestamp '-1'). Specification (3) estimates the interaction effect of the *Expnd* coefficient with a reshoring dummy. For networks not reshoring point estimates are indicated by the dots connected by full lines, and 90% confidence intervals are given by vertical lines with caps. For networks that do reshore, the sum of the level effect of *Expnd* and its interaction with the reshoring dummy R are indicated by the diamonds connected by dashed lines with the light grey-shaded areas giving the 90% confidence intervals. The differences between the two sets of results reflect the heterogenity introduced by reshoring. The number of observations in the estimation samples for different outcome variables is: 44,781 (lnVA); 94,959 (lnL); 63,221 (lnW); 88,602 (lnY); 186,803 (lnTA); and 39,907 (lnTFP).

Figure D.2: Pre- and post episode performance: affiliate expandor and reshoring interaction.



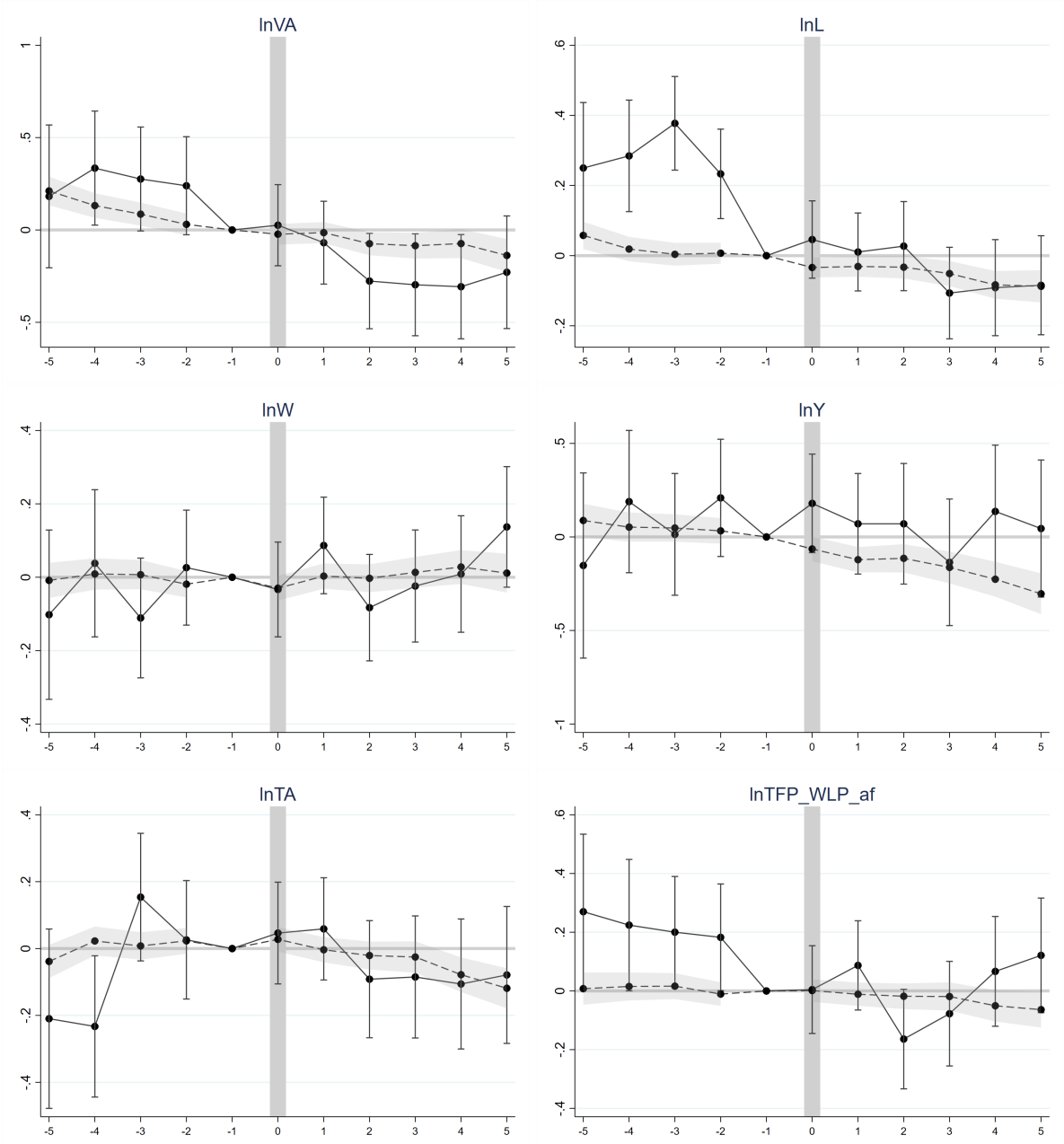
Note: Sample includes contracting networks but excludes dissolving networks. Panel headings refer to the outcome considered in the subfigures. The horizontal axis marks the time relative to the episode-end which is labelled 0. The vertical shaded area around time zero highlights the episode. Note that the length of an episode can be more than one year. In that case, only the end-year of the episode is used in the estimation sample. Coefficients are normalized relative to the year before the episode starts (timestamp '-1'). Specification (3) estimates the interaction effect of the *Expnd* coefficient with a reshoring dummy. For networks not reshoring point estimates are indicated by the dots connected by full lines, and 90% confidence intervals are given by vertical lines with caps. For networks that do reshore, the sum of the level effect of *Expnd* and its interaction with the reshoring dummy R are indicated by the diamonds connected by dashed lines with the light grey-shaded areas giving the 90% confidence intervals. The differences between the two sets of results reflect the heterogenity introduced by reshoring. The number of observations in the estimation samples for different outcome variables is: 66,809 (lnVA); 102,825 (lnL); 75,110 (lnW); 118,263 (lnY); 204,951 (lnTA); and 45,208 (lnTFP).

Figure D.3: Pre- and post episode performance: parent contractor and reshoring interaction.



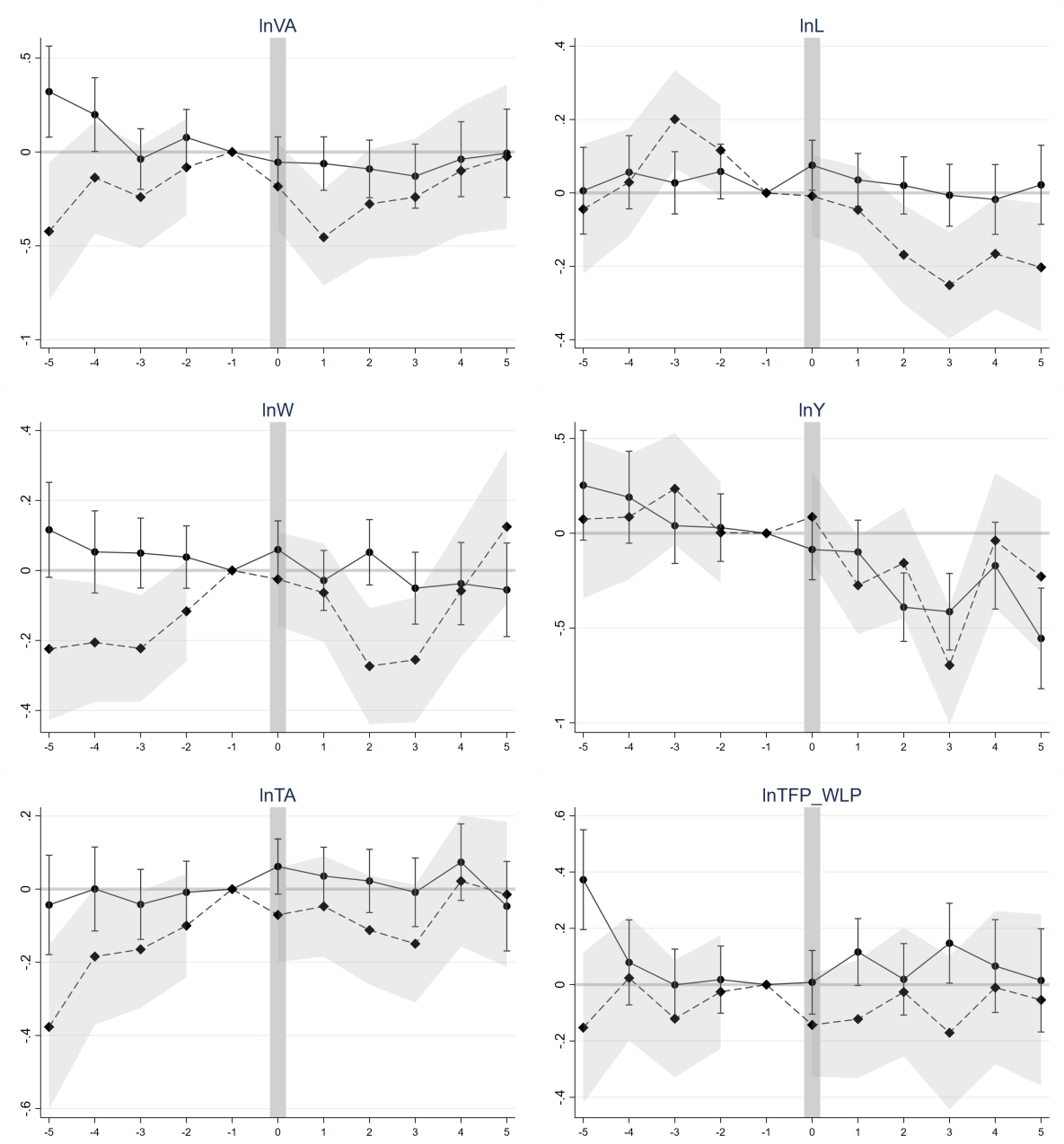
Note: Sample includes contracting networks but excludes dissolving networks. Panel headings refer to the outcome considered in the subfigures. The horizontal axis marks the time relative to the episode-end which is labelled 0. The vertical shaded area around time zero highlights the episode. Note that the length of an episode can be more than one year. In that case, only the end-year of the episode is used in the estimation sample. Coefficients are normalized relative to the year before the episode starts (timestamp '-1'). Specification (3) estimates the interaction effect of the *Ctrct* coefficient with a reshoring dummy. For networks not reshoring point estimates are indicated by the dots connected by full lines, and 90% confidence intervals are given by vertical lines with caps. For networks that do reshore, the sum of the level effect of *Ctrct* and its interaction with the reshoring dummy R are indicated by the diamonds connected by dashed lines with the light grey-shaded areas giving the 90% confidence intervals. The differences between the two sets of results reflect the heterogenity introduced by reshoring. The number of observations in the estimation samples for different outcome variables is: 44,781 (lnVA); 94,959 (lnL); 63,221 (lnW); 88,602 (lnY); 186,803 (lnTA); and 39,907 (lnTFP).

Figure D.4: Pre- and post episode performance: affiliate contractor and reshoring interaction.



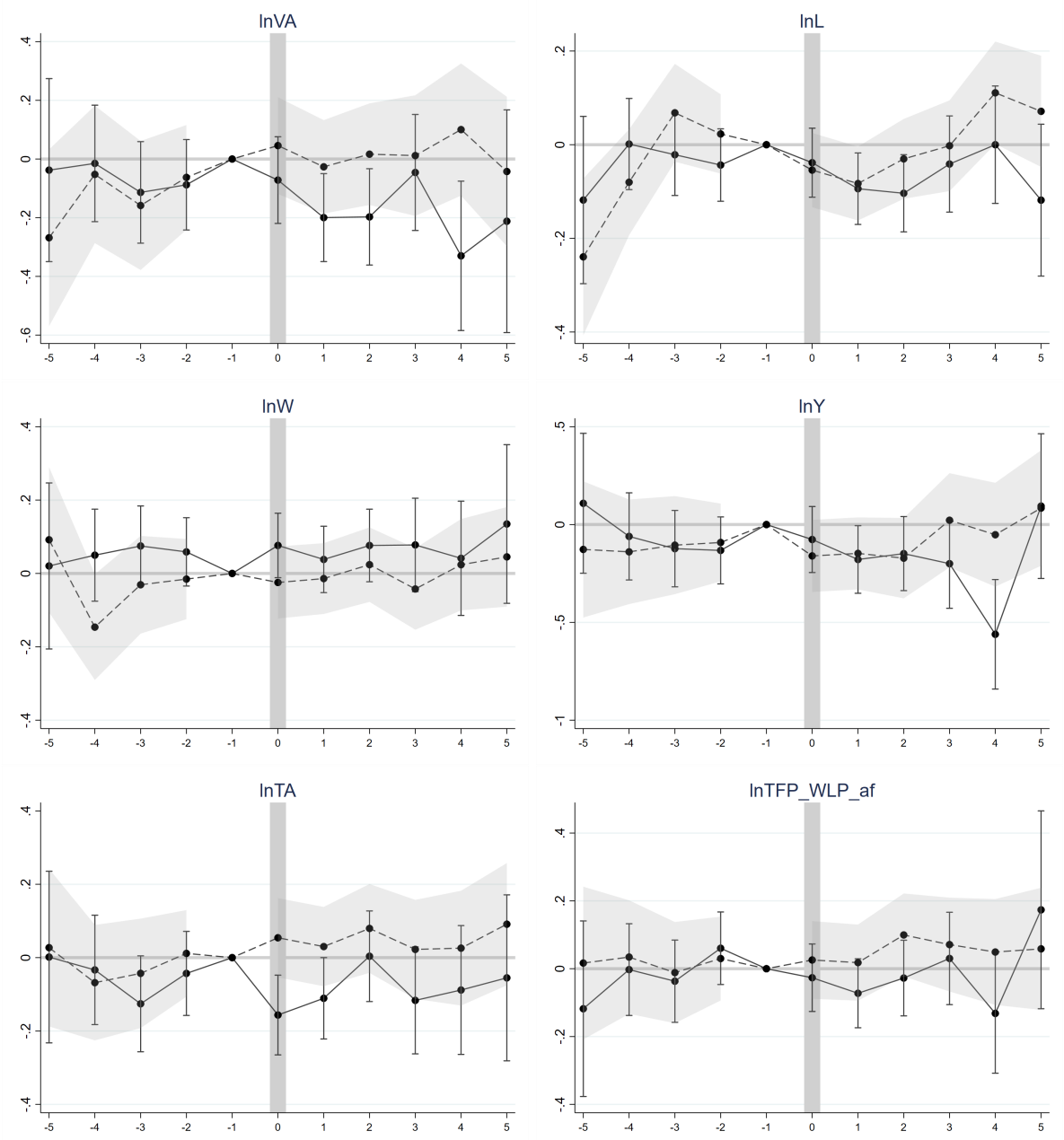
Note: Sample includes contracting networks but excludes dissolving networks. Panel headings refer to the outcome considered in the subfigures. The horizontal axis marks the time relative to the episode-end which is labelled 0. The vertical shaded area around time zero highlights the episode. Note that the length of an episode can be more than one year. In that case, only the end-year of the episode is used in the estimation sample. Coefficients are normalized relative to the year before the episode starts (timestamp '-1'). Specification (3) estimates the interaction effect of the *Ctrct* coefficient with a reshoring dummy. For networks not reshoring point estimates are indicated by the dots connected by full lines, and 90% confidence intervals are given by vertical lines with caps. For networks that do reshore, the sum of the level effect of *Ctrct* and its interaction with the reshoring dummy R are indicated by the diamonds connected by dashed lines with the light grey-shaded areas giving the 90% confidence intervals. The differences between the two sets of results reflect the heterogenity introduced by reshoring. The number of observations in the estimation samples for different outcome variables is: 66,809 (lnVA); 102,825 (lnL); 75,110 (lnW); 118,263 (lnY); 204,951 (lnTA); and 45,208 (lnTFP).

Figure D.5: Pre- and post episode performance: parent reshuffler and reshoring interaction.



Note: Sample includes contracting networks but excludes dissolving networks. Panel headings refer to the outcome considered in the subfigures. The horizontal axis marks the time relative to the episode-end which is labelled 0. The vertical shaded area around time zero highlights the episode. Note that the length of an episode can be more than one year. In that case, only the end-year of the episode is used in the estimation sample. Coefficients are normalized relative to the year before the episode starts (timestamp '-1'). Specification (3) estimates the interaction effect of the $Rshfl$ coefficient with a reshoring dummy. For networks not reshoring point estimates are indicated by the dots connected by full lines, and 90% confidence intervals are given by vertical lines with caps. For networks that do reshore, the sum of the level effect of $Rshfl$ and its interaction with the reshoring dummy R are indicated by the diamonds connected by dashed lines with the light grey-shaded areas giving the 90% confidence intervals. The differences between the two sets of results reflect the heterogenity introduced by reshoring.

Figure D.6: Pre- and post episode performance: affiliate reshuffler and reshoring interaction.



Note: Sample includes contracting networks but excludes dissolving networks. Panel headings refer to the outcome considered in the subfigures. The horizontal axis marks the time relative to the episode-end which is labelled 0. The vertical shaded area around time zero highlights the episode. Note that the length of an episode can be more than one year. In that case, only the end-year of the episode is used in the estimation sample. Coefficients are normalized relative to the year before the episode starts (timestamp '-1'). Specification (3) estimates the interaction effect of the $Rshfl$ coefficient with a reshoring dummy. For networks not reshoring point estimates are indicated by the dots connected by full lines, and 90% confidence intervals are given by vertical lines with caps. For networks that do reshore, the sum of the level effect of $Rshfl$ and its interaction with the reshoring dummy R are indicated by the diamonds connected by dashed lines with the light grey-shaded areas giving the 90% confidence intervals. The differences between the two sets of results reflect the heterogenity introduced by reshoring. The number of observations in the estimation samples for different outcome variables is: 66,809 (lnVA); 102,825 (lnL); 75,110 (lnW); 118,263 (lnY); 204,951 (lnTA); and 45,208 (lnTFP).

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