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The Economics and Policy Dynamics of Reshoring in a
Fragmenting Global Economy

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Patras, Greece, June 2026

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The Economics and Policy Dynamics of Reshoring in a Fragmenting Global Economy

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To mum and dad

Abstract

The study examines how policy tools, economic fundamentals, and automation are linked to reshoring-related outcomes across sectors. It uses EU manufacturing data organised by country, sector, and year from 2010 to 2023. Because reshoring is rarely recorded as a direct statistical event, the analysis relies on four proxy indicators: domestic value-added intensity, imported-input dependence, the EU-sourced share of imported intermediates, and the non-EU share of imported intermediates. These indicators make it possible to see whether value creation is becoming more domestic, whether reliance on imported inputs is changing, and whether firms are sourcing more from EU suppliers.

The results suggest a pattern of selective change rather than large scale reshoring. Domestic value-added intensity rose only modestly, while imported-input dependence did not fall for manufacturing. The stronger pattern is not full reshoring, but a shift towards sourcing more imported inputs from within the EU, with several sectors showing a shift in the composition of imported intermediates towards EU suppliers. The regression results suggest a positive association between sector-targeted State aid and domestic value-added intensity, but not a clear pattern for import replacement. Higher energy costs appear to weaken EU-based sourcing. The evidence on automation is more limited. When advanced digital intensity is used as a proxy for automation, the study does not find strong statistical evidence that automation makes reshoring easier across EU manufacturing.

The dissertation concludes that reshoring is more effective when used selectively, as a targeted policy tool for specific sectors. It can support resilience when policy incentives, productivity conditions, strategic priorities, and technological feasibility are aligned.

However, the evidence does not indicate a broad replacement of global value chains. The stronger pattern is selective domestic value creation and a shift towards EU-based suppliers. The main contribution of the study is to provide a framework for understanding when reshoring is feasible, what form it is likely to take, and how policy can support supply-chain resilience without overstating the case for reshoring.

Keywords

Reshoring; Global value chains; Supply-chain resilience; Industrial policy; Automation and digitalisation; European Union manufacturing.

Η Πολιτικοοικονομική Δυναμική του Επαναπατρισμού της Παραγωγής σε μια Κατακερματιζόμενη Παγκόσμια Οικονομία

Καζαντζής Γεώργιος

Περίληψη

Η εργασία εξετάζει τον τρόπο με τον οποίο τα εργαλεία πολιτικής, οι βασικοί οικονομικοί δείκτες, και η αυτοματοποίηση συνδέονται με τα αποτελέσματα του επαναπατρισμού της παραγωγής σε διάφορους τομείς. Χρησιμοποιεί στοιχεία από τον μεταποιητικό τομέα της ΕΕ ταξινομημένα ανά χώρα, τομέα και έτος, από το 2010 έως το 2023. Επειδή ο επαναπατρισμός της παραγωγής σπάνια καταγράφεται ως άμεσο στατιστικό γεγονός, η ανάλυση βασίζεται σε τέσσερις έμμεσους δείκτες: την ένταση της εγχώριας προστιθέμενης αξίας, την εξάρτηση από εισαγόμενες πρώτες ύλες, το μερίδιο των εισαγόμενων ενδιάμεσων προϊόντων που προέρχονται από την ΕΕ, και το μερίδιο των εισαγόμενων ενδιάμεσων προϊόντων που προέρχονται από χώρες εκτός ΕΕ. Οι δείκτες αυτοί καθιστούν δυνατό να διαπιστωθεί εάν η δημιουργία αξίας γίνεται όλο και περισσότερο εγχώρια, εάν η εξάρτηση από εισαγόμενες πρώτες ύλες μεταβάλλεται, και εάν οι επιχειρήσεις προμηθεύονται περισσότερο από προμηθευτές της ΕΕ.

Τα αποτελέσματα υποδηλώνουν ένα μοτίβο επιλεκτικής μεταβολής και όχι ενός επαναπατρισμού ευρείας κλίμακας. Η ένταση της εγχώριας προστιθέμενης αξίας αυξήθηκε μόνο ελαφρώς, ενώ η εξάρτηση από εισαγόμενες πρώτες ύλες δεν μειώθηκε στον τομέα της μεταποίησης. Το πιο έντονο μοτίβο δεν είναι ο πλήρης επαναπατρισμός της παραγωγής, αλλά μια στροφή προς την προμήθεια περισσότερων εισαγόμενων πρώτων υλών από εντός της ΕΕ.

Τα αποτελέσματα της παλινδρόμησης υποδηλώνουν θετική συσχέτιση μεταξύ των κρατικών ενισχύσεων που στοχεύουν σε συγκεκριμένους τομείς και της έντασης της εγχώριας προστιθέμενης αξίας, όμως δεν διαφαίνεται σαφές μοτίβο όσον αφορά την υποκατάσταση των εισαγωγών. Επίσης, το υψηλότερο ενεργειακό κόστος φαίνεται να αποδυναμώνει τις προμήθειες από κατασκευαστές εντός της ΕΕ. Τα στοιχεία σχετικά με

την αυτοματοποίηση είναι πιο περιορισμένα. Όταν η ένταση της προηγμένης ψηφιακής τεχνολογίας χρησιμοποιείται ως έμμεσος δείκτης για την αυτοματοποίηση, η μελέτη δεν εντοπίζει ισχυρά στατιστικά στοιχεία που να υποδηλώνουν ότι η αυτοματοποίηση διευκολύνει την επαναπατρισμό σε ολόκληρο τον μεταποιητικό τομέα της ΕΕ.

Η εργασία καταλήγει στο συμπέρασμα ότι ο επαναπατρισμός είναι πιο αποτελεσματικός όταν χρησιμοποιείται ως εργαλείο πολιτικής επιλεκτικά για συγκεκριμένους τομείς. Μπορεί να ενισχύσει την ανθεκτικότητα όταν τα πολιτικά κίνητρα, οι συνθήκες παραγωγής, οι στρατηγικές προτεραιότητες και η τεχνολογική δυνατότητα είναι εναρμονισμένα.

Ωστόσο, τα στοιχεία δεν υποδεικνύουν μια ευρεία αντικατάσταση των παγκόσμιων αλυσίδων αξίας. Η πιο έντονη τάση είναι η επιλεκτική εγχώρια δημιουργία αξίας και η στροφή προς προμηθευτές με έδρα την ΕΕ. Η κύρια συμβολή της εργασίας είναι η παροχή ενός πλαισίου για την κατανόηση του πότε ο επαναπατρισμός παραγωγικών δραστηριοτήτων είναι εφικτός, ποια μορφή είναι πιθανό να λάβει, και πώς οι πολιτικές επιλογές μπορούν να στηρίξουν την ανθεκτικότητα της εφοδιαστικής αλυσίδας χωρίς να υπερεκτιμούνται τα επιχειρήματα υπέρ του επαναπατρισμού της παραγωγής.

Λέξεις – Κλειδιά

Επαναπατρισμός παραγωγής; Παγκόσμιες αλυσίδες παραγωγής; Ανθεκτικότητα της εφοδιαστικής αλυσίδας; Βιομηχανική πολιτική; Αυτοματοποίηση και ψηφιοποίηση; Μεταποίηση στην Ευρωπαϊκή Ένωση

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List of Abbreviations & Acronyms

Abbreviations & Acronyms	Full form / Meaning
COVID-19	Coronavirus Disease 2019
DII	Eurostat Digital Intensity Index
EU	European Union
EU27	The 27 Member States of the European Union
EUR	Euro
FIGARO	Full International and Global Accounts for Research in Input-Output Analysis ¹
GFC	Global Financial Crisis
GVC	Global Value Chain
ICT	Information and Communication Technology
IoT	Internet of Things
kWh	Kilowatt-hour
NACE	Nomenclature statistique des activités économiques dans la Communauté européenne. (Statistical Classification of Economic Activities in the European Community)
NBER	National Bureau of Economic Research
n.e.c.	Not elsewhere classified
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
pp	Percentage points
R&D	Research and Development
RQ	Research Question
US	United States
VAT	Value Added Tax
VUCA	Volatility, Uncertainty, Complexity and Ambiguity

¹ EU inter-country supply, use and input-output tables (FIGARO)

1. Introduction and Study Overview

1.1 Introduction

Since the global financial crisis (GFC) of 2008, the global economy has become more unstable. Recurring shocks, geopolitical tensions, and growing scepticism towards economic integration have challenged the assumptions underpinning globalisation and economic integration. Before the crisis, global value chains (GVCs) expanded through international specialisation, cost arbitrage, and trade liberalisation. The financial crisis, the COVID-19 pandemic, and rising trade tensions exposed the vulnerabilities of long and geographically fragmented supply chains, changing the environment in which multinational firms operate, particularly in advanced economies such as the European Union (Clancy et al., 2024).

In response, reshoring and related strategies such as nearshoring, friend-shoring, diversification and regionalisation have become important strategic priorities. Governments often present these strategies as the means of strengthening supply-chain resilience, reducing external dependencies, and supporting economic and national security. Such policy goals are now linked to strategic autonomy and to rebuilding domestic or regional capacity in sectors considered as economically or geopolitically sensitive (Kazancoglu et al., 2024).

To avoid any conceptual ambiguity, the typology of strategies used in this dissertation is listed in Table 1. These terms are used throughout the dissertation in a narrow analytical sense, as defined in the table.

Strategy	Meaning
Reshoring	Return of production or sourcing to the home country.
Nearshoring	Relocation of production or sourcing to geographically nearby economies.
Friend-shoring	Relocation of production or sourcing to politically aligned or trusted economies.
Diversification	Use of multiple suppliers, countries, or regions to reduce concentration risk.

Regionalisation	Greater concentration of production or sourcing within a regional bloc, such as the EU.
Localisation	Broader policy aim of strengthening domestic or regional capacity (albeit, not necessarily bringing production back to the home country)

Table 1 - Conceptual typology of supply-chain reconfiguration strategies

For firms, recent shocks have made decisions on production-location depend not only on wages, but also on transport costs, regulatory risk, inventory needs, and proximity to customers. (Kudrenko, 2024). Automation and digitalisation may reduce the importance of labour costs, yet they require capital and skills. Therefore, reshored production may be more automated and create less jobs than political debates sometimes imply (Kudrenko, 2024).

As a result, the economic case for reshoring is not straightforward. Localisation can improve perceived resilience, but it can also raise prices, or reduce output as a result of weakening competition and productivity (Clancy et al., 2024). The dissertation examines reshoring as the combined result of policy incentives, economic feasibility, and sector-specific conditions. (Gereffi et al., 2021).

The academic motivation for this study stems from the fact that reshoring is explained in different ways. Comparative advantage emphasises the efficiency of international specialisation. Research on resilience focuses on diversification and risk reduction. Industrial policy debates, by contrast, place more emphasis on security and strategic autonomy. The evidence is also fragmented, as macroeconomic studies, firm-level relocation cases, and sector-specific analyses often measure different outcomes.

This dissertation focuses on EU sectoral evidence because the EU combines a large internal market with strategic-autonomy objectives. As a result, changes in supply-chain may appear either as stronger domestic value creation or as greater reliance on EU-based sourcing. Reshoring is also difficult to measure directly, since official statistics rarely record relocation decisions. It therefore has to be inferred cautiously from proxy indicators such as domestic value-added intensity, imported-input dependence, and the regional composition of imported intermediates (Gereffi et al., 2021; Grossman et al., 2021).

1.2 Problem Statement

Recent disruptions have made cross-border sourcing less reliable, especially for critical inputs. Dadush (2023) links this concern to more frequent and severe GVC shocks, which have contributed to shortages, delays, and inflation. In the EU, this has strengthened the policy of Open Strategic Autonomy and the aim of reducing excessive external dependencies (Clancy et al., 2024). The US-China rivalry has also made location decisions part of a broader contest over technology and economic power (Gur & Dilek, 2023). However, these pressures do not necessarily produce a straightforward reversal of globalisation. Research on GVC governance shows that trade policy can trigger supplier switching, multi-sourcing, regionalisation, and relocation of selected stages, rather than repatriation of entire value chains (Gereffi et al., 2021).

The policy lesson is not that all production should return home. GVCs still remain efficient, and their resilience may be the result of multiple suppliers, spare capacity, or targeted localisation of critical stages (Dadush, 2023). Therefore, treating reshoring as a single, uniform response would give an inaccurate picture of how firms usually adjust.

At firm level, firms take account of shipping costs, inventories, tariffs, regulations, disruption exposure, and speed to market (Kudrenko, 2024). Automation may reduce the labour-cost gap, but in advanced economies it can also mean fewer jobs, and its feasibility varies by sector (Gur & Dilek, 2023). Automation is not equally feasible across industries. In labour-intensive sectors, practical real-world constraints limit the scope for relocating production to advanced economies (Bárcia de Mattos et al., 2021). As a result, the economic and social effects of reshoring are likely to vary systematically across sectors.

How firms respond to pressures for reshoring creates trade-offs across the economy (e.g. employment vs inflation) that policymakers must address. Localisation agendas are pursued through subsidies, investment incentives, standards, compliance requirements, and other regulatory measures that can indirectly limit imports (Clancy et al., 2024). Yet EU efforts to reshape supply chains and bring selected activities closer to home are moving faster than the evidence needed to assess sector-specific trade-offs and to design coherent policy responses. Economy-wide studies may estimate aggregate effects, but they often overlook how sector mechanisms and policy instruments are combined in practice (Clancy et al., 2024).

The resulting problem is that firms and policymakers lack a clear framework for identifying which combinations of policy instruments and economic factors can strengthen resilience without excessive costs or unintended supply-chain reconfiguration. Firm-level relocation models help managers compare offshoring, nearshoring, and reshoring, yet they are usually built around individual cases and do not always link operational choices with economic outcomes (Kazancoglu et al., 2024). This dissertation addresses that gap by linking policy tools, economic fundamentals, automation, and sectoral conditions in one analytical framework, while recognising that reshoring cannot be observed directly and must therefore be inferred from proxy outcomes. The key issue is not only whether reshoring occurs, but in which form or configuration it appears under different policy and sector conditions.

1.3 Research Questions

The dissertation asks how policy measures and economic conditions shape reshoring and wider supply-chain organisation across industries during a period of global fragmentation. This focus reflects the evidence that recent shocks have exposed GVC vulnerabilities without necessarily triggering a withdrawal from cross-border production (Dadush, 2023).

The analysis also starts from the observation that policy pressure does not usually move whole value chains back home. Firms may switch suppliers, regionalise sourcing, or relocate selected stages, (Gereffi et al., 2021). The study therefore examines sectoral patterns in the EU, including differences between sectors more and less exposed to policy intervention.

Automation is treated separately because it can change the labour-cost calculations, reorganise production, and alter employment effects, but only where the sectoral and technological conditions make this feasible (Gur & Dilek, 2023; Bárcia de Mattos et al., 2021). The research questions are therefore structured around the three explanatory dimensions developed in the conceptual framework: policy tools, economic fundamentals, and automation, while at the same time preserving its sectoral focus.

The empirical analysis of RQ1 is deliberately narrower than the broader discussion of policy tools in Chapter 2. This practically means that, while Chapter 2 discusses tariffs, export controls, sanctions, and standards as part of the policy environment, Chapter 4 is using only

sector-targeted State aid as the comparable country-sector-year proxy for direct policy support. The RQ1 results should therefore be read as evidence on direct support, not on the full range of policy tools.

Research Question (RQ) 1: How does sector-targeted policy support affect outcomes associated with reshoring across different sectors?

Research Question (RQ) 2: How do economic fundamentals (e.g., labour costs, energy prices) influence outcomes associated with reshoring across sectors?

Research Question (RQ) 3: Does automation make reshoring more feasible by reducing the importance of labour-cost differences?

1.4 Contribution of the Study

This dissertation contributes to the reshoring and supply-chain resilience debate by linking policy instruments that influence where firms organise production, with the economic fundamentals that determine what firms can feasibly change in their supply chain. Existing research shows that repeated shocks and geopolitical shifts have changed how firms balance risk, while at the same time they have encouraged governments to pursue localisation agendas. Yet, it does not always provide an explanation of how policy instruments and economic fundamentals interact to determine reshoring outcomes (Dadush, 2023; Grossman et al., 2021; Kazancoglu et al., 2024).

Conceptually, the dissertation treats reshoring as one possible outcome within a wider set of supply-chain adjustments. It builds on evidence that trade-policy shocks and geopolitical uncertainty often lead firms to adjust their networks through partial relocation, and regionalisation. It also shows how policy instruments, such as subsidies, and economic fundamentals, including labour costs, energy costs, and technological capability, can shape outcomes such as reshoring, nearshoring, and diversification (Gereffi et al., 2021).

Empirically, the dissertation compares how reshoring-related indicators have changed across EU manufacturing since the global financial crisis. This addresses a limitation in the existing debate. Some studies examine the effects of localisation policies on the economy, while many industry- and firm-level studies remain case-specific, making systematic cross-

sector comparison difficult (Clancy et al., 2024; Bárcia de Mattos et al., 2021). The sectoral approach used in this dissertation helps align the research questions, methodology and results, while avoiding claims that cannot be supported by aggregate data alone.

Automation is also separated from the other drivers because its effect differs across industries and is often associated with capital-intensive production and limited job creation (Kudrenko, 2024; Bárcia de Mattos et al., 2021).

1.5 Structure of the Dissertation

The dissertation proceeds in five chapters. Chapter 1 introduces the background, problem, research questions, and contribution. Chapter 2 reviews the literature and develops the framework linking policy tools, economic fundamentals, automation, and supply-chain reconfiguration. Chapter 3 explains the sectoral research design, data sources, variables, and proxy indicators. Chapter 4 presents the empirical results for EU manufacturing, focusing on policy exposure, economic feasibility, automation, and sectoral variation. Chapter 5 draws the findings together, discusses policy and managerial implications, states the limitations, and identifies areas for future research.

2. Literature Review

2.1 Theoretical Foundations

2.1.1 GVCs and comparative advantage

The literature reviewed treats GVCs as cross-border production networks in which different stages of production are distributed across countries and coordinated through trade, investment, and firm organisation. Broecke (2024) describes this as the international restructuring of activities through outsourcing and offshoring, while Dadush (2023) shows that GVCs can still generate efficiency gains when suppliers remain connected through comparative advantage.

Comparative advantage is therefore the starting point for the analysis. Firms offshore production to access lower costs and access specialised capabilities. These gains came with exposure to shocks, adjustment costs, and political pressure, particularly where the benefits of globalisation were not evenly distributed. (Broecke, 2024; Clancy et al., 2024). Reshoring debates arise from this tension between efficiency and the demand for resilience, security, and domestic capacity.

Gereffi et al. (2021) provide the most useful GVC framework for this study. They show that firms facing trade-policy shocks often switch production, markets, or suppliers, or upgrade into higher-value activities. This supports the dissertation's treatment of reshoring as one possible form of reconfiguration, rather than as the automatic response to disruptions.

2.1.2 Supply-chain resilience, supply risk, and diversification

Kazancoglu et al. (2024) define supply-chain resilience as the capacity to prepare for disruption and to recover while maintaining continuity of operations. In this view, reshoring is only one option for resilience. Nearshoring, supplier diversification, and alternative sourcing arrangements can serve the same purpose.

Grossman et al. (2021) make this distinction clearer by asking whether policy should promote diversification or domestic sourcing. Their model shows that the welfare effects depend on risk exposure and demand conditions, and that diversification can sometimes provide resilience at lower cost than reshoring. This point is important because resilience and localisation should not be treated as identical.

Dadush (2023) argues that risk should be assessed across firm and value-chains. Supply chains with many alternative suppliers are easier to stabilise than those based on specialised knowledge, proprietary capabilities or regulated processes. The feasibility of reshoring therefore depends on supply risk, value-chain complexity, and supplier concentration.

2.1.3 Industrial policy, techno-nationalism, and strategic autonomy²

The literature also links reshoring to the resurgence of industrial policy. Gereffi et al. (2025) argue that industrial policy has shifted from a prosperity-driven agenda associated with global integration toward a security-driven agenda under geopolitical fragmentation³. In advanced economies, economic security is increasingly pursued through instruments such as tariffs, sanctions, due diligence requirements, and chokepoint avoidance, which may encourage reshoring, nearshoring, or bringing strategic activities under direct firm control.

This security-oriented logic is especially visible in techno-nationalism⁴. Gur and Dilek (2023) interpret reshoring as part of US-China economic rivalry and analyse neo-protectionism and smart automation as interrelated strategies intended to reduce dependence on China and strengthen domestic manufacturing. They argue that protectionism and automation are unlikely, on their own, to restore competitiveness or generate broad employment gains. These measures need to be supported by a wider policy framework, including industrial policy, technology policy, taxation, R&D, and workforce training. Cieřlik and Zamojska (2025) similarly caution that techno-nationalism may weaken GVC resilience, whereas diversification of supply sources and regional cooperation can help reinforce it.

² Strategic autonomy refers policies to secure critical inputs and reduce excessive external dependence.

³ The economic relations based on political and security priorities making trade, investment and sourcing less predictable.

⁴ Policies that protect and promote national capabilities in strategic sectors.

Industrial policies change the incentives firms face, but they cannot dictate the final outcome. Firms may relocate selected stages, switch suppliers, internalise strategic functions, or regionalise production while still relying on their international networks (Gereffi et al., 2021; Gereffi et al., 2025; Gur & Dilek, 2023). This is why the empirical analysis links policy measures to several possible outcomes rather than to reshoring alone.

2.1.4. Firms' relocation decision: cost, risk and capability

Tsai and Urmetzer (2024) review several frameworks for explaining relocation decisions, including the resource-based view and transaction cost economics. These perspectives help explain how coordination costs, ownership advantages, and location advantages shape firms' relocation decisions. However, they also have limitations. Transaction cost economics may underestimate resilience and political pressure, while the resource-based view may underestimate geopolitical shocks.

Reshoring decisions are increasingly made under uncertainty. Kudrenko (2024) shows that firms assess total cost beyond labour, including productivity, energy, transport, tariffs, supplier reliability, and flexibility. Kazancoglu et al. (2024) describe GVCs as complex systems where disruption can spread through the network. Reshoring is therefore shaped by cost and risk, not by cost minimisation alone.

Firm capabilities and knowledge also matter. Skilled labour, specialised knowledge, supplier ecosystems, and technological capability affect whether reshoring is practical and what form it takes (Dadush, 2023; Kudrenko, 2024). This keeps the theoretical focus aligned with the dissertation's empirical variables: policy tools, economic fundamentals, automation, and sectoral conditions.

2.1.5. Synthesis and research gap

The reviewed theories show that reshoring is shaped by GVC structures, comparative advantage, resilience considerations, industrial policy, firm capabilities, risk exposure, and technological feasibility. However, these explanations are often treated separately. Macro-level studies identify the output and inflation effects of localisation but do not fully capture sectoral differences (Clancy et al., 2024). Firm-level relocation studies explain decision-making but they do not always link those decisions to broader policy outcomes (Tsai &

Urmetzer, 2024). Resilience research identifies alternative strategies but does not always show how policy instruments and economic fundamentals interact across sectors (Grossman et al., 2021; Kazancoglu et al., 2024).

The research gap addressed by this dissertation is therefore more relevant. There is limited longitudinal evidence at EU sector level on how policy exposure, economic feasibility, and automation jointly shape reshoring-related outcomes. Since reshoring is not directly observed in the available datasets, the dissertation operationalises it through proxy indicators of domestic value creation, imported-input dependence, and the EU versus non-EU sourcing composition of imported intermediates.

2.2. Concept and Evolution of Reshoring

Rather than a simple reversal of globalisation, the evolution of reshoring should be seen against the earlier expansion of offshoring, the subsequent reassessment of supply-chain risk, and the growing tendency of firms to reconfigure value chains rather than fully repatriate production.

2.2.1. From offshoring to strategic relocation

Reshoring is best understood against the history of offshoring and GVC expansion. Firms originally spread production across countries to benefit from lower costs and greater efficiency gains, especially through cheaper, specialised suppliers, and large-scale production networks (Broecke, 2024; Friebe et al., 2025). In this sense, reshoring is better understood as a reassessment of earlier location decisions in response to changing costs, new technologies, risks, and policy conditions (Tsai & Urmetzer, 2024; Broecke, 2024).

Recent shocks have made this reassessment more visible. Dadush (2023) links the renewed attention to reshoring to more frequent disruptions caused by geopolitical tensions, climate-related risks, and global economic instability. Kudrenko (2024) shows that reshoring decisions are shaped by a broader set of concerns, including vulnerability, responsiveness, inventory costs, tariffs, and proximity to markets, rather than wage comparisons alone. Friebe et al. (2025) describe the VUCA environment as a trigger for reassessment, while

also stressing that reshoring remains dependent on industry, product type, and operational complexity.

At policy level, reshoring is linked to concerns about strategic dependencies and the role of industrial policy. In Europe, Open Strategic Autonomy reflects concern about excessive reliance on external suppliers and the objective to strengthen domestic or regional capacities (Clancy et al., 2024). Yet the literature does not suggest a general collapse of globalisation. Instead, Cieřlik and Zamojska (2025) show that technological GVCs can remain resilient without full decoupling, while Friebel et al. (2025) interpret reshoring more as strategic adaptation rather than wholesale de-globalisation.

2.2.2. Selective reshoring and GVC reconfiguration

Policy research warns against reading disruption as evidence that GVCs are simply shrinking. Dadush (2023) argues that domestic production is not automatically more efficient or safer, and that resilience can depend on multiple suppliers, spare capacity, and targeted localisation of critical stages. Kolev and Obst (2022) treat reshoring as one resilience strategies, alongside diversification, stockpiling, and adjusted delivery times. Grossman et al. (2021) further show that diversification can, in some cases, deliver resilience at lower cost than reshoring.

Sectoral and technological constraints reinforce this view. Automation and Industry 4.0 may reduce the importance of low-wage labour, but their effects vary across sectors. Kudrenko (2024) highlights the investment and workforce requirements linked to automation, while Bárcia de Mattos et al. (2021) show that basic manual tasks in the apparel industry remain difficult to automate. Reshoring therefore depends on the specific tasks, technologies, and supplier ecosystems within each industry.

The key point is that reshoring should not be treated as a binary outcome. A more useful approach is to examine which activities are relocated, which remain international, and whether firms respond through domestic relocation, EU regional sourcing, or diversification.

2.3. Economic Drivers of Reshoring

Although wage arbitrage was an important driver of early globalisation, recent disruptions have shifted attention towards broader cost factors, operational frictions, and the value of resilience (Broecke, 2024; Dadush, 2023; Friebe et al., 2025). The relevant drivers therefore include labour and energy costs, productivity, transport and inventory costs, capital requirements, and technological feasibility (Kudrenko, 2024; Tsai & Urmetzer, 2024).

Labour-cost differences still matter, but their role is now more conditional. Broecke (2024) notes that firms offshored not only to reduce labour costs, but also because of shortages in labour and skills at home. As wages and compliance costs have risen in some offshore locations, partial reshoring or regionalisation can become more attractive (Broecke, 2024; Tsai & Urmetzer, 2024). However, higher labour costs in advanced economies still constrain reshoring unless they are offset by productivity, technological, or gains in logistics (Kudrenko, 2024).

This is why the literature shifts from wage comparison to total cost of ownership. Kudrenko (2024) shows that production-location decisions depend on productivity, energy costs, transport, tariffs, supplier reliability, flexibility, and inventory needs, rather than labour costs alone. Shorter supply chains can reduce buffer stocks and improve responsiveness, which may partly offset higher domestic costs. In labour-intensive supply chains, transport costs and lead times also matter, especially when demand is volatile and products change quickly (Bárcia de Mattos et al., 2021).

The same logic applies to the variables used in the empirical analysis. A higher domestic value-added share does not mean that the entire value chain has returned. It may simply indicate that selected stages have become more local while other inputs continue to be sourced from abroad. Similarly, a fall in foreign input dependence may reflect diversification or regional sourcing rather than full reshoring.

For Europe, productivity and the cost of energy are particularly important. Domestic or regional production becomes feasible when productivity gains can offset higher costs, and less feasible when energy or labour costs remain high. This is why economic fundamentals are treated as explanatory variables rather than as background conditions.

Economic fundamentals also matter at the macroeconomic level. Clancy et al. (2024) show that euro-area localisation policies can raise inflation and reduce output if they weaken

competition or productivity. During the adjustment period, higher domestic costs and real exchange-rate effects may also reduce competitiveness. Reshoring should therefore not be treated as cost-neutral, since it may generate inflationary pressures and transition costs (Clancy et al., 2024; Dadush, 2023).

2.4. Policy and Institutional Factors

The literature presents reshoring as part of broader state strategies which are aimed at strengthening economic security, resilience, and strategic autonomy. The key question is not only whether governments support reshoring, but how policy measures influence the way firms actually respond.

Gereffi et al. (2025) describe current industrial policy as being more concerned with strategic supply chains, economic security, and resilience. Reshoring is therefore not only a firm response to costs or disruption risks; it is also an effort to reduce dependencies and regain control over selected strategic activities. This logic is also visible in US-China rivalry and in EU debates on strategic autonomy. Gur and Dilek (2023) link reshoring to technological competition through neo-protectionism and smart automation, but they also warn that these measures are unlikely to deliver productivity gains or jobs without broader investment and labour-market policies. In Europe, Clancy et al. (2024) link localisation to Open Strategic Autonomy and the production of key inputs.

Policy tools extend beyond tariffs. They include subsidies, procurement rules, standards, certification requirements, export controls, sanctions, and other non-tariff measures. Broecke (2024) notes that many countries pursue reindustrialisation rather than explicit reshoring policies, with reshoring emerging as one possible outcome. Clancy et al. (2024) model localisation through stricter regulatory standards, showing how non-tariff measures can reduce imports without taking the form of traditional protectionism.

Firm strategy also matters. Gereffi et al. (2021) argue that trade-policy shocks often lead to adaptive reconfiguration rather than direct reshoring, as firms change suppliers, relocate selected stages, switch markets, or upgrade activities. Policymakers must also take into account competition and productivity effects. Clancy et al. (2024) caution that reduced

foreign competition can increase markups, add to inflationary pressure, and weaken output gains.

2.5. Impacts and Implications

The literature suggests that tariffs, subsidies, export controls, standards, and other policy measures alone, do not determine outcomes. Their effects depend on how firms reassess total costs, risks on disruption, technological capability, access to markets, and alternative sourcing. In capital-intensive sectors, automation and digitalisation may reduce labour-cost differences and make production closer to end markets more viable. In labour-intensive sectors, automation may remain limited and supplier ecosystems may matter more than political pressure to relocate (Bárcia de Mattos et al., 2021; Kudrenko, 2024). The employment effects of reshoring are also likely to be limited where returning production is highly automated (Gur & Dilek, 2023; Stihl et al., 2025).

Another implication is that reshoring involves important macroeconomic trade-offs. Clancy et al. (2024) show that localisation policies can be inflationary, weaken competition, and reduce long-run output, while Dadush (2023) cautions that domestic production is neither inherently more efficient nor a guarantee against future disruption. Resilience strategies should therefore be tailored to sector characteristics and supported by coordinated policy action. The key problem is how policy can reduce strategic vulnerabilities while preserving the efficiency gains of GVCs and international specialisation (Clancy et al., 2024; Kolev & Obst, 2022; Cieřlik & Zamojska, 2025).

Sector comparisons should not treat reshoring as a single observable event, but should look for patterns across policy exposure, domestic value-added intensity, imported-input dependence, cost conditions, and automation capacity. The literature implies that the strongest evidence of reshoring is likely to appear only where policy pressure aligns with economic fundamentals and technological feasibility.

Reshoring should consequently be treated as a policy tool for sectors with high strategic importance, limited supplier alternatives, and high disruption risk.

2.6. Conceptual Framework

The research problem examines how policy measures and economic conditions are associated with the reorganisation of production across sectors in Europe. This framework reflects the dissertation's central argument: reshoring-related outcomes are associated with the interaction of policy tools, economic fundamentals, and automation, while sectoral characteristics and value-chain conditions help explain differences in the strength, direction, and form of that relationship.

2.6.1. Analytical approach

The conceptual framework organises the dissertation around the relationship between the explanatory variables identified in the literature, and observable reshoring-related outcomes. It specifies how policy tools influence firms' incentives, how economic fundamentals shape feasibility, and how automation can strengthen or weaken the case for relocation (Gereffi et al., 2021; Grossman et al., 2021).

The dependent variable is defined broadly. It captures whether production returns to the home country, but also the extent to which firms reorganise production and sourcing locations. The explanatory side of the framework has three main variables. The first is policy tools, such as State aid. The second is economic fundamentals, especially labour costs, productivity, and energy costs. The third is automation, which is treated separately because it changes the relevance of labour costs differently across sectors (Kudrenko, 2024; Bárcia de Mattos et al., 2021; Gur & Dilek, 2023).

2.6.2. Policy tools

Policies shape the incentives faced by the firms when deciding where to source and produce. They may encourage localisation through subsidies or import restrictions; but they might also lead firms to switch suppliers, move selected stages of production, or relocate regionally. (Gereffi et al., 2021; Broecke, 2024).

2.6.3. Economic fundamentals

Reshoring decisions cannot be explained by wage differences alone. Firms assess the total cost of ownership, taking into account productivity, energy costs, transportation, tariffs, inventories, supplier reliability, and lead times. Kudrenko (2024) shows that domestic and offshore production need to be compared within this broader cost framework, which can either support or weaken policy incentives for localisation.

Even where governments support localisation, reshoring remains unlikely if domestic production involves higher total costs that cannot be offset by productivity gains, logistics advantages, or lower risks. Reshoring becomes more viable when the offshore cost advantages diminish, for example because of rising wages, stricter environmental rules, or higher transport costs. The OECD evidence reviewed by Broecke (2024) supports this conditional relationship.

2.6.4. Automation

The third explanatory variable is automation. The literature treats it not just as a productivity factor, but as one of the determinants in firms' location decisions. It can reduce the importance of labour-cost differences, change skill requirements, and serve as a catalyst for productivity gains, while remaining technically difficult or economically unattractive in others.

Kudrenko (2024) associates Industry 4.0 technologies with higher efficiency and better supply-chain optimisation, but also with high investment costs and strong demand for skilled workers. Gur and Dilek (2023) similarly link smart automation to reshoring strategies, while arguing that automation alone cannot restore competitiveness or create large numbers of jobs.

Automation therefore affects the role of labour costs in reshoring decisions. Where production can be standardised and automated, higher domestic wages may matter less. Where automation is limited, labour costs and supplier ecosystems remain decisive, as shown by Bárcia de Mattos et al. (2021).

2.6.5. Sectoral and value-chain characteristics

The literature reviewed in Sections 2.1-2.5 shows that the same policy or economic factors can produce very different outcomes across industries. The framework therefore includes sectoral and value-chain characteristics as background conditions that help explain how the three main explanatory variables relate to reshoring decisions. Dadush (2023) shows that vulnerability depends on value-chain complexity and the concentration of specialised knowledge.

Within the framework, these characteristics help explain why the effects of policy tools, economic fundamentals, and automation differ across sectors, and why supply-chain reconfiguration may take different forms. Sectors dependent on concentrated supplier ecosystems, for example, may respond through nearshoring rather than reshoring (Dadush, 2023; Bárcia de Mattos et al., 2021; Friebe et al., 2025).

2.6.6. Conceptual framework and analytical expectations

Figure 1 below represents the conceptual model of reshoring and supply-chain reconfiguration:



Figure 1 - Conceptual model

Policy tools and economic fundamentals jointly define the incentive environment in which firms reassess production locations. Automation modifies this environment by changing the role of labour costs and the technological feasibility of relocation, while sectoral and value-chain conditions help explain whether firms adopt reshoring or alternative forms of supply-chain reconfiguration.

The outcome is therefore not as a binary reshoring/non-reshoring decision but as a range of location and sourcing adjustments consistent with the literature on adaptive reconfiguration and resilient globalisation (Gereffi et al., 2021; Friebel et al., 2025; Cieřlik & Zamojska, 2025).

The framework guides the empirical analysis by focusing on sector-level policy exposure, cost and productivity conditions, automation-related capability, and sector characteristics.

2.6.7. Linking the framework to the research questions

The framework directly supports RQ1 by showing that sector-targeted policy support is only one part of the policy environment. The empirical test focuses on whether direct support is associated with reshoring-related outcomes across sectors (Gereffi et al., 2021; Gereffi et al., 2025; Broecke, 2024).

The framework also supports RQ2, which asks how economic fundamentals influence reshoring across sectors. These fundamentals are not treated simply as control variables. They also help determine whether relocation is feasible.

Finally, the framework supports RQ3, which asks whether automation makes reshoring more feasible by reducing the importance of labour cost differences. The framework implies a conditional answer. Automation may support reshoring where production can be standardised and where capital can substitute for labour. However, its effects cannot be assumed to apply uniformly across sectors (Bárcia de Mattos et al., 2021; Gur & Dilek, 2023; Kudrenko, 2024).

3. Research Methodology

3.1. Methodology Overview

This chapter outlines how the dissertation examines the relationship between policy measures, economic fundamentals, automation, and supply-chain reconfiguration in EU manufacturing. Since the dissertation focuses on sectoral patterns over time, the research design is comparative, longitudinal, and it is based on secondary data. Case studies are useful to understanding how individual firms make decisions, but they are less suitable for comparing how policy exposure, costs, and technology vary across sectors and over time (Kazancoglu et al., 2024; Tsai & Urmetzer, 2024).

The analysis combines two types of evidence. First, it identifies policy interventions from secondary sources. Second, it links these policy indicators to economic and technological variables across manufacturing sectors, labour costs, energy costs, productivity, and technological capability. This allows the study to examine whether reshoring-related indicators change over time, and whether these changes are associated with policy exposure, economic fundamentals, or technological capability.

The approach is explanatory rather than purely descriptive. RQ1 is examined through policy exposure, RQ2 through labour costs, energy costs, productivity, and related economic fundamentals, and RQ3 through the extent to which automation may reduce the importance of labour-cost differences.

The unit of analysis is the *country-sector-year* observation. This level is appropriate for the dissertation's sectoral focus on manufacturing, because it captures variations in policy exposure and economic conditions across countries, sectors, and time more effectively than an aggregate EU-level approach.

3.2. Research Design

The research design uses a country-sector dataset for EU manufacturing covering 2010 to 2023, in line with the FIGARO data used in Chapter 4. This period captures the years after the global financial crisis and includes the years in which reshoring, strategic autonomy, and resilience became more prominent.

The FIGARO tables (*Full International and Global Accounts for Research in Input-Output analysis*) are appropriate because their inter-country input-output structure tracks how industries use EU, and non-EU inputs. This makes them more appropriate than simple trade data for examining value-chain dependence and sectoral input patterns.

The study focuses on manufacturing sectors for which comparable data are available on sectoral input-output structure, imported-input dependence, labour and energy costs, and technological capability. The aim is not to cover every industrial activity, but to examine specific sectors consistently across the research questions. This sectoral focus is necessary because Chapters 1 and 2 show that reshoring differs by industry, and that the same policy measure can lead to different outcomes depending on technologies, input structures, and supplier ecosystems (Dadush, 2023; Tsai & Urmetzer, 2024; Friebe et al., 2025).

For this dissertation, a policy intervention is any government measure that changes the relative cost, feasibility, or risk of offshore production compared with domestic or regional production in a given sector. The study treats policy interventions as a change in the incentive environment that may result in domestic relocation, EU regional sourcing, supplier switching, or other forms of reconfiguration.

The dependent variable is reshoring intensity, defined as the degree to which production or sourcing moves towards domestic or closer locations.

3.3. Data Collection

The dissertation uses secondary data from four categories:

- trade and value-added datasets,
- production and cost statistics,
- technology and automation indicators, and

- standardised policy indicators from the OECD, European Commission, and Eurostat.

This combination is necessary because reshoring is not captured in a single dataset. It appears partly in value-added patterns, in imported-input dependence, and in production and cost conditions, that change the firms' incentives.

Policy exposure is identified using publicly available standardised indicators. These indicators make it possible to compare the timing and relative intensity of policy measures across sectors and years.

Since official statistics do not directly record firm-level reshoring decisions, the dependent variables are constructed from proxy indicators. Such indicators capture changes in the share of value⁵ created domestically or regionally, and changes in dependence on imported intermediate inputs.

The explanatory variables have been selected in line with the total-cost logic of Chapter 2. Labour cost is evaluated in combination with labour productivity, energy costs, and exposure to imported inputs. This allows the analysis to assess whether higher domestic costs are offset by productivity gains, rather than considering wages as the only determinant of reshoring (Kudrenko, 2024; Dadush, 2023).

Automation is measured through proxy indicators that reflect the ability of production to rely on capital- and technology-intensive processes, rather than to depend solely on low-cost labour. In Chapter 4, advanced digital intensity is used as a proxy for automation because there are no sector-specific automation data available for the full sample. This limitation is acknowledged in the interpretation of RQ3.

Digital intensity should not be confused with robotics or production-line automation. It can indicate a sector's general digital readiness, but it does not directly measure whether firms use automation technologies in production.

⁵ Value-added content

3.4. Data Analysis

The data analysis in Chapter 4 is organised around the dissertation’s three research questions and uses four common outcome indicators throughout: domestic value-added intensity, imported-input dependence, the EU-sourced share of imported intermediates, and the non-EU share of imported intermediates (see Table 2 below).

Reshoring-related outcome indicator	Definition
Domestic value-added intensity	The share of gross output generated as domestic value-added, in a given country, sector, and year. (A higher value indicates stronger domestic value creation.)
Imported-input dependence	The share of total intermediate inputs from foreign suppliers. (A higher value indicates greater reliance on imported intermediate inputs.)
EU-sourced share of imported intermediates	The share of imported intermediate inputs sourced from suppliers in EU. (A higher value indicates stronger regional or EU-based sourcing)
Non-EU-sourced share of imported intermediates	The share of imported intermediate inputs sourced from suppliers outside the EU. (A higher value indicates greater reliance on non-EU suppliers.)

Table 2 - Reshoring-related outcome indicators

These indicators are based on the European Union’s inter-country supply, use and input-output tables, also referred to throughout this dissertation as FIGARO tables (Eurostat, 2025). Section 4.1 uses descriptive statistics and trend charts to establish whether the evidence is more consistent with domestic value creation, regional rebalancing, or continued reliance on imported inputs.

The analysis then estimates ordinary least squares (OLS) regressions aligned with each research question rather than one single model containing all explanatory variables at the same time. Section 4.2 addresses RQ1 by using sector-targeted State aid, measured as a percentage of gross output, as the policy variable. Each of the four reshoring-related indicators is used separately as the dependent variable, with country, sector, and year dummy variables included to account for differences across Member States, manufacturing sectors, and years. The full construction of this model is reported in Appendix B.

Section 4.3 addresses RQ2 by combining descriptive comparisons, correlation analysis, and OLS dummy-variable regression. Labour compensation per hour, real labour productivity per hour, and non-household electricity prices are used as economic fundamentals shaping relocation feasibility. Separate regressions are again estimated for the four common outcome indicators, with country, sector, and year dummy variables included. Appendix C reports the full variable construction.

Section 4.4 addresses RQ3 by testing whether automation-related digital capability changes the relationship between labour costs and reshoring-related outcomes. Because the available Digital Intensity Index is measured at manufacturing country-year level, the variable for automation is advanced digital intensity rather than a direct measure of robotics or production-line automation. The model is estimated for the restricted sample of 2021 and 2023 described in Appendix D.

The formal regression equations and notation for Sections 4.2, 4.3, and 4.4 are reported in Appendices B, C, and D, respectively.

Across all Chapter 4 models, the coefficients are interpreted as conditional associations rather than causal effects. Statistical significance is assessed using t-statistics and p-values. It should be noted that the final interpretation does not solely rely on estimating the coefficients, descriptive patterns, correlations, and regression results are read together with the conceptual framework in Chapter 2. This keeps the interpretation focused on selective domestic value creation and regional rebalancing, rather than treating the findings as evidence of large-scale reshoring.

4. Results and Discussion

4.1. Descriptive Overview of Reshoring Patterns in EU Manufacturing

4.1.1. Data scope and analysis

This section introduces the empirical results by presenting the evidence on reshoring-related data across EU manufacturing sectors. Its purpose is not to test causality or to estimate the impact of policy, economic, or automation initiatives. Instead, it establishes the broad empirical landscape before the regression analysis in Sections 4.2, 4.3, and 4.4.

The section uses the following four common reshoring-related outcome variables as proxy measures of domestic value creation, import dependence, and regional rebalancing (see Table 2, above)

1. Domestic value-added intensity;
2. Imported-input dependence;
3. the EU-sourced share of imported intermediates; and
4. the non-EU share of imported intermediates.

The detailed variable construction is kept in Appendix A.

Appendix A also outlines the data source (Eurostat, 2025), unit of observation (country-sector-year), ratio construction, and assumptions.

4.1.2. Reshoring indicators and aggregate trends

Table 3 compares the early period (2010-2014) of the available Eurostat (2025) sample with the later period (2019-2023) of that sample. The values are average annual EU27 manufacturing ratios (percentage indicators – see Appendix A.4).

Outcome variable	2010-2014 average	2019-2023 average	Change (pp)
Domestic value-added intensity (%)	28.21	29.42	1.21
Imported-input dependence (%)	38.09	39.69	1.60
EU-sourced share of imported intermediates (%)	48.79	51.77	2.98
Non-EU-sourced share of imported intermediates (%)	51.21	48.23	-2.98

Table 3 - EU27 manufacturing outcome profile, early and later periods

The aggregate pattern is mixed. Domestic value-added intensity increased from 28.21 per cent in 2010–2014 to 29.42 per cent in 2019–2023, a rise of 1.21 percentage points. This suggests some increase in domestic value creation within EU manufacturing. However, imported-input dependence also increased, from 38.09 per cent to 39.69 per cent. This means the descriptive evidence does not show broad import replacement. Instead, domestic value creation and the use of imported intermediate increased in relative terms. Analytically, this combination points to partial reshoring or selective localisation. Some value-adding stages appear to have strengthened domestically, while firms still depend on imported components and production materials.

The sourcing indicators point more clearly to regional rebalancing. The EU-sourced share of imported intermediates rose by 2.98 percentage points, while the non-EU share declined by the same amount. This pattern, however, should be interpreted as regional reconfiguration rather than reshoring in the narrow domestic sense, because the overall dependence on imported intermediates did not fall.

The yearly trend charts reinforce the same interpretation. Domestic value-added intensity and imported-input dependence (see Figure 2, below) do not move in a single reshoring pattern. The sourcing-share chart (see Figure 3, below) shows stronger movement between EU and non-EU import composition, but this is not equivalent to a general return of production to the domestic economy. The descriptive evidence therefore supports the dissertation’s view that any reshoring-related change should be understood as selective and conditional.

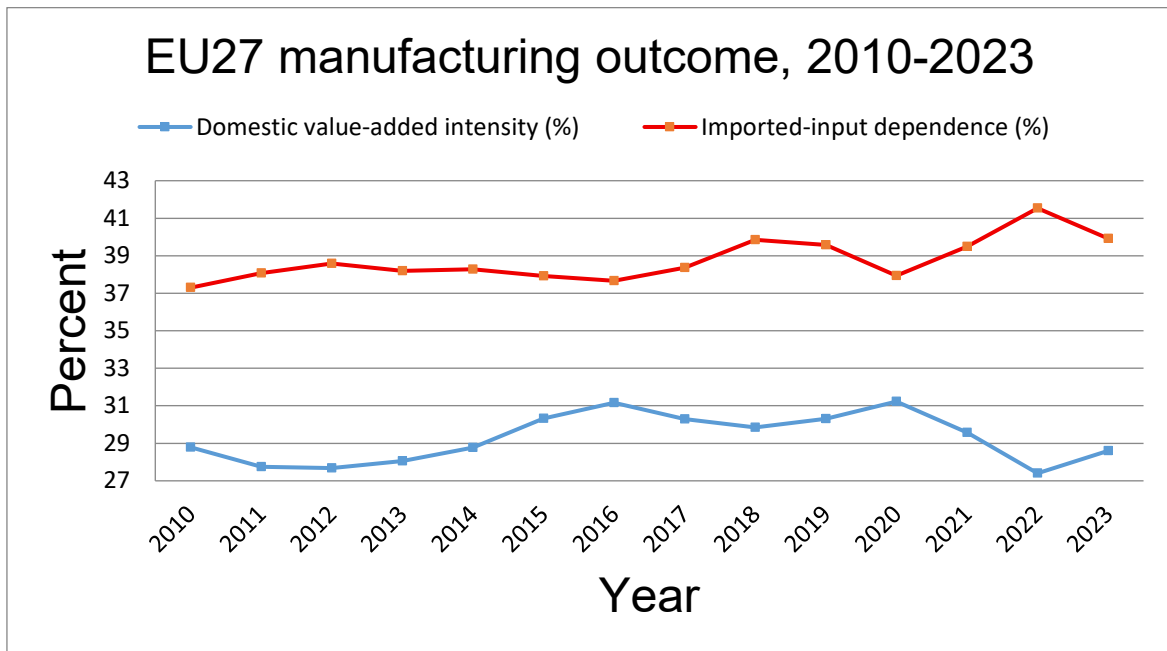


Figure 2 - EU27 manufacturing Domestic value-added intensity and Imported-input dependence, 2010–2023

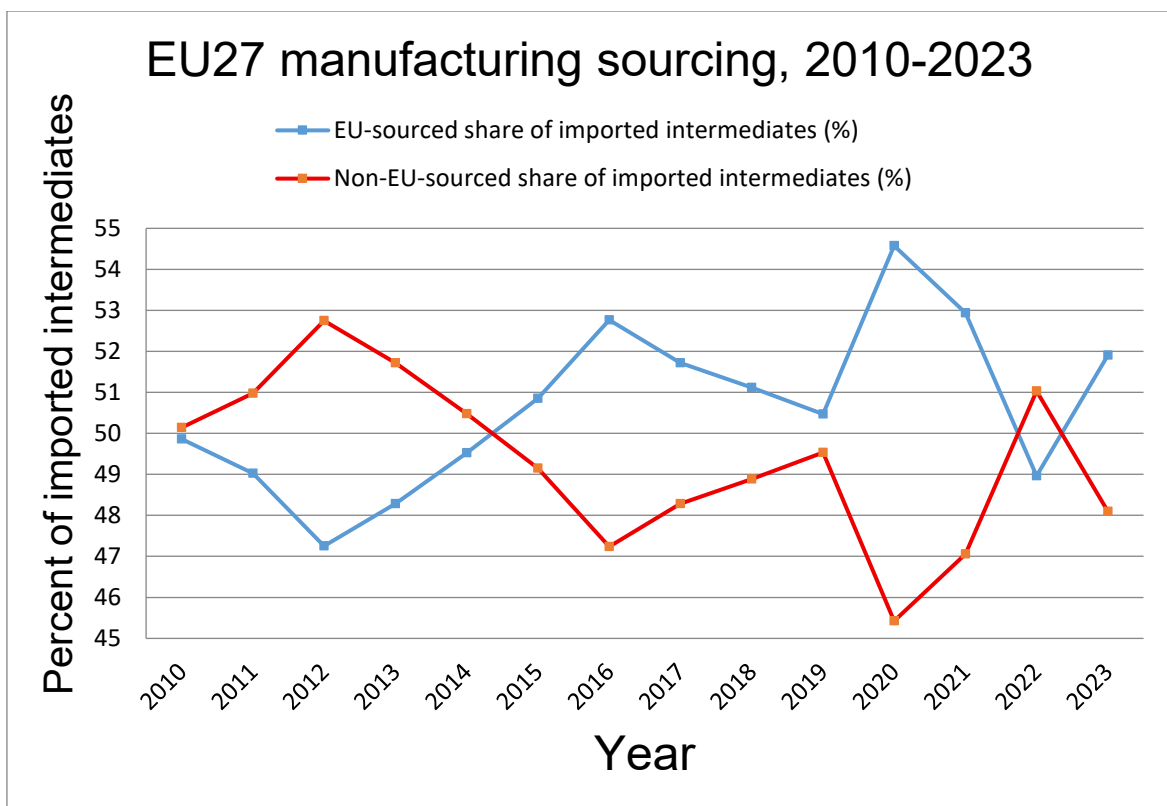


Figure 3 - EU27 sourcing composition of imported intermediates, 2010–2023

4.1.3. Sectoral variations in reshoring outcomes

The sector-level comparison shows stronger variation than the aggregate figures. Table 4 ranks the 19 manufacturing sectors by the change in domestic value-added intensity between the early and later periods.

Sector name	Change in Domestic value-added intensity (pp)	Change in Imported-input dependence (pp)	Change in EU-sourced import share (pp)	Change in non-EU-sourced import share (pp)
Computer, electronic and optical products	12.308	0.160	2.913	-2.913
Coke and refined petroleum products	2.795	-3.274	-0.978	0.978
Chemicals and chemical products	1.625	2.007	-0.438	0.438
Wood and products of wood and cork, except furniture; articles of straw and plaiting materials	1.264	3.650	1.814	-1.814
Textiles, wearing apparel, leather and related products	0.844	1.682	-0.379	0.379
Motor vehicles, trailers and semi-trailers	0.519	3.023	-1.939	1.939
Basic pharmaceutical products and pharmaceutical preparations	0.260	10.090	-1.517	1.517
Furniture and other manufacturing	0.118	3.059	0.048	-0.048
Paper and paper products	0.060	1.294	-1.282	1.282
Machinery and equipment n.e.c.	-0.122	2.343	0.963	-0.963
Other non-metallic mineral products	-0.254	3.257	0.586	-0.586
Other transport equipment	-0.602	7.497	0.109	-0.109
Food products, beverages and tobacco products	-0.614	3.888	1.434	-1.434
Rubber and plastic products	-0.672	2.499	0.818	-0.818
Repair and installation of machinery and equipment	-0.723	3.478	3.962	-3.962
Basic metals	-0.744	-0.015	0.186	-0.186
Printing and reproduction of recorded media	-0.864	3.626	-0.531	0.531

Fabricated metal products, except machinery and equipment	-1.130	2.217	1.899	-1.899
Electrical equipment	-2.352	4.878	0.116	-0.116

Table 4 - Sector-level changes in reshoring-related outcomes

The sectoral results confirm that the pattern is not uniform. Nine of the 19 manufacturing sectors recorded an increase in domestic value-added intensity, which is fewer than half of the sectors in the sample. The strongest increase appears in computer, electronic and optical products, while the largest decline appears in electrical equipment. This indicates that domestic value creation increased in some manufacturing activities but weakened in others.

The imported-input-dependence column is even less consistent. Only two sectors, coke and refined petroleum products, and basic metals reported a fall in imported-input dependence. Most sectors became more dependent on imported intermediate inputs. This does not support a general claim that EU manufacturing replaced foreign inputs with domestic production during the sample period.

By contrast, the sourcing-share indicators show evidence of a regional rebalancing. Twelve sectors recorded an increase in the EU-sourced share of imported intermediates. This suggests that the main adjustment is not a full return of production to the home economy, but a shift towards EU suppliers in many sectors. This pattern is consistent with selective nearshoring, supplier switching, and regional substitution.

4.2. Policy Tools and Reshoring-Related Outcomes (RQ1)

4.2.1. Policy Support and reshoring outcomes

This section moves from the descriptive evidence in Section 4.1 to a more structured test of RQ1. Policy is treated as altering the incentive environment in which firms and sectors reorganise production. The purpose is to examine whether stronger policy support is associated with reshoring-related outcomes once differences across countries, sectors, and years are taken into account.

The policy-exposure variable used in the main model is the sector-targeted State aid measure, expressed as a percentage of gross output. It is used as the proxy for direct policy support. The full procedure, sample structure, and variable construction are reported in Appendix B. This means that the empirical test focuses only on direct support that can be measured consistently. Tariffs, export controls, sanctions, and standards are therefore not treated as directly measured explanatory variables.

Positive sector-targeted policy exposure appears only in 717 of the 7,182 observations (9.98 per cent), so the results should be read as evidence on targeted direct support rather than evidence on industrial policy.

The model estimates each outcome separately with country, sector, and year dummy variables; Appendix B reports the full equation, notation, dummy variables, and assumptions.

4.2.2. Regression results

Table 5 presents the regression results for RQ1. Each column corresponds to one of the four reshoring-related outcomes. The main coefficient of interest is the association between policy exposure and each outcome after country, sector, and year effects have been included.

Statistic	Domestic value-added intensity	Imported-input dependence	EU-sourced share of imported intermediates	Non-EU share of imported intermediates
Policy exposure coefficient	0.3833	0.2208	-0.3188	0.3188
Standard error	0.1731	0.2284	0.1745	0.1745
t-statistic	2.2149	0.9665	-1.8277	1.8277
p-value	0.0268	0.3338	0.0676	0.0676
Adjusted R-squared	0.5323	0.6068	0.7839	0.7839
Observations	7167	7167	7165	7165

Table 5 - Associations between sector-targeted State aid exposure and reshoring-related outcomes

Three points follow from Table 5. First, policy exposure is positive and statistically significant in the domestic value-added equation ($\beta = 0.3833$, $p = 0.0268$). Holding country, sector, and year effects constant, a one-percentage-point increase in sector-targeted State aid relative to gross output is associated with a 0.38 percentage-point increase in domestic

value-added intensity. This is the clearest result in the table and is consistent with stronger domestic value creation in sectors receiving more intensive direct policy support.

Second, the coefficient in the Imported-input dependence equation is positive but statistically insignificant ($\beta = 0.2208$, $p = 0.3338$). The regression therefore does not support the view that stronger direct policy support is associated with lower dependence on imported intermediates.

Third, the sourcing-composition equations do not provide positive evidence of regional substitution within the European Union. The coefficient on the EU-sourced share of imported intermediates is negative and only marginally significant ($\beta = -0.3188$, $p = 0.0676$), while the mirror coefficient on the non-EU share is positive by construction.

Statistically, Table 5 supports one clear policy-related inference. Policy exposure is significantly associated with domestic value-added intensity, but the results for imported-input dependence and sourcing composition are not strong enough to support claims of policy-driven import substitution.

4.2.3. Interpretation for RQ1

The estimates suggest a limited policy effect. Stronger direct support is associated with some evidence of domestic value creation, but not with a fall in imported-input dependence and not with a strong move towards EU-based sourcing. This is important for the dissertation's conceptual framework. Section 2.6 argues that policy pressure increases the likelihood of reconfiguration, but it does not predetermine which form that reconfiguration will take.

The results in Table 5 support a more cautious interpretation of policy exposure. The coefficient for domestic value-added intensity suggests that stronger direct support is associated with some strengthening of domestic production. However, the absence of a statistically clear negative result for imported-input dependence means that the evidence does not support a broader claim of general import replacement. The table does also not provide equally strong evidence of a systematic shift towards EU-based sourcing.

The answer to RQ1 is therefore conditional and narrower than the broader policy discussion in Chapter 2. Stronger sector-targeted policy support is associated mainly with higher domestic value-added intensity, while the broader structure of foreign sourcing remains

largely intact. For this reason, the evidence in Section 4.2 is more consistent with selective domestic relocation of specific stages than with broad reshoring. This is also consistent with the literature reviewed in Chapter 2, especially the argument that policy intervention tends to reshape rather than fully reverse global value-chain organisation (Gereffi et al., 2021; Clancy et al., 2024; Dadush, 2023).

4.3. Economic Fundamentals and Relocation Feasibility (RQ2)

4.3.1. Economic fundamentals and reshoring outcomes

This section addresses RQ2 by examining whether reshoring-related outcomes are stronger where domestic production appears more economically feasible. In line with the conceptual framework developed in Chapter 2 and the methodology set out in Chapter 3, economic fundamentals are treated as central conditions influencing the extent to which policy pressure and supply-chain risk can translate into domestic value creation, lower imported-input dependence, or regional sourcing within the European Union.

The four outcome indicators are the same as in Sections 4.1 and 4.2. Section 4.3 tests country-level manufacturing cost and productivity conditions while controlling for sector differences. Appendix C contains the full variable construction and assumptions.

The regression uses labour compensation, real labour productivity and non-household electricity prices with country, sector, and year dummy variables. Full model details are provided in Appendix C.

4.3.2. Descriptive and correlation results

Table 6 first summarises the direction of change in the available economic variables by comparing the early part of the sample with the later period used in Section 4.1. The figures are simple averages across the 27 EU Member States. They are therefore descriptive indicators of the cost environment rather than measures of aggregate EU manufacturing costs.

Variable	2010-2014 average	2019-2023 average	Change
Labour compensation per hour (EUR)	18.13	23.19	5.05
Real labour productivity per hour (2015=100)	91.37	113.02	21.64
Nominal unit labour cost (2015=100)	102.66	115.09	12.43
Electricity price (cent/kWh)	9.74	13.35	3.61

Table 6 - Economic fundamentals, early versus later sample averages

The descriptive evidence shows that the economic environment changed substantially over the sample period. labour compensation per hour increased by 5.05 euros between the two periods, while real labour productivity per hour rose by 21.64 index points. Nominal unit labour cost also increased. Electricity prices rose by 3.61 cents per kilowatt-hour, indicating a more expensive energy environment in the later period.

Table 7 reports simple correlations between the economic variables and the four reshoring-related outcome indicators. These correlations are descriptive only. They do not control for country, sector, or year effects and therefore serve mainly as a first indication of the direction and strength of the relationship before the regression results are considered.

Economic variable	Domestic value-added intensity	Imported-input dependence	EU-sourced share of imported intermediates	Non-EU share of imported intermediates
Labour compensation per hour (EUR)	-0.0202	-0.0181	-0.0257	0.0257
Real labour productivity per hour (2015=100)	0.0775	0.0886	-0.0240	0.0240
Nominal unit labour cost (2015=100)	-0.0983	0.0591	0.0539	-0.0539
Electricity price (cent/kWh)	-0.0022	0.0626	-0.1787	0.1787

Table 7 - Correlations between economic fundamentals and reshoring-related outcomes

The simple correlations are generally weak. Labour compensation per hour shows almost no simple two-variable relationship with domestic value-added intensity or imported-input dependence. Real labour productivity per hour is positively correlated with both domestic value-added intensity and imported-input dependence, although the relationships remain modest. Nominal unit labour cost is negatively correlated with domestic value-added intensity. This suggests that sectors or countries with higher labour costs relative to

productivity tend to show weaker domestic value-added intensity, which is consistent with the idea that weaker cost advantage can make domestic production less attractive.

The clearest relationship is between electricity prices and sourcing composition. Higher electricity prices are associated with a lower EU-sourced share and a higher non-EU share of imported intermediates. This suggests that energy prices may affect where firms source their inputs, rather than the firms' overall reliance on foreign inputs.

4.3.3. Regression results

Table 8 reports the main regression results for RQ2. Each column corresponds to one of the four common reshoring-related outcomes. The coefficients on labour compensation, real labour productivity, and electricity prices are estimated while holding constant country, sector, and year dummy variables. Full model inputs are reported in Appendix C.

Statistic	Domestic value-added intensity	Imported-input dependence	EU-sourced share of imported intermediates	Non-EU share of imported intermediates
Labour compensation per hour (EUR) coefficient	-0.0935	-0.2774	0.2466	-0.2466
Standard error	0.0692	0.0915	0.0698	0.0698
t-statistic	-1.3512	-3.0314	3.5309	-3.5309
p-value	0.1767	0.0024	0.0004	0.0004
Real labour productivity per hour (2015=100) coefficient	0.0945	0.0959	-0.0169	0.0169
Standard error	0.0111	0.0147	0.0112	0.0112
t-statistic	8.4793	6.5082	-1.5007	1.5007
p-value	<0.0001	<0.0001	0.1335	0.1335
Electricity price (cent/kWh) coefficient	-0.0898	0.0472	-0.3321	0.3321
Standard error	0.0495	0.0654	0.0500	0.0500
t-statistic	-1.8150	0.7219	-6.6462	6.6462
p-value	0.0696	0.4704	<0.0001	<0.0001
Country dummies	Yes	Yes	Yes	Yes
Sector dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Adjusted R-squared	0.5367	0.6092	0.7854	0.7854

Observations	7167	7167	7165	7165
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Table 8 - Economic fundamentals and reshoring-related outcomes

Three results are relevant for RQ2. First, labour compensation per hour is not statistically significant in the domestic value-added equation ($\beta = -0.0935$, $p = 0.1767$). This means that, once country, sector, and year effects are included, higher manufacturing labour compensation is not clearly associated with weaker domestic value-added intensity. The coefficient is negative, but the estimate is not precise enough to support a strong conclusion. However, labour compensation is negatively and significantly associated with imported-input dependence ($\beta = -0.2774$, $p = 0.0024$) and positively associated with the EU-sourced share of imported intermediates ($\beta = 0.2466$, $p = 0.0004$). These results do not show that imported inputs are being replaced by domestic production. They only suggest that higher labour costs appear to be less import-dependent and more oriented towards EU-based sourcing.

Second, real labour productivity per hour is positively and statistically significantly associated with domestic value-added intensity ($\beta = 0.0945$, $p < 0.0001$). This is the clearest result in the table. A one-point increase in productivity is associated with a 0.09 percentage-point increase in domestic value-added intensity, holding the other variables and dummy controls constant. This supports the dissertation's argument that higher labour costs must be interpreted together with productivity. Productivity also has a positive and significant coefficient in the imported-input-dependence model ($\beta = 0.0959$, $p < 0.0001$). This means that productivity should not be interpreted as automatically reducing reliance on imported inputs. Instead, some manufacturing sectors may create more domestic value while still depending on imported intermediate goods

Third, electricity prices are not statistically significant in the imported-input dependence model, but they are strongly associated with the imported intermediates. A one-cent increase in the electricity price is associated with a 0.33 percentage-point lower EU-sourced import share and a 0.33 percentage-point higher non-EU share, holding other factors constant. This does not prove that electricity prices cause firms to source outside the EU. However, it suggests that higher energy costs in the domestic or regional production environment may weaken the relative attractiveness of EU-based sourcing. The RQ2 model provides stronger evidence for the role of productivity and energy costs on the composition of sourcing, than for the role of labour compensation. Since the coefficient for labour compensation in the

domestic value-added equation is not statistically significant, its sign should not be interpreted as evidence that labour costs reduce domestic value creation.

4.3.4. Interpretation for RQ2

The answer to RQ2 is therefore conditional and limited by the available data. The results do not show that higher labour costs alone prevent reshoring-related outcomes. The strongest evidence relates to productivity. Higher manufacturing productivity is associated with stronger domestic value-added intensity, which suggests that domestic production becomes more viable once efficiency gains partially offset higher costs.

This finding fits the total-cost logic discussed in Chapter 2 and the methodology in Chapter 3, where reshoring feasibility depends on the overall balance between labour costs, productivity, energy costs, and supply-chain risk rather than on wage levels alone.

At the same time, the results do not indicate broad import replacement. Imported-input dependence remains positively associated with productivity and is not significantly reduced by higher electricity prices. The EU manufacturing appears to be characterised by selective reconfiguration rather than a general return of production to domestic locations. Sectors and countries with higher productivity may increase the domestic share of value creation while continuing to rely on imported intermediates.

The results on electricity price add a further qualification. Energy costs appear to influence the geographic origin of imported inputs (EU, versus non-EU), rather than whether sectors depend on imported inputs in general. Higher electricity prices are associated with a higher non-EU share, and a lower EU-sourced share of imported intermediates.

Overall, the evidence suggests that economic fundamentals influence relocation feasibility, but their effects are selective and not always straightforward. Where regional production costs are high, firms may continue to rely on external suppliers rather than shifting sourcing within the EU. However, neither finding supports a simple interpretation in which economic fundamentals alone produce reshoring.

4.4. The Interaction Between Automation and Labour-Cost (RQ3)

4.4.1. The effects of automation and labour-cost

This section addresses RQ3 by testing whether automation capability changes the relationship between labour costs and reshoring-related outcomes. In line with the conceptual framework in Chapter 2, automation is not treated as a universal driver of reshoring. The purpose is to examine whether stronger digital capability helps sectors offset higher labour costs.

The automation analysis is constrained by the available Eurostat Digital Intensity Index, (Eurostat, n.d.-a). The proxy is observed at manufacturing country-year level rather than for the 19 detailed sectors, and the comparable sample is limited to 2021 and 2023.

The proxy that is used is advanced digital intensity, interpreted as automation-related digital capability rather than data on robotics or production-line automation; Appendix D contains the full construction, interaction term, and sample restrictions.

The model estimates each outcome with labour compensation, advanced digital intensity and their interaction, while controlling for country, sector, and year effects. Appendix D reports the full equation and notation.

4.4.2. Descriptive and correlation results

Table 9 summarises the automation and labour-cost variables used in the analysis. The average share of manufacturing enterprises with high or very high digital intensity index (DII) rises from 20.62 per cent in 2021 to 23.17 per cent in 2023. The broader “at least basic” digital intensity measure also increases, from 53.82 per cent to 56.03 per cent. Labour compensation per hour rises from 23.42 euros to 25.48 euros, while real labour productivity per hour also increases slightly.

Variable	2021 average	2023 average	Change	2021 country observations	2023 country observations
Advanced digital intensity (% of enterprises with high or very high DII)	20.6238	23.1748	2.5510	26	27
At least basic digital intensity (% of enterprises)	53.8219	56.0337	2.2118	26	27

Labour compensation per hour (EUR)	23.4154	25.4778	2.0624	26	27
Real labour productivity per hour (2015=100)	113.7817	116.1699	2.3882	26	27

Table 9 - Descriptive automation and labour-cost profile

Table 10 reports simple correlations between the main Section 4.4 explanatory variables and the four reshoring-related outcomes. The correlations are descriptive only. They are included to show the unconditional pattern before the regression results are interpreted.

Variable	Domestic value-added intensity	Imported-input dependence	EU-sourced share of imported intermediates	Non-EU share of imported intermediates
Advanced digital intensity	0.0442	0.0639	-0.0644	0.0644
Labour compensation per hour	-0.0396	-0.0184	0.0188	-0.0188
Labour cost × advanced digital intensity	-0.0069	0.0173	0.0002	-0.0002

Table 10 - Correlations between automation, labour cost and reshoring-related outcomes

The simple correlations are weak. Advanced digital intensity is positively correlated with domestic value-added intensity, but the value is small. It is also positively correlated with imported-input dependence and with the non-EU share of imported intermediates. These signs do not indicate a clear reshoring pattern. Labour compensation per hour also has only weak unconditional relationships with the four reshoring-related outcomes.

4.4.3. Regression results

Table 11 reports the regression results for RQ3. Each column corresponds to one of the four common reshoring-related outcomes. The coefficient most relevant to the analysis is the interaction between labour compensation per hour and advanced digital intensity.

Statistic	Domestic value-added intensity	Imported-input dependence	EU-sourced share of imported intermediates	Non-EU share of imported intermediates
Labour compensation per hour (EUR) coefficient	0.1640	-0.0976	-0.5003	0.5003

Standard error	0.3969	0.5111	0.3946	0.3946
t-statistic	0.4132	-0.1910	-1.2679	1.2679
p-value	0.6795	0.8485	0.2051	0.2051
Advanced digital intensity coefficient	0.1487	-0.1096	0.0443	-0.0443
Standard error	0.1714	0.2207	0.1704	0.1704
t-statistic	0.8677	-0.4965	0.2601	-0.2601
p-value	0.3858	0.6196	0.7948	0.7948
Labour-cost × advanced digital intensity coefficient	-0.0018	0.0029	0.0001	-0.0001
Standard error	0.0049	0.0063	0.0049	0.0049
t-statistic	-0.3662	0.4508	0.0245	-0.0245
p-value	0.7143	0.6523	0.9805	0.9805
Country dummies	Yes	Yes	Yes	Yes
Sector dummies	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes
Adjusted R-squared	0.5463	0.6444	0.7782	0.7782
Observations	1005	1005	1005	1005

Table 11 - Automation, labour cost and reshoring-related outcomes

The results do not provide clear statistical evidence that advanced digital intensity is associated with stronger reshoring-related outcomes. The coefficient on advanced digital intensity is positive in the domestic value-added equation, but it is not statistically significant. It is negative in the imported-input-dependence equation, but again not statistically significant. The equations on import-source composition also show no statistically meaningful association between advanced digital intensity and the EU or non-EU composition of imported intermediates.

The interaction term is also not statistically significant in any of the four outcome equations. In the domestic value-added equation, the coefficient on the *labour-cost × advanced digital intensity* term is slightly negative and statistically insignificant. In the imported-input-dependence equation, it is slightly positive and statistically insignificant. In the EU and non-EU sourcing-share equations, the interaction is effectively zero. These results do not support the proposition that higher digital capability weakens the role of labour costs in the observed reshoring-related outcomes.

Statistically, because the main and interaction effects are not significant, the model cannot distinguish a genuine automation effect from random variation in the available sample.

4.4.4. Interpretation for RQ3

The answer to RQ3 is therefore cautious and limited by the available data. The regression results do not show that automation-related digital capability makes reshoring more feasible by reducing the importance of labour-cost differences. More specifically, the available evidence does not show a statistically significant effect of advanced digital intensity, nor does it show a statistically significant labour-cost $\times$ digital-intensity interaction.

This does not mean that automation is irrelevant to reshoring. Rather, it means that the available data do not allow this dissertation to demonstrate this statistical relationship. The main limitation is that automation is measured at a broader level than the reshoring outcomes. The Digital Intensity Index is available only for manufacturing as a whole in each country and year, while the reshoring outcomes are measured by country, sector, and year. The model therefore cannot observe whether a specific sector such as computer, electronic and optical products, textiles, or machinery has a higher or lower automation level in a particular country and year.

Sections 4.1 to 4.3 already showed that domestic value creation, imported-input dependence, and regional sourcing do not move in a single uniform direction. Section 4.4 adds that, within the restricted automation proxy, there is no clear evidence that digital capability alone changes the labour-cost constraint.

The safest conclusion is that automation may remain relevant to the reshoring logic discussed in the literature, but the available data do not provide a strong statistical basis for claiming that it makes reshoring more feasible across EU manufacturing by reducing the importance of labour-cost differences. Within the limits of the available data, the empirical answer to RQ3 is therefore negative.

4.5. Synthesis of Findings

4.5.1. Empirical evidence and conceptual interpretation

This final section brings together the empirical evidence presented in Sections 4.1 to 4.4. Its purpose is to interpret the results of Chapter 4 and to assess whether they support the conceptual argument developed in Chapter 2. That is, the argument that treats reshoring as conditional, selective, and embedded in broader supply-chain reconfiguration, rather than a simple reversal of globalisation.

The chapter began with a descriptive overview of the four common reshoring-related outcome indicators: domestic value-added intensity, imported-input dependence, the EU-sourced share of imported intermediates, and the non-EU share of imported intermediates. Section 4.1 showed that the aggregate EU27 manufacturing pattern was mixed. The descriptive evidence suggested that the empirical question was not whether EU manufacturing had consistently reshored, but which types of reconfiguration were visible and under what conditions. Sections 4.2 to 4.4 then examined the three explanatory variables identified in the research questions: sector-targeted policy support, economic fundamentals, and automation.

Taken together, these sections suggest that reshoring does not follow a single, uniform direction. The evidence instead suggests that each indicator captures a different aspect of supply-chain reconfiguration. The results are more consistent with the conceptual framework than with a simplistic explanation of reshoring.

4.5.2. Research questions: interpretation of results

For RQ1, Section 4.2 found that sector-targeted State aid, relative to gross output, was positively and significantly associated with domestic value-added intensity. However, it was not significantly associated with lower imported-input dependence or with a robust shift towards EU-sourced imported intermediates. The interpretation should therefore remain narrow. Direct policy exposure is associated with some domestic value creation, but not with comprehensive reshoring or systematic import replacement.

This is consistent with the literature reviewed in Chapter 2, which treats policy as a factor that shapes the firms' incentive rather than a determinant of a single response (Gereffi et al., 2021; Clancy et al., 2024). It is also important to note that the policy variable in Section 4.2

(State aid), does not cover tariffs, regulatory standards, or procurement rules, discussed in the literature.

For RQ2, Section 4.3 showed that economic fundamentals affect the feasibility of relocation. Labour compensation per hour was not statistically significant in the domestic value-added equation. Therefore, the results do not show that higher labour costs significantly reduce domestic value-added intensity. The stronger result was the positive association between real labour productivity per hour and domestic value-added intensity. This supports the total-cost logic of Chapter 2. Higher wages need to be interpreted alongside productivity, as productivity can partly offset higher labour costs.

Additionally, Section 4.3 did not show broad import replacement. Productivity was also positively associated with imported-input dependence, which suggests that more productive manufacturing environments can remain highly integrated into cross-border supply chains. Effectively, higher productivity may strengthen domestic value creation while firms continue to rely on imported intermediate inputs. The evidence therefore supports the idea that domestic value creation and global or regional sourcing can coexist.

Energy costs added a further constraint. Electricity prices were strongly associated with the composition of imported intermediates. Higher electricity prices were associated with a higher share sourced from outside the EU, and a lower share of imported intermediates sourced from the EU. This suggests that high cost for regional production may weaken the relative attractiveness of EU-based sourcing.

For RQ3, Section 4.4 provided the most cautious result in the chapter. The regression did not find statistically significant evidence that advanced digital intensity was associated with stronger reshoring-related outcomes. It also did not find a statistically significant interaction between labour compensation and advanced digital intensity. Within the available data, automation-related digital capability does not provide sufficient evidence that labour-cost constraints are weakened or make reshoring easier across EU manufacturing.

However, Section 4.4 could not test the sector-specific dimension because the Digital Intensity Index used in the model is only available at the manufacturing country-year level.

5. Conclusions and Policy Recommendations

5.1. Concluding Overview

This chapter concludes the dissertation by bringing together the conceptual and empirical insights from Chapters 1 to 4. The study examined reshoring in a fragmenting global economy, where disruption, geopolitical tension, policy intervention, and changing economic conditions have encouraged firms and governments to reconsider how GVCs are organised.

The central aim was to examine how sector-targeted policy support, economic fundamentals, and automation are linked to reshoring-related outcomes across EU manufacturing sectors. Chapter 4 addressed this objective through a comparative country-sector-year analysis. For this purpose, it used four proxy indicators: domestic value-added intensity, imported-input dependence, the EU-sourced share of imported intermediates, and the non-EU share of imported intermediates. These indicators made it possible to distinguish between domestic value creation, import replacement, and regional rebalancing.

5.2. Conclusions by Research Question

5.2.1. RQ1: Policy support

RQ1 asked how policy support affects outcomes associated with reshoring across different sectors. The main conclusion is that direct support, measured through sector-targeted State aid can support domestic value creation, but it does not automatically produce broad reshoring or import replacement.

This suggests that direct policy support may strengthen domestic production activity in supported sectors. However, the same policy measure was not associated with a clear fall in imported-input dependence or with strong evidence of a systematic shift towards EU-sourced imported intermediates. This conclusion is limited to the proxy used in the empirical

analysis and should not be generalised to every policy tool discussed conceptually in Chapter 2.

The answer to RQ1 is therefore conditional. Policy tools can change the incentive environment in which firms reorganise production, but they cannot determine the outcome. Policy support may increase domestic value creation where it aligns with economically viable production conditions.

5.2.2. RQ2: Economic fundamentals

RQ2 asked how economic fundamentals influence reshoring-related outcomes across sectors. The main conclusion is that they matter, but not simply because of labour costs. The results do not suggest that labour costs alone explain reshoring-related outcomes. Labour compensation per hour was not statistically significant in the domestic value-added equation. Productivity was more important. Real labour productivity per hour was positively associated with domestic value-added intensity. This supports the total-cost logic developed in Chapter 2, because higher wages are less likely to discourage domestic production when they are offset by higher productivity.

At the same time, productivity was also positively associated with imported-input dependence. Productive manufacturing environments can therefore strengthen domestic value creation while remaining integrated into cross-border supply chains. Energy costs added a further qualification: higher electricity prices were associated with a higher non-EU share of imported intermediates and a lower EU-sourced share. The overall answer to RQ2 is therefore that the feasibility of reshoring depends on the broader balance between productivity, cost conditions, energy prices, and value-chain structure, rather than on wages alone.

5.2.3. RQ3: Automation and conditional reshoring

RQ3 asked whether automation makes reshoring more feasible by reducing the importance of labour-cost differences. The empirical answer is cautious and limited by the available data.

The Chapter 4 regression that used advanced digital intensity as a proxy to automation, did not find statistically significant evidence that automation-related digital capability

strengthens reshoring-related outcomes. Also, it did not find any significant interaction between labour compensation and advanced digital intensity. Therefore, within the limits of the proxy for automation and the available sample, the study cannot demonstrate that automation makes reshoring more feasible across EU manufacturing.

This, however, does not mean that automation is irrelevant. The literature reviewed in Chapter 2 suggests that automation can reduce the importance of labour-cost differences in some sectors, especially where production is standardised and demands high capital expenditures.

The available data did not allow to directly test sector-specific automation. Automation may therefore support reshoring in some sectors, but it cannot be treated as a general solution for offsetting labour-cost differences across EU manufacturing.

Overall, the evidence does not show a broad reversal of globalisation. Instead, it is linked to selective domestic value creation, continued dependence on imported inputs, and partial regional reconfiguration. Reshoring should therefore be understood as a tool within a broader resilience strategy, rather than as a general policy objective.

5.3. Policy Recommendations

The policy recommendations follow from the study's findings and from the literature reviewed in Chapter 2. They do not assume that reshoring is always beneficial or that GVCs are inherently problematic. Instead, they focus on how policy can reduce strategic vulnerabilities while preserving the efficiency gains of international specialisation where these gains remain important.

5.3.1. Reshoring as a resilience strategy

Recommendation 1: Policymakers should use reshoring selectively and treat diversification, nearshoring, and regional sourcing as valid resilience strategies alongside domestic relocation.

Chapter 4 did not find evidence of broad reshoring across EU manufacturing. Instead, domestic value-added intensity increased only modestly at aggregate level, while imported-

input dependence also increased. At sector level, the pattern was mixed, as some sectors exhibited stronger domestic value creation, while others did not.

Reshoring can be a viable option where a product or input is strategically important, its supply is exposed to disruption risks, and its production is economically feasible domestically or regionally. Firms should also recognise that resilience can also be achieved in other ways. Grossman et al. (2021) show that diversification can strengthen resilience at a lower cost than reshoring. Dadush (2023) and Gereffi et al. (2021) similarly show that firms often respond through supplier switching, regionalisation, or selective reconfiguration rather than full repatriation.

Policy success should not be defined only as production returning to the home country. It can also mean reducing dependence on a single supplier or country, finding alternative sources, or by shifting sourcing to the EU or neighbouring regions when this is feasible.

5.3.2. Policy support for productivity

Recommendation 2: Public support for domestic capacity should be linked to productivity, technological capability, and competitiveness; while avoiding protectionism or long-term dependence on subsidies.

This recommendation follows from the findings for RQ1 and RQ2. State aid was associated with domestic value-added intensity, rather than broad import replacement. Productivity also showed a stronger relationship with domestic value-added intensity than with labour costs.

Subsidies and incentives for investment should support the capabilities that make domestic production sustainable. These include advanced manufacturing, production efficiency, workforce skills, digital capability, and process improvement. This is consistent with Clancy et al. (2024), who caution that localisation policies can reduce output or increase inflation if they weaken productivity or competition.

Reshoring that depends only on subsidies may prove unsustainable when support ends. Reshoring supported by productivity gains is more likely to be sustained over time. Policy support should therefore have clear objectives and scope, and be linked to improvements in capacity, supply security, or technological capability.

5.3.3. Energy costs and industrial policy

Recommendation 3: Industrial policy and energy policy should be treated together, especially in sectors where energy costs affect production and sourcing decisions.

This recommendation follows from the RQ2 evidence on electricity prices. Chapter 4 found that higher electricity prices were associated with a higher non-EU share and a lower EU-sourced share and of imported intermediates. This does not prove that high electricity prices cause firms to source outside the EU, but it does suggest that high energy costs may make EU-based sourcing less attractive.

The policy implication is that reshoring cannot be considered separately from the cost environment in which firms operate. If energy-intensive production returns to Europe while energy prices remain high, firms may face cost pressures. In such cases, subsidies alone may not be enough to make production sustainable. Support for domestic or regional production in strategic sectors therefore needs also to consider the availability of competitive energy prices.

5.3.4. Realistic policies for automation

Recommendation 4: Policy should support automation and digital capability where they can improve productivity, but it should not present automation as a guaranteed solution to reshoring or job creation.

This recommendation follows from the cautious answer to RQ3. Chapter 4 did not find statistically significant evidence that advanced digital intensity strengthened reshoring-related outcomes, or that it weakened the labour-cost constraint. This result, however, is limited by data availability.

The literature reviewed in Chapter 2 points in the same direction. Kudrenko (2024) argues that automation and Industry 4.0 technologies can reduce the importance of low-wage labour, but they require capital investment and skilled workers. Bárcia de Mattos et al. (2021) show that automation is not equally feasible across all sectors.

Support for automation should therefore be linked to skills, training, and sectoral assessment. In sectors where automation is technically feasible, it may improve productivity and make local production more viable.

5.4. Managerial and Strategic Implications

The findings also have implications for managers. The main implication is that reshoring should be assessed as one option within a wider supply-chain strategy, alongside nearshoring, supplier diversification, regional sourcing, and continued global sourcing.

Managers should consider the total cost, not just labour cost. The dissertation finds that labour compensation by itself does not explain domestic value-added intensity. Productivity and energy costs also matter. Comparing a firm's options for location should therefore include labour productivity, energy costs, transport, supplier reliability, tariffs, and regulatory requirements.

Firms should also be aware of their dependence on imported intermediates. Chapter 4 showed that domestic value creation and imported-input dependence can rise at the same time. A firm may therefore create more value domestically while still relying on foreign suppliers.

Managers should compare reshoring with other possible responses. If the main risk is dependence on one supplier or country, adding alternative suppliers may be more effective than bringing production back home. If the problem is delivery time or proximity to clients, nearshoring may be more suitable. If a product is critical but relocation is not economically feasible, stockpiling or backup supply agreements may be preferable to reshoring.

Automation may support reshoring where production is standardised and firms have the capital, skills, and technical capability to use it effectively. However, this dissertation showed that digital capability does not automatically reduce labour-cost constraints across all sectors.

Overall, resilience requires a portfolio approach. The best strategy is carefully considering cost, risk, technology, and policy conditions.

5.5. Limitations of the Study

This dissertation has several limitations. Nevertheless, these limitations do not undermine the value of the study, they rather define the boundaries within which the findings should be interpreted.

The first limitation concerns measurement and level of analysis. Reshoring is not observed directly in the available data, therefore the study used proxy indicators: domestic value-added intensity, imported-input dependence, EU-sourced imported intermediates, and non-EU-sourced imported intermediates. These indicators are suitable for identifying reshoring-related patterns at country-sector level, but they do not show whether a specific firm moved a specific part of its production activity back to the home economy.

The second limitation concerns causality and policy measurement. The regression models in Chapter 4 identify conditional associations, not causal effects. In addition, the policy variable that was used in Section 4.2 was sector-targeted State aid as a percentage of gross output. This can be a useful proxy for policy support, but it does not capture all policy tools discussed in Chapters 1 and 2, including tariffs, sanctions, export controls, procurement rules, regulatory standards, and informal political pressure.

The third limitation concerns data granularity. Labour compensation, productivity, and electricity prices were available at manufacturing country-year level for the 19 manufacturing sectors. The model therefore cannot estimate detailed sector-specific cost or productivity conditions within each Member State. The variable for automation has a similar limitation. Advanced digital intensity is a proxy for digital capability, not a direct measure of robots, automated machinery, or production-line automation. In the available data it varies by country and year, rather than by sector.

A further limitation concerns omitted variables. The models do not include the firms' investment, supplier concentration, inventory practices, transport costs, exchange rates, demand shocks, or product-level criticality. As a result, some of the statistical relationships identified in the models may partly reflect factors that are not directly observed. This is why the coefficients are interpreted as conditional associations, not as causal estimates.

5.6. Future Research on Firm and Product-Level Evidence

5.6.1. Firm and product-level data

Future research could extend the methodology by using data that observe firms, products, or specific production stages more directly. Firm-level panel data would make it possible to track whether individual firms relocate production, change suppliers, or increase domestic capacity after policy interventions or supply-chain shocks. Product-level trade data would allow researchers to identify whether particular inputs move from non-EU to EU sourcing, or from foreign sourcing to domestic production. This would provide a more precise picture than broad sector-level averages.

Future studies could also combine quantitative and qualitative methods. Interviews with managers and policymakers would help explain why firms choose reshoring, nearshoring, or they continue global sourcing. Case studies could show how relocation decisions are made inside firms and how managers evaluate cost, risk, energy prices, and automation. These approaches would complement the secondary-data design used in this dissertation.

5.6.2. Reconfiguration and automation

Future research would benefit from more detailed data that distinguish between different forms of supply-chain reconfiguration. Relocation back to the home country, EU regional sourcing, nearshoring outside the EU, friendshoring, diversification, and stockpiling are not equivalent strategies. Treating them separately would make it easier to identify which response firms adopt under different conditions.

More detailed automation data would also improve future research. Direct measures of robotics, automated equipment, capital intensity, and sector-specific digital investment would allow a stronger test of RQ3. Better data would allow researchers to test whether automation has different effects in sectors such as electronics, machinery, textiles, motor vehicles, and pharmaceuticals.

When reshored production is highly automated, it may create fewer jobs than policymakers expect. However, another aspect of automation is that the jobs it creates may require

different technical, digital, or engineering skills. Future research on these effects would help connect policies on reshoring with education and training needs.

5.6.3. Final reflection

Reshoring should therefore be treated as a selective resilience instrument, rather than as a general policy objective. In a fragmented global economy, firms and governments have to balance security, cost, productivity, and competitiveness. The evidence from EU manufacturing does not point to outright localisation, but to a more selective and conditional reconfiguration of production and sourcing.

Governments should not seek to bring production back home regardless of cost. They should focus on areas where domestic or regional capacity is strategically important and economically feasible. At the same time, they should also assess whether other resilience strategies could achieve similar goals in more efficient ways.

Over recent decades, GVCs have generated important efficiency gains. Recent disruptions, however, have shown that resilience also matters. Resilience does not always mean reshoring. The challenge for policymakers and firms is to improve the security of supply without undermining competitiveness. Reshoring should be viewed as a means to an end, not the end in itself.

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Appendix A: Methodology Appendix

A.1. Purpose and scope

This appendix explains the descriptive statistical analysis implemented in Section 4.1.

A.2. Data source and unit of observation

The data source is the European Union's inter-country supply, use and input-output tables, also referred to as FIGARO tables for 2010–2023 (Eurostat, 2025). The initial unit of observation is a country–sector–year observation. The analysis covers 27 EU Member States, 19 manufacturing sectors, and 14 years.

A.3. Construction of the Eurostat components

For each country c , sector s , and year t , the relevant Eurostat (2025) industry was selected. The following components were then calculated from that industry.

$$\textbf{Gross output}_{cst} = \text{total sum for the relevant industry} \quad (\text{A.1})$$

$$\textbf{Total intermediate inputs}_{cst} = \text{sum of all industry rows} \\ \text{from the relevant industry} \quad (\text{A.2})$$

$$\textbf{Gross value added}_{cst} = \text{compensation of employees} + \text{other taxes} - \\ \text{subsidies on production} + \text{gross operating surplus} + \text{gross mixed income} \quad (\text{A.3})$$

$$\textbf{Imported intermediate inputs}_{cst} = \\ \text{intermediate inputs purchased from all foreign supplier industries} \quad (\text{A.4})$$

$$\textbf{EU sourced imported intermediate inputs}_{cst} \\ = \text{imported intermediate inputs purchased from supplier industries} \\ \text{located in EU Member States} \quad (\text{A.5})$$

$$\textbf{Non EU sourced imported intermediate inputs}_{cst} \\ = \text{imported intermediate inputs purchased from} \\ \text{supplier industries located outside the EU27} \quad (\text{A.6})$$

A.4. Construction of the four outcome variables

Using the components defined above, four outcome variables were calculated as follows.

$$\textbf{Domestic value added intensity}_{cst} = 100 \times \frac{\text{Gross value added}_{cst}}{\text{Gross output}_{cst}} \quad (\text{A.7})$$

$$\text{Imported input dependence}_{cst} = 100 \times \frac{\text{Imported intermediate inputs}_{cst}}{\text{Total intermediate inputs}_{cst}} \quad (\text{A.8})$$

$$\text{EU sourced import share}_{cst} = 100 \times \frac{\text{EU sourced imported intermediate inputs}_{cst}}{\text{Imported intermediate inputs}_{cst}} \quad (\text{A.9})$$

$$\text{Non EU sourced import share}_{cst} = 100 \times \frac{\text{Non EU sourced imported intermediate inputs}_{cst}}{\text{Imported intermediate inputs}_{cst}} \quad (\text{A.10})$$

A.5. Descriptive aggregation procedure

The Section 4.1 analysis uses three levels of descriptive aggregation. First, the country–sector-year table. Second, the EU27 manufacturing-year table. Third, the EU27 sector-year table.

A.6. Statistical interpretation

The statistical analysis in Section 4.1 is descriptive. It uses ratios, averages, charts, and rankings. The results therefore show patterns in the data rather than causal effects.

A.7. Working assumptions and limitations

The main working assumptions are as follows. First, the Eurostat (2025) tables are treated as internally consistent enough to support comparisons across countries, sectors, and years. Second, the four outcome variables are treated as proxy indicators of reshoring-related and reconfiguration-related change, not as direct observations of firm-level relocation decisions. Third, the period comparison is descriptive and does not isolate a single policy shock. Fourth, ratios are calculated only where the relevant denominator is positive and observed.

Appendix B: Methodology Appendix

B.1. Purpose and scope

This appendix explains the regression model implemented in Section 4.2 and sets out the construction of all variables used in that section.

B.2. Regression sample and unit of observation

The regression sample is a country–sector–year panel covering 27 EU Member States, 19 manufacturing sectors, and the years 2010–2023. Each observation therefore refers to one manufacturing sector in one Member State in one year. This preserves the panel structure described in Chapter 3, while restricting the policy analysis to the data that could be matched consistently across the uploaded sources.

B.3. Construction of the dependent variables from FIGARO

All dependent variables are derived from the Eurostat FIGARO industry-by-industry inter-country input-output tables (Eurostat, 2025). For each country–sector–year observation, the following quantities were first constructed from the industry column corresponding to that country and sector.

$$\textbf{Gross output}_{cst} = \text{total column sum for the relevant industry} \quad (\text{B.1})$$

$$\begin{aligned} \textbf{Total intermediate inputs}_{cst} = \\ \text{sum of all industry rows flowing into that same industry column} \end{aligned} \quad (\text{B.2})$$

$$\begin{aligned} \textbf{Gross value added}_{cst} = & \text{compensation of employees} + \text{other taxes} - \\ & \text{subsidies on production} + \text{gross operating surplus} + \text{gross mixed income}. \end{aligned} \quad (\text{B.3})$$

$$\begin{aligned} \textbf{Imported intermediate inputs}_{cst} = \\ \text{intermediate inputs purchased from all foreign supplier industries} \end{aligned} \quad (\text{B.4})$$

$$\begin{aligned} \textbf{EU sourced imported intermediate inputs}_{cst} \\ = \text{imported intermediate inputs purchased from supplier industries} \\ \text{located in EU Member States} \end{aligned} \quad (\text{B.5})$$

$$\begin{aligned} \textbf{Non EU sourced imported intermediate inputs}_{cst} \\ = \text{imported intermediate inputs purchased from supplier industries} \\ \text{located outside the EU27}. \end{aligned} \quad (\text{B.6})$$

Using those components, the four common reshoring-related outcome variables were defined as follows.

$$\text{Domestic value added intensity}_{cst} = 100 \times \frac{\text{Gross value added}_{cst}}{\text{Gross output}_{cst}} \quad (\text{B.7})$$

$$\text{Imported input dependence}_{cst} = 100 \times \frac{\text{Imported intermediate inputs}_{cst}}{\text{Total intermediate inputs}_{cst}} \quad (\text{B.8})$$

$$\text{EU sourced import share}_{cst} = 100 \times \frac{\text{EU sourced imported intermediate inputs}_{cst}}{\text{Imported intermediate inputs}_{cst}} \quad (\text{B.9})$$

$$\text{Non EU sourced import share}_{cst} = 100 \times \frac{\text{Non EU sourced imported intermediate inputs}_{cst}}{\text{Imported intermediate inputs}_{cst}} \quad (\text{B.10})$$

The last two variables are undefined where imported intermediate inputs are equal to zero. This is why the sourcing-share regressions use two fewer observations than the first two models.

B.4. Construction of the policy-exposure variable from the State Aid Scoreboard

The explanatory variable used in Section 4.2 is based on the European Commission State Aid Scoreboard disaggregated dataset. The construction followed four steps.

First, only EU Member States and expenditure years from 2010 to 2023 were retained.

Second, the inflation-adjusted aid element, measured in EUR million at constant 2024 prices, was used instead of nominal expenditure.

Third, State aid entries were matched to the Eurostat (2025) manufacturing sectors only when the reported sector codes could be assigned to one Eurostat (2025) manufacturing aggregate.

Fourth, the remaining aid entries were aggregated to the country–sector–year level and converted into a relative policy measure.

$$\text{Policy exposure}_{cst} = 100 \times \frac{\text{Sector targeted State aid}_{cst}}{\text{Gross output}_{cst}} \quad (\text{B.11})$$

This means that the regression captures direct support-type policy exposure only. It does not measure all policy tools discussed in Chapter 2.

B.5. Regression model and notation

Section 4.2 estimates the following dummy-variable multiple regression separately for each of the four dependent variables.

$$Y_{cst} = \alpha + \beta P_{cst} + \mu_c + \gamma_s + \lambda_t + \varepsilon_{cst} \quad (\text{B.12})$$

where:

Y_{cst} is one of the four outcome variables for country c , sector s , and year t .

P_{cst} is policy exposure, measured as sector-targeted State aid as a percentage of gross output.

μ_c represents country dummy variables.

γ_s represents sector dummy variables.

λ_t represents year dummy variables.

ε_{cst} is the residual term.

B.6. Dummy variables

The country dummies absorb time-invariant differences across Member States, the sector dummies absorb persistent differences across manufacturing activities, and the year dummies absorb shocks that affect the full sample in a given year. This makes the coefficient on policy exposure easier to interpret because it is estimated after accounting for these broad structural differences.

B.7. Working assumptions and interpretation

The regression model is used here as an associative tool rather than as a causal identification strategy. The main working assumptions are therefore kept at a level consistent with the dissertation's scope.

First, the relationship between the dependent variable and policy exposure is treated as approximately linear within the observed range.

Second, each country–sector–year observation is treated as a distinct observation in the regression table.

Third, the policy variable and the FIGARO (Eurostat, 2025) outcomes are assumed to be measured consistently enough to support comparison across countries, sectors, and years.

Appendix C: Methodology Appendix

C.1. Purpose and scope

This appendix explains the regression model implemented in Section 4.3 and sets out the construction of the economic-fundamentals variables used in that section.

C.2. Regression sample and unit of observation

The regression sample follows the same country–sector–year structure as Sections 4.1 and 4.2.

C.3. Dependent variables

The dependent variables in Section 4.3 are the same four indicators based on Eurostat (2025): domestic value-added intensity, imported-input dependence, the EU-sourced share of imported intermediates, and the non-EU share of imported intermediates. These variables are using the same logic described in Appendix B.

Using the same dependent variables ensures that Section 4.3 remains directly comparable with Sections 4.1 and 4.2. However, these variables remain proxy indicators. They capture reshoring-related and reconfiguration-related patterns at country–sector level, not direct firm-level relocation decisions.

C.4. Construction of the economic-fundamentals variables

The main explanatory variables are constructed at the country-year level and then matched to each manufacturing sector in the Eurostat (2025) data. This is necessary because the Eurostat economic-fundamentals data⁶ provide manufacturing-wide country-year indicators rather than the same 19 detailed manufacturing sectors used in Eurostat (2025).

The labour-cost variable is labour compensation per hour worked in manufacturing, measured in euros and taken from Eurostat (n.d.-c). In the model, this variable is denoted LC_{ct} .

The productivity variable is real labour productivity per hour worked in manufacturing, measured as an index with 2015 equal to 100. It is taken from Eurostat (n.d.-e). In the model, this variable is denoted $PROD_{ct}$.

⁶ Eurostat (n.d.-e); Eurostat (n.d.-c); Eurostat (n.d.-b)

The energy-cost variable is the electricity price for non-household consumers, using consumption band ID, excluding VAT and other recoverable taxes and levies, measured in euros per kilowatt-hour in Eurostat (n.d.-b). In the model, this variable is denoted **ELEC_{ct}**.

C.5. Regression model and notation

Section 4.3 estimates the following dummy-variable multiple regression separately for each of the four dependent variables:

$$Y_{cst} = \alpha + \beta 1 LC_{ct} + \beta 2 PROD_{ct} + \beta 3 ELEC_{ct} + \mu_c + \gamma_s + \lambda_t + \varepsilon_{cst} \quad (C.1)$$

where:

Y_{cst} is one of the four reshoring-related outcome variables for country *c*, sector *s*, and year *t*.

LC_{ct} is labour compensation per hour in manufacturing for country *c* and year *t*.

PROD_{ct} is real labour productivity per hour in manufacturing for country *c* and year *t*.

ELEC_{ct} is the non-household electricity price in cents per kilowatt-hour for country *c* and year *t*.

μ_c represents country dummy variables.

γ_s represents sector dummy variables.

λ_t represents year dummy variables.

ε_{cst} is the residual term.

C.6. Interpretation of coefficients

The coefficient **β1** estimates the association between labour compensation per hour and the outcome variable, holding productivity, electricity prices, and the dummy variables constant. The coefficient **β2** estimates the association between real labour productivity and the outcome variable, holding the other variables constant. The coefficient **β3** estimates the association between electricity prices and the outcome variable, holding the other variables constant.

C.7. Working assumptions and limitations

The relationship between each explanatory variable and the dependent variable is treated as approximately linear within the observed range. Each country–sector–year observation is treated as a separate observation in the regression table. The residual term captures other influences on reshoring-related outcomes that are not included explicitly in the model.

The most important limitation is that the economic variables do not vary by the Eurostat (2025) manufacturing sectors. They vary by country and year and are therefore repeated across sectors within each country-year. Sector dummy variables are included to control for persistent differences across manufacturing sectors, but the model cannot estimate sector-specific labour-cost, productivity, energy-cost, or logistics effects. This limitation narrows the interpretation of RQ2.

Appendix D: Methodology Appendix

D.1. Purpose and scope

This appendix explains the regression model implemented in Section 4.4 and sets out the construction of the automation-related variable, the labour-cost variable, the interaction term, and the final regression sample.

D.2. Regression sample and unit of observation

The regression sample follows the same country–sector–year logic used in Sections 4.2 and 4.3, but with a narrower time period. The regression sample covers 27 EU Member States, 19 manufacturing sectors, and the years 2021 and 2023. Each observation refers to one manufacturing sector in one Member State in one year. The time period is restricted because the Digital Intensity Index measure (Eurostat, n.d.-a) used in the regression is available in a comparable version for 2021 and 2023 only.

D.3. Dependent variables

The dependent variables in Section 4.4 are the same four outcome indicators used throughout Chapter 4: domestic value-added intensity, imported-input dependence, the EU-sourced share of imported intermediates, and the non-EU share of imported intermediates.

The dependent variables remain proxy indicators. They capture reshoring-related and reconfiguration-related patterns at country-sector level, not direct firm-level decisions to relocate production.

D.4. Construction of the automation-related variable

The main automation-related variable is constructed from the Eurostat Digital Intensity Index (Eurostat, n.d.-a). The Eurostat (n.d.-a) classifies enterprises according to the number of digital conditions they meet. For the version used here, enterprises can be classified as having very low, low, high, or very high digital intensity.

The variable used in the regression is Advanced Digital Intensity, defined as the percentage of manufacturing enterprises with high or very high digital intensity. It is calculated as:

Advanced Digital Intensity_{ct} =

$$\text{At least basic digital intensity}_{ct} - \text{Low digital intensity}_{ct} \quad (\text{D.1})$$

Where this calculation is not possible, but the high and very high categories are directly available, the variable is calculated as:

Advanced Digital Intensity_{ct} =

$$\text{High digital intensity}_{ct} + \text{Very high digital intensity}_{ct} \quad (\text{D.2})$$

The variable is measured as a percentage of enterprises. It is used as a proxy for automation-related and digital capability. It is not a direct measure of industrial robots, automated machinery, or production-line automation.

D.5. Construction of the labour-cost and interaction variables

The labour-cost variable is labour compensation per hour in manufacturing, taken from the Eurostat labour productivity and unit labour costs by industry (Eurostat, n.d.-d). It is measured in euros and varies by country and year.

The interaction variable is constructed by multiplying labour compensation per hour by advanced digital intensity:

Interaction_{ct} =

$$\text{Labour compensation per hour}_{ct} \times \text{Advanced digital intensity}_{ct} \quad (\text{D.3})$$

The purpose of this variable is to test whether the relationship between labour costs and reshoring-related outcomes changes when manufacturing digital capability is higher. A statistically meaningful interaction would suggest that labour costs and digital capability should be interpreted jointly rather than separately.

D.6. Regression model and notation

Section 4.4 estimates the following dummy-variable multiple regression separately for each of the four dependent variables:

$$Y_{cst} = \alpha + \beta_1 LC_{ct} + \beta_2 AUTO_{ct} + \beta_3 (LC_{ct} \times AUTO_{ct}) + \mu_c + \gamma_s + \lambda_t + \varepsilon_{cst} \quad (\text{D.4})$$

where:

Y_{cst} is one of the four reshoring-related outcome variables for country c , sector s , and year t .

LC_{ct} is labour compensation per hour in manufacturing for country c and year t .

$AUTO_{ct}$ is advanced digital intensity in manufacturing for country c and year t .

$LC_{ct} \times AUTO_{ct}$ is the interaction between labour cost and advanced digital intensity.

μ_c represents country dummy variables.

γ_s represents sector dummy variables.

λ_t represents year dummy variables.

ε_{cst} is the residual term.

The coefficient $\beta 1$ estimates the association between labour compensation per hour and the outcome when advanced digital intensity is held constant. The coefficient $\beta 2$ estimates the association between advanced digital intensity and the outcome when labour compensation is held constant. The coefficient $\beta 3$ is the interaction coefficient. It is the key coefficient for RQ3 because it shows whether the labour-cost association changes as digital intensity increases.

D.7. Dummy variables and reference categories

Country, sector, and year dummy variables are included to keep the model consistent with Sections 4.2 and 4.3.

D.8. Working assumptions and limitations

The main working assumptions are the same as in Sections 4.2 and 4.3. The relationships are treated as approximately linear within the observed range. Each country-sector-year observation is treated as a distinct observation in the regression table.

The main limitation is that the automation-related variable does not vary across the 19 manufacturing sectors. It varies only by country and year. This means the model cannot test whether automation has different effects in more standardisable or capital-intensive sectors compared with sectors where automation is technically limited.

A second limitation is that the automation proxy is based on digital intensity rather than direct automation. The Digital Intensity Index (Eurostat, n.d.-a) it is not a direct measure of robots, automated production lines, or capital equipment used in manufacturing. For this

reason, Section 4.4 states the results as evidence on automation-related digital capability, not as direct evidence on automation itself.

Author's Statement:

I hereby expressly declare that, according to the article 8 of Law 1559/1986, this dissertation is solely the product of my personal work, does not infringe any intellectual property, personality and personal data rights of third parties, does not contain works/contributions from third parties for which the permission of the authors/beneficiaries is required, is not the product of partial or total plagiarism, and that the sources used are limited to the literature references alone and meet the rules of scientific citations.