

Conclusions

Costs and benefits of industrial relocations: a conceptual approach

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1. Introduction

This chapter takes a closer look at the political economy of global value chain (GVC) relocations through the prism of costs and benefits and their distribution. To do so, we distinguish between *moral* and *strategic* relocations. The first type aim to redress an environmental or social ‘bad’ that is produced — alongside the good (or service) — in, and often as a result of, existing long, thin supply chains that can stretch across the globe. Strategic relocations, in contrast, target increases in capability, autonomy and resilience, and have become more of an urgent concern because of recent geopolitical developments and supply shocks. While this chapter is primarily intended as an analytical overview, it also makes a simple argument. Very few relocations have only minor or no costs; consequently, the governance of the (net) costs and benefits is crucial. The distribution of these costs and benefits, in the EU or abroad, will determine the type and level of political and social support in different jurisdictions. This is not a defeatist acceptance of the status quo, but a call for proactive thinking about relocation strategies with the distribution of costs and benefits in mind and for developing governance arrangements that address this redistribution.

We will start with a conceptual section on costs and benefits, primarily to drive home the point that they are everywhere, even though they may not always be fully visible, measurable or play out over different time horizons. We then explore different categories of social, environmental and economic costs and benefits of moral and strategic relocations in two subsequent sections. Most of this discussion is programmatic, building on a burgeoning literature, including policy reports, and fed by examples to illustrate the issues. Our concluding section lays out a summary research agenda on the political economy of relocations.

2. Costs and benefits: a conceptual approach

There is no such thing as a free lunch. Without this simple maxim, economics and political economy would make little sense: economics postulates the perennial nature of costs, parallel to physicists for whom energy never disappears in a system, while political economists focus on the politics of pre- and post-distribution of costs. Yet,

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somewhat surprisingly given their central role in at least these two disciplines, the idea of costs is often not well understood.

2.1 Hidden benefits and costs

The first important distinction is between visible, identified costs, often expressed in monetary terms, and otherwise hidden costs, for example the costs of searching for a new job: scanning job ads, drawing up and sending out a CV, going to interviews, and digesting the emotional toll of a rejection. Yet even visible costs are not necessarily objectively measurable: costs are in a fundamental way constructed through accounting conventions, which define what is considered a cost, what not and how it is expressed. (Political) economists have a slightly different, complementary perspective: they assume that costs are everywhere and can in aggregate not be reduced, only redistributed – even if they cannot be accounted for.

Transaction costs are an important category of hidden costs, especially in relocation debates. Relocating (parts of) GVCs back to the EU requires firms to search for and set up production sites as well as links with (new) suppliers. The EU's industrial alliances, such as the Battery Alliance, which coordinate the establishment of new European supply chains, absorb many of these transaction costs. The creation of intangible assets also produces hidden expenses: how do you measure the benefits of high-quality engineering and incrementally built-up quality control systems, which have high costs now but possibly higher benefits further down the line? Firms may invest in skills now, but the full benefit may only materialise after several years, especially if experience is crucial for a specific task. And while transaction costs for firms can be reduced by coordinating institutions such as sectoral training systems, mutual trust usually follows from iterative positive interactions between actors: in contrast to many other goods, trust increases in value when used (I trust you more after a positive experience than before). Finally, the opportunity costs of relocation are possibly among the most important hidden costs (but also the most abstract) for governments, businesses and society at large: what else can be done with the time, money and effort spent on the relocation initiative?

Externalities, both negative and positive, are a very different type of costs or benefits. They are usually hidden, not easily visible, or ignored, and not immediately apparent by simply looking at the monetary price of an activity. Technically, negative externalities occur when A produces an adverse effect for B (and C), but without paying the full cost. In the case of positive externalities, A generates a beneficial effect for B (and C) without charging them the full price for the benefit they receive. Environmental dumping is a classic example of a negative externality: all else being equal, firms in countries with weak(er) environmental regulation can produce certain goods at a lower price, as they externalise a share of the true cost to local communities and their natural environments (Zhang et al. 2018). Negative externalities, which create unaccounted costs for (unrelated) third parties, therefore usually are at the basis of arguments for moral relocations. They are aimed at correcting a 'bad' that was unnoticed with the good (or service) produced.

2.2 Indirect costs and benefits

The second important distinction is between direct and indirect costs and benefits. Imagine that relocation of production entails a significant shift of upstream and downstream activities, as is likely the case in a sector such as semiconductors. Innovation activities, including basic research, may follow in the wake of that decision. Setting up and maintaining fabrication ('chips fabs' in the industry jargon) is likely to result in new industrial construction, enhanced infrastructure, and a profound shift in training, from engineers to shopfloor workers. The local (and regional or national) economy will gradually turn into an ecosystem of vibrant research institutes, commercial hardware and software developers, powerful community colleges and higher education institutions, and upgraded infrastructure, while employment in service-sector subcontractors and local tax revenue will increase. Since these (positive) second-order effects and sectoral or regional spillovers can have multiple origins alongside the relocation, it is hard to attribute a precise benefit to a specific intervention.

These types of identification issues are not just academic. Often, they lead to time inconsistency problems: the (abstract and not always easily quantifiable) costs happen today but the tangible benefits, which may be equally hard to identify, emerge much later and are distributed over a considerably larger and less homogenous population. Take, for example, the electric transition in the automobile industry today. Specific assets of workers (industry-specific skills) and capitalists (dedicated machinery) impose strong costs on the two parties in the industry today, while the benefits of lower CO₂ emissions are spread over the entire planet and accrue with a time lag.

And what about the costs of not doing something precisely because of the decision to do something else? These *opportunity costs* are easy to understand conceptually but very hard to measure as they refer to an absent action. Imagine that we aim for electric individual mobility systems; by and large, because of the constraint imposed by a fixed budget and accounting rules, we are forced to forego a future based on better public transport or (green) hydrogen, to name just two possible alternatives that may be more effective – but we will not know. Unless we can tweak budget rules to avoid the hard choices, opportunity costs will always hang over our heads.

2.3 Net costs

Adding all the costs and benefits, visible and hidden, direct and indirect, into one number gives us the net sum of costs and benefits of a project (assuming we can estimate the relation between current costs and future benefits through discount rates): net costs exist when all costs outweigh the benefits, while net benefits emerge the other way around. Net costs and benefits are relatively easy to identify if all terms in the sum can be measured or translated into the same unit of value.

If they cannot, however, we face what are called *commensurability* problems. Take the example of EU enlargement: was that a net benefit or a net cost? The answer depends on the weight you attach to the moral imperative to make the ex-communist countries

again a part of Europe. If this is high, it likely trumps any financial costs ('it simply was the right thing to do'). However, if it is low, a more utilitarian, transactional definition of costs may prevail, with a more pessimistic conclusion. Note that these two registers of argument are a priori not easily comparable in terms of costs or benefits. The first is almost a 1-0 identity issue, while the more transactional approach could, in principle, have resulted in a slow, gradual process with clearly identified milestones and positive deliverables for both the new Member States and the EU.

In current discussions of open strategic autonomy in the EU, both arguments appear. For some, the EU needs to relocate some activities to control its own destiny, while others point out the potentially high costs (and likely low returns) of relocations. These dimensions alert us to the problem of commensurability if costs are located in one sphere and benefits in another.

These types and categories of costs and benefits show up in both moral and strategic relocations. Hidden environmental and social costs in non-EU producer locations or international transport networks often serve as motives for moral relocations, while strategic reshoring to the EU is typically driven by costs that result from dependencies or volatility in GVCs. Well-designed relocations can reduce these specific costs. On aggregate, however, both the net costs and the benefits of relocations along entire GVCs are likely to be relatively small. Instead, the major problems result from a redistribution of costs between geographies and actors. Importantly, however, this does not mean that (adverse) effects on individual groups or countries should be neglected. The direct and dynamic effects that arise from the new distribution of costs increase the need for a more holistic cost accounting system, well beyond visible and measurable first-order impacts, as it can alert policymakers to likely hold-ups, sources for opposition, or other unintended consequences. The next section will explore the costs and benefits of moral relocations, unpack their dynamic consequences and point out the (sometimes difficult) new trade-offs that might arise.

3. The costs and benefits of moral relocations

After the collapse of communist regimes in eastern Europe in the early 1990s and China's accession to the WTO in 2001, western firms encountered a vast untapped supply of cheap labour and productive capacity. The fragmentation of production into GVCs allowed a growing number of emerging economies to become part of the international production system (Baldwin 2016). European businesses invested heavily in overseas sites, creating jobs for local workers, opportunities for (smaller) regional suppliers to access world markets and tax revenues for governments. Over the past two decades, the integration of distant production sites into GVCs have lifted large parts of the global population out of poverty and significantly increased aggregate living standards in countries where suppliers are located (World Bank 2020: 3). Households and businesses in the EU, the consumers of these goods and services, have also benefited from cheaper and more diverse products.

However, the rapid rise of global supply networks has also produced a series of side effects along GVCs that are often not adequately reflected in the monetary value of a final product (Wiedmann and Lenzen 2018). Many of these adverse impacts occur in sectors where costs – as opposed to market proximity or access to specific skills – are the main driver of location or sourcing decisions. Many multinational companies (MNCs), for example those in the textile or consumer electronics industries or in administrative and technical support services where labour costs drive competitiveness, select low-wage, low-tax countries for their manufacturing or supplier base (Mihalache and Mihalache 2016). Since those nations typically have weaker social and environmental regulation than EU Member States, or lack the governance frameworks to enforce existing rules, such a stretched supply chain can lead to social and environmental dumping.

The existence of these – often unaccounted – social and environmental costs is at the root of what we call moral relocations (which are different from the strategic relocations that we will discuss in the next section). The premise of such relocation initiatives is that reshoring production to the EU minimises adverse social and environmental impacts in supplier countries, in international transport chains, and even in the EU, while it can potentially unlock benefits in Europe (e.g. employment creation).² For reasons of simplicity, we evaluate costs and benefits in three steps in the GVC – from non-EU production and supplier countries over international transport networks to EU Member States. Note, however, that the dynamic effects of moral relocations on different parts of GVCs cannot be viewed in isolation. While relocation can reduce certain negative effects of GVCs, the aggregate costs typically do not simply disappear but shift between actors and geographies.

3.1 Moral relocation costs and benefits in non-EU countries

Let us start with the first step in the GVC: production or supplier locations in non-EU countries, typically located in the Global South. One of the main motives for moral relocations is that working conditions – including working hours, skills development, social security and pension arrangements, severance and notice pay, as well as health and safety standards – in non-EU supplier countries are often only weakly regulated, if at all, and are well below European standards. For example, wages in places like Mae Sot, a garment manufacturing hub in Thailand, where many large western brands subcontract production, are well below the Thai minimum wage but workers – typically migrants from adjacent, war-torn Myanmar – simply accept the low pay, because it is higher than what they would earn in their native country. Moreover, migrant workers in Thailand have little legal protection and are not allowed to lead or form unions (Dugan 2022).

2. Note that EU governments do not explicitly have to force firms to relocate for moral reasons. Social and environmental due diligence laws through which EU firms can be held accountable and fined for proven misconduct in their upstream GVCs – as currently discussed in the context of an EU Directive on Corporate Sustainability Due Diligence (European Commission 2022) – can lead businesses to relocate to Europe, if the risk of wrongdoing in foreign partner firms is high and cannot easily be monitored.

Such practices allow firms to externalise a share of the true production costs onto workers (Zhang et al. 2018). But the situation is not always as clear cut in the non-EU location. While wages and working conditions in firms are significantly below European norms, they typically enable higher living standards than work in domestic or informal sectors³ (Girma et al. 2019). Because of these ambiguous effects, simply relocating plants to the EU could make the problem more intractable: unless growing regional players in the Global South fill the void, employment in non-EU GVC-participating firms will inevitably fall because of the European relocation initiatives. That is also likely to lead to a fall in tax revenues and put further pressure on often already stretched social expenditure budgets.

The second important moral motive is to reduce environmental externalities in the Global South.⁴ The issue is one of regime competition: looser environmental regulations allow companies to save on expensive clean technology, while facing at best very low risks of very low fines. All else being equal, this reduces production costs and, thus, increases profits. Crucially, this problem is unsolvable without regulation; even in an era of improved environmental governance accounting, voluntary initiatives require that all potential polluters sign up. That crucial condition faces a permanent problem of defection by firms who will exploit the voluntary constraint by others – since all know that defection by at least one is likely, cooperation will fall apart without regulatory enforcement. Many non-EU governments are reluctant to regulate too tightly on their own, however: unless regulations in all potential locations are roughly at the same level, authorities will privilege foreign investment over environmental cooperation.

The proposed EU Directive on Corporate Sustainability Due Diligence would change this by requiring large companies or firms in high-risk sectors to identify and prevent or mitigate adverse social and environmental impacts in their entire supply chains (European Commission 2022). In the case of non-compliance, national administrative authorities may impose fines, and victims in third countries will be able to take legal action against EU firms for social and environmental damages that could have been avoided by following the EU's due diligence rules. While the far-reaching EU proposal is more promising than voluntary initiatives, there is a risk that it indirectly leads firms to relocate their GVCs away from high-risk countries, especially if they have to request, verify and process due diligence data from a large number of suppliers across the globe. The Austrian multinational construction company STRABAG, for instance, has already pulled out of Africa in response to the German supply chain due diligence law – a less ambitious cousin of the EU proposal that came into force in January 2023 – as the administrative effort and remaining legal risks would be too large compared to their revenues in the region (Kurmayer 2022).

3. The extreme case of child labour in GVCs exemplifies a harsh truth: while underage minors should obviously not be obliged to work, there is a risk that they will be pushed into informal sectors (e.g. prostitution) if a prohibition of child labour is implemented without appropriate accompanying policy measures (e.g. daily free meals in schools).
4. Importantly, however, some of the most polluting activities can simply not be relocated to the EU in the short run. For example, reshoring the mining and processing of raw materials to the EU is a long-term process, as many mines have been closed in recent decades. Reopening them will take time because of long permit procedures and likely public opposition. The related legal and transaction costs for firms will be significant.

Overall, regulations or initiatives that lead firms to relocate their GVCs to high-standards jurisdictions can be problematic. If patriation cannot eliminate the related environmental costs associated with consumption and production, it will simply shift them geographically. The relevant figures speak volumes: EU aggregate consumption in 2019 accounted for about 10 per cent of global CO₂ emissions, that is, 3.4 gigatonnes (Gt) (Eurostat 2022). Of these emissions, 3.1 Gt were produced in the EU. Emissions embodied in EU imports (0.9 Gt) were higher than emissions related to EU exports (0.6 Gt), making the EU a net importer of CO₂ emissions, with roughly 9 per cent of EU consumption-related emissions produced in non-EU countries. All other things being equal, relocation would therefore increase European CO₂ emissions, even in technologically more advanced economies (Eurostat 2022; Xu and Dietzenbacher 2014; de Vries and Ferrarini 2017; Wiedmann and Lenzen 2018). Since the EU Emissions Trading Scheme (ETS) prices a part of carbon emissions in some sectors, and ecological protection is generally stronger in the EU, relocation forces firms to internalise these costs. The remaining (unaccounted) costs would be paid for by the European environment unless EU regulation is significantly tightened.

In sum, simply relocating production away from low-wage, weak-regulation countries to the EU will shift much of the environmental costs onto EU firms. While this can be considered as a fair development, it also risks exacerbating social dislocation in the Global South. Any initiatives in that direction, including due diligence laws that may (unintentionally) lead EU firms to pull out their operations or orders from high-risk regions, would require careful analysis and governance to minimise the associated disruptions.

3.2 Moral relocation costs and benefits in international transport

International transport – the logistical backbone of GVCs – is one of the few areas where relocation could actually reduce aggregate net environmental costs, rather than shifting them between actors or geographies. Transporting more than 80 per cent of global trade by volume (UNCTAD 2021: 111), maritime shipping is the most important and among the most polluting modes of global transport, with annual greenhouse gas (GHG) emissions nearly as large as those of Germany (Bullock et al. 2020: 2). In addition, global shipping also has significant negative effects on marine biodiversity (European MSP Platform 2021). Relocation of production to the EU would radically reduce the demand for global shipping in the medium run and environmental costs would fall. Even though the net environmental benefit depends on the additional costs associated with intra-EU transport via air, road or rail, it is almost certainly positive.

The social costs and benefits of relocation for shipping are less clear. There is little doubt that social dumping at sea would be minimised by a reduction in demand for seaborne cargo. While the International Maritime Organisation (IMO) sets regulatory standards regarding taxation, health and safety, and workforce organisation, enforcement varies, usually depending on the flag under which a ship sails (Union of International Associations 2020). Because many small coastal or island nations allow ship owners to fly under their so-called flag of convenience, the potential for tax evasion and other

socially harmful practices (e.g. wage dumping or union prohibition) is vast. Reducing shipping would, in one move, thus reduce these regulatory abuses. That said, the concomitant employment losses would create significant social costs for seafarers; and, since their skill set is not easily transferable, these losses would be hard to compensate by equivalent employment elsewhere.

Social dumping practices can also occur in inland or coastal shipping, which will still play a role even in the case of relocation to EU – even though in principle that could be subject to tighter social clauses that apply to access to the single market. Relocations would also affect existing ports along GVC stages: while lower demand would lead to fewer jobs, it could potentially benefit the remaining workers by reducing their physical and mental stress (which has spiked dramatically due to Covid-induced port congestions and backlogs⁵).

3.3 Moral relocation costs and benefits in the EU

The costs and benefits of moral relocations for EU countries – the last step in our stylised GVC – are largely of a different nature. One of the key arguments within the EU for relocation is the repatriation of jobs that were previously outsourced to non-EU countries. Transferring employment back to the EU is also likely to lead to a reintegration of supply chains and a concurrent increase in bargaining power for workers. Yet a frequently ignored dimension in this debate on the social benefits of relocation is that the moral relocation rationale disproportionately affects low value-added (VA) sectors, such as textiles, basic electronics or administrative support services. New employment would therefore most likely be in relatively low-wage countries in the EU periphery, where there are weaker worker representation systems than in the core. While those gains are not insignificant, cost-based fragmentation may easily survive the relocation rationale, with considerably weaker positive effects as a result.

An even more significant problem harks back to the original outsourcing motives of European firms. Due to their considerably lower labour costs, many non-EU countries have had a comparative advantage in cost-sensitive low-VA sectors. In addition, environmental regulations are usually stricter in the EU, forcing firms to internalise some of the costs related to emissions and other environmental impact. Relocating low-VA activities back to the EU therefore means that European firms will experience a drop in competitiveness on global markets, unless tax regimes shift from capital gains and income to environmental taxes. Businesses could therefore face strong incentives to automate their production systems. That would simultaneously reduce labour costs and decrease the benefits associated with new or stable employment. The key problem here is that the short-run capital expenditure associated with automation is substantial, especially when it is added to the transaction costs of setting up a new intra-EU supply chain and the investments in skills and inter-firm cooperation. European governments are therefore likely to implement trade measures to compensate for differences in

5. While Chinese ports already run on a 24/7 basis, amidst the Covid-induced supply chain crunch, the White House urged Los Angeles and Long Beach port operators to switch to the same model (Baertlein 2021).

production costs across geographies. The Carbon Border Adjustment Mechanism (CBAM), which will put an import levy on products from countries without carbon-pricing mechanisms or comparable schemes (European Commission 2021a), can be seen in this light.

Overall, the net benefits of relocation for EU firms, governments and consumers are, beside the abstract moral benefit for European societies, not entirely clear. The positives are easy to identify. Relocation is likely to lead to lower pollution and CO₂ emissions, a net increase in stable employment, including in low-VA sectors that could benefit poorer countries and less-skilled workers in the EU, and possibly raise the bargaining power of workers directly through increased demand for labour, and indirectly because accompanying measures will limit the exit options of capital. But moral relocations also have some important negative effects, mainly because they work against the logic of comparative advantage, which would reduce the global competitiveness of European companies on average. And while protectionist measures could shield businesses, effectively that would simply shift the costs onto consumers by increasing the price of goods and potentially reducing their diversity.

In sum, moral relocations – directly enforced or because of strict social and environmental due diligence regulations that are currently discussed on the EU level – are no panacea. Most of the existing costs do not simply disappear but shift between geographies and actors. The shift of the onus in terms of environmental costs may appear to be normatively fair and relatively more straightforward: relocating production from the environmentally less-strictly regulated Global South to the EU forces firms to internalise some of the ecological costs (though this might also increase costs for consumers). At the same time, a reduction in demand for global shipping could eradicate some of the most costly environmental impact if intra-EU transport proves less polluting than international cargo operations. But moral relocations are unlikely to reduce the social costs of GVCs in transportation and might even be counterproductive in supplier countries if local workers are pushed into informal employment or unemployment as a consequence of European withdrawal. The costs of relocation in the EU are manifold – including capital expenditure, various transaction costs and higher labour costs, which would, all else being equal, lead to higher costs for consumers – while the benefits mainly depend on the quality and quantity of jobs that are created. Overall, moral relocations offer no simple solutions but rather create new trade-offs. The EU might still decide to implement measures to address the adverse consequences of GVCs; however, as we have shown in this section, this requires a careful and dynamic analysis of all the visible and hidden costs and benefits.

4. Benefits and costs of strategic relocations

But what if the calculus for relocation is different? What if it revolves around ideas of resilience, redundancy and autonomy? As the Covid-induced semiconductor supply crisis has made abundantly clear, the high concentration of chip production in a very

small number of East Asian countries⁶ can quickly create bottlenecks for producers of almost any sophisticated consumer goods – such as cars, household appliances, and electronic devices – in the advanced capitalist world. Russia’s weaponisation of fossil energy during the Ukraine war in 2022 reinforced the idea that Europe (and the US) need to rethink their supply chains for such strategically important components, raw materials and energy – not least because a successful green transition will require more of the former (and possibly less gas and petrol). We will call these reshoring ideas and initiatives, which build on a logic of national (or regional) security, strategic relocations to differentiate them from the moral relocations discussed earlier that aim to reduce environmental and social ‘bads’.

4.1 Benefits of strategic relocations

Strategic relocations can create a series of significant benefits for the EU. In the most abstract sense, they increase economic stability and national security because they reduce volatility in crucial supply chains. In addition, the revitalised industrial activities and rising or stabilised employment produce direct benefits for firms and workers in the sector as well as for local communities. Relocation has also important positive up- and downstream effects, as it can foster innovation, upgrades the workforce’s skills base through training, and offers local suppliers an opportunity to participate in the new (European) value chains. The size of these benefits, however, will largely depend on the nature of products and activities that are being (re)patriated: if they tend towards commodified products, the positive effects will be small, but if relocation revolves primarily around higher value-added sectors the economic and social benefits are likely to be quite significant. What is good for the economy does not necessarily benefit the environment, but all else being equal, strategic relocations also reduce the demand for global shipping, thereby lowering the transport-related GHG emission and biodiversity impacts. In sum, the net political, economic, social and environmental benefits are substantial.

Furthermore, a major benefit of strategic relocations can only be indirectly measured. Assuming relatively static industrial profiles, patriating production into the EU can mitigate supply bottlenecks and therefore safeguard the continuity in production. The semiconductor shortage following the Covid-19 lockdowns, for example, is estimated to have cost the European automotive industry close to 100 billion euros over 2021 and 2022 (Duthoit and Lemerle 2022). If reshoring can prevent such hold-ups, the benefits will be large.

Importantly, many of these gains are conditional on the supply of cheap energy or access to critical raw materials further up the value chain. This complicates the net benefit calculus. In 2022, the dependence on Russian gas made very clear that even those industries that do not suffer from any other shortages are also constrained in their

6. The world’s capacity to manufacture leading-edge logic chip manufacturing (i.e. nodes smaller than 10 nanometres or nm) is concentrated in only two countries: Taiwan’s TSMC, with 92 per cent, and South Korea’s Samsung, with 8 per cent (Varas et al. 2021). References to the semiconductor industry in this section are borrowed from Hancké and Garcia Calvo (2022).

production capacity once their energy supply is constrained and becomes prohibitively expensive. And even though battery-producing plants may be increasingly important to support the European automotive industry's shift towards electric vehicles, these factories rely on raw materials that are controlled by a small number of non-EU countries. In 2020, the EU Commission identified 30 critical raw materials that are crucial for green technologies but also suffer from strong foreign dependencies (European Commission 2020). Between 2012 and 2016, China provided 98 per cent of the EU's supply of rare earths, Turkey provided 98 per cent of the EU's supply of borate, and South Africa provided 71 per cent of the EU's needs for platinum. Generally, raw materials are produced in highly politically sensitive countries: besides Turkey, China and South Africa, which have different political goals or levels of political stability than the EU, in 2018, more than 70 per cent of global production of cobalt, rare earths and tungsten was affected by export restrictions (European Commission 2021b). Any project that involves strategic relocations will therefore have to include strategies to handle second- and third-order effects in supply chains and adjacent activities that may jeopardise the initial project.

4.2 Costs of strategic relocations

While the net benefits of strategic relocations are often intangible, diffuse and riddled with problems rooted in the network complexity of supply chains, their costs are usually very clear and likely to be substantial. Primarily motivated by concerns of political dependency and economic stability, the relocation of strategically important (parts of) GVCs typically implies a loss of specialisation. Many production steps were previously outsourced to locations that allowed firms to optimise their cost structure, given the quality constraints they face in different sectors. Wages and taxes may be only two among many other determinants of offshoring (Mihalache and Mihalache 2016). Yet, since they matter a lot in low-margin sectors, reshoring to the EU will, because of the continent's comparatively high wages and low levels of state aid, be relatively more costly. All else being equal, this set-up will therefore lead to higher prices.

Taxes and wages are not the only problems. The transaction costs related to pre-production activities – locating a production site, establishing a (regional) supplier base, and finding or developing a trained workforce – are likely to be significant. The EU's industrial alliances (e.g. the Battery or Semiconductor Alliance) absorb some of these coordination costs. Direct capital expenditure for reindustrialisation in new areas and reconversion of existing industrial zones is usually extremely high in strategically important sectors. Building a state-of-the-art semiconductor fab, for example, can cost up to 20 billion euros (Codagnone et al. 2021) while battery cell plants, depending on their output volumes, require also several billion euros in upfront investments⁷. The EU and national governments are acutely aware of the high set-up costs and try to facilitate strategic relocations in these sectors by allowing an increased level of state aid for certain so-called Important Projects of Common European Interest (IPCEI). But

7. For instance, the Northvolt Ett plant in Skellefteå, Sweden, is expected to produce up to 60 GWh per year and has attracted investments of roughly four billion euros (Beermann and Vorholt 2022).

such megaprojects can create a series of uncovered costs for the regions where they are situated, especially if the required infrastructure – (clean) energy, broadband/5G access, transport links – is not or only sporadically available or requires updating. Moreover, production in sectors associated with strategic relocations usually requires complex and expensive capital investment, staffed by a workforce that requires retraining in partly new skills. In cases of tight local labour markets, strategic relocations are likely to deplete the skilled labour force, and wages would have to rise – further increasing production costs.

The higher costs of labour, energy and emissions in the EU create comparatively large operating expenditures. Some estimates suggest that the cost, over a decade, of operating a semiconductor fab with an annual production of 35 000 300 mm wafers in Europe is 33 per cent higher than in South Korea and 63 per cent higher than in mainland China (AT Kearney 2021). If the EU wants to remain competitive in world markets in this and similar high-tech but low-margin sectors in a world of relatively free trade, further subsidies will be necessary. While this might be an acceptable political price to pay to strengthen the EU's autonomy and stabilise the supply of critical goods, too often such significant costs further down the line rarely show up in the initial strategic plans.

As well as these direct one-off and recurring economic costs of strategic relocations, we need to consider a series of social and other second-order effects when evaluating their net costs and benefits. Any relocation – be it for moral or strategic reasons – produces social dislocation in the non-EU countries set to lose foreign direct investment and employment. Furthermore, since wages and working conditions in strategically important high-tech GVCs in the non-EU countries are typically much more favourable than in the rest of these economies, any relocation to the EU will affect overall economic growth and living standards quite dramatically.

However, these negative effects are a double-edged sword, appearing under the assumption that the void European firms leave is not filled by firms from growing regional economic powers such as India or China. Even though such a substitution would significantly mitigate the costs of EU relocation for the non-EU countries, it may produce the perverse effect of putting the Asian countries in a stronger economic and political position vis-à-vis their European counterparts – producers and governments. Firms in increasingly important South-South value chains can utilise the growing advanced manufacturing know-how (e.g. from China) as well as lower labour, tax and environmental protection costs to put pressure on global competitors.

Indirect costs from strategic relocations also occur in the EU. In the short run, the environmental and social impact of industrial construction activities can be substantial. The environmental costs of converting a natural area into an industrial site can also produce significant public opposition, as evidenced by outcries against new mining projects in Spain (Dombey 2021) or Tesla's car and battery plant in Germany (Chazan 2020). Preventing such tensions will require careful planning and zoning, a process with important transaction costs, since it is likely to include local stakeholders very early on. In the medium term, one major environmental cost of strategic relocations

is, unless basic energy sources decarbonise rapidly, a likely increase in GHG emissions related to energy, production, and intra-EU transport.

Finally, relocations might increase regional economic inequality in the EU because of agglomeration and concentration effects. The highly productive ‘blue banana’ regions – from Benelux over to the German Rhineland and southern Germany, and the east of France, to Switzerland, western Austria and northern Italy – is much better placed to host relocated advanced manufacturing sites than areas in the south of the EU. Larger Member States, such as Germany or France, are also more likely to benefit more from relocation, as their financial capacity allows them to attract businesses with substantial state aid under IPCEI. Specialised regions in Eastern Europe, with established positions as manufacturing hubs in the automotive sector and other advanced industries, are also set to benefit more from strategic relocations in, for example, the battery supply chain.

In conclusion, this discussion suggests that much depends on the nature of strategic relocations. If they target future-proof industries, the industrial revitalisation, including positive up- and downstream spillovers, is almost certain to lead to rising and stable regional prosperity and employment growth across the EU. And the benefits derived from industrial stability as a result of strategic autonomy – that is, preventing production hold-ups – are also significant. However, the direct upfront costs of relocation and reindustrialisation will be considerable. And the comparatively higher wages and overhead costs in the EU may require ongoing subsidies for activities in patriated sectors with low margins and many non-EU competitors who can play by different rules. Without a rapid decarbonisation of basic energy and careful planning and zoning of industrial areas, the environmental costs resulting from increasing land and energy use for production and intra-EU transport will be considerable. Overall, strategic relocations might reduce GVC bottlenecks or dependencies – assuming that access to (clean) energy, raw materials and required skills can be secured – but, as we suggested here, this comes at a price. Successful strategic relocations that create a lasting positive impact in the EU will therefore have to keep these costs and their distribution in mind and develop appropriate governance arrangements.

5. Conclusion

All relocations produce benefits – economic, social, environmental or political. But they also produce new costs – such as externalities, transaction costs, and new social or environmental bottlenecks. Like energy in physics, costs therefore typically do not disappear when thinking about relocations but shift between actors and/or geographies. For example, what we have called moral relocations can reduce environmental costs in non-EU countries by forcing European firms to internalise some of the ecological costs – a normatively fair shift, but which is likely (all else being equal) to lead to higher costs for EU consumers, which may not be evenly distributed. There are very few areas that are not subject to the iron law of cost preservation; a reduction in demand for global transport is a rare exception where nature-related costs can be minimised, if the concomitant rise of intra-EU transport proves less polluting. But such moral relocations are also unlikely to mitigate the social costs of GVCs in transportation and might even be

counterproductive in supplier countries, since they lower, all else being equal, standards of living and increase dependency on a smaller number of producers. If costs do not disappear, it may be worthwhile considering alternative sophisticated mechanisms that might prove more effective in addressing some of the adverse social and environmental consequences of GVCs, while keeping the benefits of comparative advantages. Supply chain sustainability due diligence standards, as currently discussed on the EU level, are promising but their design must not indirectly lead firms to relocate their supply chain.

Relocations might also be required for strategic reasons – our second relocation rationale. The industrial revitalisation that occurs from strategic relocations in future-proof industries can lead to rising and stable regional prosperity and employment growth across the EU, while creating further benefits from preventing production hold-ups. Yet the direct upfront costs of relocation and reindustrialisation in strategically important sectors may be even higher than in the case of moral relocations. Comparatively higher wages and overhead costs in the EU might also require ongoing subsidies for relocated activities. The resulting requirements for financial support from national governments might also inadvertently increase fragmentation within the EU, as larger (and richer) Member States and established manufacturing regions are better placed to host the new European value chains.

These findings do not necessarily lead to policy immobilism – the desirability of moral or strategic relocations ultimately depends on a normative political judgement in the EU and the willingness to consider a redistribution of the associated costs. Our view is that such multifaceted, far-reaching policy programmes require careful reflection and evidence about the diverse first- and second-order impacts of costs and benefits. This broad-based knowledge is crucial to stimulate a political discussion about relocation (or any other megaprojects) that takes all relevant stakeholder groups into account and brings them on board at an early stage in the process. Decision-making processes which rely on a traditional (monetary) cost-benefit accounting are likely to ignore further costs down the line and usually neglect the redistribution of costs and their negative effects. Not only does this create a risk of overlooking hold-ups that could jeopardise the policy programmes or other unintended consequences, but it also neglects potential sources of (public) opposition.

Beside considerations about policy, we have identified five possible avenues for future research that follow from this analysis. The first pertains to the need for new, more sophisticated cost-benefit accounting systems. We concentrated here on the financial, social, and environmental costs and benefits of relocating GVCs from non-EU to EU countries. While we uncovered the most pressing environmental and social impacts and the associated distribution of costs and benefits before and after relocation initiatives, further research should explore these areas in more detail. This will require an interdisciplinary approach which links insights from welfare economics, existing social and environmental accounting methodologies, and political economy to flag potential costs and benefits, and quantify them where possible. The additional insights about the social and environmental impact of GVC relocations should be combined with an analysis of the economic costs and benefits in a more holistic cost-benefit accounting system.

Tensions with single market rules constitute our second area of further research. Our discussion here, in light of the initial findings from the ETUI report on open strategic autonomy for the Belgian government (Akgüç et al. 2022) indicates that the single market, with its relatively prohibitive rules regarding state aid and mergers between (large) companies, could also become an obstacle for relocation initiatives. While limited national public subsidies are allowed for GVC relocations under the IPCEI and the Temporary Crisis and Transition Framework, further research should explore whether this solution could lead to increasing fragmentation in the EU, in which larger Member States have more financial firepower, in absolute and relative terms, to attract relocated GVCs with significant subsidies.

The third area concerns the European varieties of capitalism. While the single market rules apply equally to all EU countries, the institutional economic governance frameworks differ significantly across Europe. This raises several questions. One, does this diversity mean that large parts of existing comparative advantages can be replicated within Europe, locating activities in the best-fitting jurisdictions? Two, to what extent would these varying capacities to host relocated GVCs lead to increasing fragmentation in the EU – and to what extent is that a desirable outcome (pitting resilience because of different cycles versus more pronounced core-periphery dynamics)?

We think forms of experimentation, from the local to the international level, offer a series of potential solutions to institutional obstacles under the conditions of deep uncertainty associated with relocations in the era of green and digital transitions. As we have shown in our chapter, relocations tend to work against the principle of comparative advantage: stricter social and environmental regulation and higher costs for labour and energy make, all else being equal, EU-based production more expensive than in many non-EU countries (while changing accounting rules obviously alters that balance, it is more than a game of numbers on paper – there are real effects). Could a stronger focus on the links between the relocation debate and innovation and skills – the key resources of EU economies – help render (re)patriated GVCs competitive on global markets, while creating stable and adequately paid employment in the EU? This will require proactive and possibly more experimental governance of innovation and skills, supported by (regional) institutional frameworks. Strong innovation systems require information exchange between research organisations and firms but also among firms within and beyond the traditional sectoral boundaries. New occupations cannot always wait for cumbersome negotiations, so wages (which are usually linked to job descriptions) therefore need a certain *ex ante* stability that can be revisited when the contours of change become clear. Regional industrial actors, such as chambers of commerce or similar interlocutors, can play an important role as forums for information and experimentation in this regard.

Finally, we also see a need to move away from eurocentrism and examine the likely repercussions for current producer locations outside the EU. Aside from further research on the impact of relocations on EU countries and the institutional and regulatory frameworks that are necessary to maximise the net benefits from patriation, additional studies should explore the repercussions of relocations (and potential mitigation measures) in non-EU producer locations. One of the main questions in this regard is

whether the void that is left behind from the exodus of European firms will be filled by companies from other countries, as recent Chinese initiatives in Africa, the BRI, and ports in Europe may suggest.

In sum, the debate about relocations – and more widely about industry in Europe for the remainder of the 21st century – is rapidly opening new research areas in the social sciences. The angle that we have privileged here is that of explicit and tacit benefits and costs associated with the loss of comparative advantage – the logical backbone of GVCs – and the reorganisation of new and old industries on the continent. That debate requires information to allow relevant actors, from industry and government to trade unions, to take informed positions. This chapter, and this book, is, we hope, a first step in that process.

References

- Akgüç M., Countouris N., Hancké B. and Pochet P. (2022) Rethinking the European single market: moving towards new frontiers for a highly competitive, socio-ecologically sustainable and resilient Europe, ETUI.
- AT Kearney (2021) Europe's urgent need to invest in leading-edge semiconductor ecosystem. <https://www. Kearney.com/communications-media-technology/article/?/a/europes-urgent-need-to-invest-in-a-leading-edge-semiconductor-ecosystem>
- Baertlein L. (2021) U.S. port's supply chain fix challenge: selling 24/7 shifts, Reuters, 15.10.2021. <https://www.reuters.com/world/us/us-ports-supply-chain-fix-challenge-selling-247-shifts-2021-10-14/>
- Baldwin R. (2016) The World Trade Organization and the future of multilateralism, *Journal of Economic Perspectives*, 30 (1), 95-116.
- Beermann V. and Vorholt F. (2022) European battery cell production expands, Market analysis Q4 2021, IPCEI Batteries. https://www.ipcei-batteries.eu/fileadmin/Images/accompanying-research/market-updates/2022-01-BZF_Kurzinfo_Marktanalyse_Q4_ENG.pdf
- Bullock S., Mason J., Broderick J. and Larkin A. (2020) Shipping and the Paris Climate Agreement: a focus on committed emissions, *BMC Energy*, 2 (1), 1-16.
- Chazan G. (2020) Elon Musk jolted by German protests over Tesla factory plan, *Financial Times*, 31.01.2020. <https://www.ft.com/content/8b10555e-4345-11ea-abea-0c7a29cd66fe>
- Codagnone C., Liva G., Gunderson L., Misuraca G. and Rebesco E. (2021) Europe's digital decade and autonomy, European Parliament.
- de Vries G.J. and Ferrarini B. (2017) What accounts for the growth of carbon dioxide emissions in advanced and emerging economies? The role of consumption, technology and global supply chain participation, *Ecological Economics*, 132, 213-223.
- Dombey D. (2021) Spain's rush for lithium falls foul of local opposition, *Financial Times*, 20.10.2021. <https://www.ft.com/content/459191d9-774d-4a2b-8ec6-ba472017b05e>
- Dugan E. (2022) How big brands like Tesco are drawn to 'wild west of global supply chain', *The Guardian*, 19.12.2022. <https://www.theguardian.com/world/2022/dec/19/how-big-brands-like-tesco-are-drawn-to-wild-west-of-global-supply-chain>
- Duthoit A. and Lemerle M. (2022) Missing chips cost EUR100bn to the European auto sector, Allianz Research. https://www.allianz-trade.com/content/dam/onemarketing/aztrade/allianz-trade_com/en_gl/erd/publications/the-watch/2022_09_13_European-Auto.pdf

- European Commission (2020) Critical raw materials for strategic technologies and sectors in the EU: a foresight study. <https://ec.europa.eu/docsroom/documents/42881/attachments/1/translations/en/renditions/native>
- European Commission (2021a) Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - 'Fit for 55': delivering the EU's 2030 Climate Target on the way to climate neutrality, COM(2021) 550 final, 17.07.2021. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0550&from=EN>
- European Commission (2021b) Commission staff working document - Strategic dependencies and capacities. Accompanying the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Updating the 2020 New Industrial Strategy: building a stronger Single Market for Europe's recovery, SWD(2021) 352 final, 05.05.2021. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021SC0352&from=FR>
- European Commission (2022) Proposal for a Directive of the European Parliament and of the Council on Corporate Sustainability Due Diligence and amending Directive (EU) 2019/1937, COM(2022) 71 final, 23.02.2022. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52022PC0071>
- European MSP Platform (2021) Conflict fiche 4: maritime transport and area-based marine conservation. https://maritime-spatial-planning.ec.europa.eu/sites/default/files/sector/pdf/4_transport_conservation_kg-3.pdf
- Eurostat (2022) EU's CO₂ footprint continues to decrease. <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20220524-1>
- Girma S., Görg H. and Kersting E. (2019) Which boats are lifted by a foreign tide? Direct and indirect wage effects of foreign ownership, *Journal of International Business Studies*, 50, 923-947.
- Hancké B. and Garcia Calvo A. (2022) Mister Chips goes to Brussels: on the pros and cons of a semiconductor policy in the EU, *Global Policy*, 13 (4), 585-593.
- Kurmayer N. (2022) New EU supply chain law makes waves in Austria, *Euractiv*, 02.12.2022. <https://www.euractiv.com/section/politics/news/new-eu-supply-chain-law-makes-waves-in-austria/>
- Mihalache M. and Mihalache O.R. (2016) A decisional framework of offshoring: integrating insights from 25 years of research to provide direction for future, *Decision Sciences*, 47 (6), 1103-1149.
- UNCTAD (2021) Review of maritime transport. https://unctad.org/system/files/official-document/rmt2021_en_0.pdf
- Union of International Associations (2020) Evasion of shipping regulations and taxes by flags of convenience. <http://encyclopedia.uia.org/en/problem/134827>
- Varas A., Varadarajan R., Goodrich J. and Yinug F. (2021) Strengthening the global semiconductor value chain in uncertain times, Boston Consulting Group and Semiconductor Industry Association. <https://www.ipcei-me.eu/policy-papers-and-reports/>
- Wiedmann T. and Lenzen M. (2018) Environmental and social footprints of international trade, *Nature Geoscience*, 11, 314-321.
- World Bank (2020) World development report 2020: trading for development in the age of global value chains. <https://openknowledge.worldbank.org/handle/10986/32437>
- Xu Y. and Dietzenbacher E. (2014) A structural decomposition analysis of the emissions embodied in trade, *Ecological Economics*, 101, 10-20.

Zhang W., Padmanabhan P. and Huang C.H. (2018) Firm level offshoring activities, pollution regulation, triple bottom line, and market structure: what do they have in common?, *Journal of Cleaner Production*, 195, 618-624.

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