

SWEDISH ECONOMIC FORUM REPORT 2021

SWEDISH PERSPECTIVES ON INDUSTRIAL POLICY

THE WASHINGTON CONSENSUS AND BEYOND



SWEDISH ENTREPRENEURSHIP
FORUM

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PREFACE

Since 2009 Swedish Entrepreneurship Forum has published a yearly research publication in conjunction with the recurring conference Swedish Economic Forum. The aim is to address policy relevant issues that focus on entrepreneurship, small business, innovation and growth.

This year Swedish Economic Forum Report examines industrial policy. Over the 20th century industrial policy has been used for promoting economic development in both advanced industrialized countries as well as in developing countries. However, there is no real consensus as to what industrial policy encompasses or how effective it is for achieving economic development. In recent years, geopolitical and geoeconomic considerations have spurred a renewed interest and advocacy for the use of industrial policy.

In the report we assess this new interest for industrial policy from a Swedish and international perspective. The various chapters in the report describes experiences and impacts of conducting industrial policies in Sweden, UK, Germany, and China. The chapters address different theoretical and empirical perspectives of industrial policies.

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The authors take full responsibility for the analysis and recommendations in their respective chapters.

Stockholm, November 2021

Johan E. Eklund
Managing Director Swedish Entrepreneurship Forum
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CHAPTER 1

SWEDISH PERSPECTIVES ON INDUSTRIAL POLICY

THE WASHINGTON CONSENSUS AND BEYOND

MARTIN ANDERSSON, ENRICO DEIACO AND JOHAN E. EKLUND (EDITORS)

*“The superiority of open markets...lies in the fact that
the optimum outcome cannot be predicted.”¹*

1. INDUSTRIAL POLICY

Industrial policy has played a prominent role in both advanced industrialized countries and developing countries over the 20th century. Despite this, there is neither consensus among policy-makers nor academics as to what exactly comprises industrial policy or how effective industrial policies are in promoting economic development. Traditionally, industrial policy has been defined as a set of tools used by the government of a country to promote and increase the competitiveness of its industry, often the manufacturing industry. Classical arguments in favor of industrial policies have been market failures that justify market interventions (such as economies of scale), but in practice, one needs to look beyond these classical motifs to understand the logic of present-day industrial policies.²

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1. By Alfred Edward Kahn (October 17, 1917–December 27, 2010), American professor at Cornell and expert in regulation and deregulation, and an important influence in the deregulation of the airline and energy industries in the US. Quoted in: Noahpinion, Nov 3, 2021.
 2. See for example: Aiginger and Rodrik (2020), Bartelme et al. (2019), Bloom et al. (2019), Cherif and Hasanov (2019) and Rodrik (2008).

As pointed out in Chapter 3, the whole field of industrial policy today is in something of a “state of flux”. In the 1980s, most countries had some form of industrial policy, ranging from protectionism, entry barriers and public ownership to institutional and regulatory systems that distorted market mechanisms. However, after the failures, in some cases blatant, of industrial policies to promote economic progress in many countries in the late 1980s and early 1990s, the so-called Washington Consensus³ rejected industrial policy as an effective means to achieve economic growth, particularly in the developing world. Williamson (1990) put it the following way: “The Washington Consensus was a ... response to a leading role for the state in initiating industrialization and import substitution. The Washington Consensus said that this era was over” (Williamson, 1990 as quoted in Serra et al. (2008). However, the term has been used in both a broader and narrower sense and has sometimes been dismissed as a “neoliberal agenda”. The core ideas of the Washington Consensus are market economy, openness to trade and macroeconomic discipline (see Serra et al., 2008). In short, policies in most industrialized countries shifted focus to emphasize sound horizontal framework conditions.

One reason industrial policy is difficult to define is that it often overlaps with other policy areas, such as research, education and innovation policies and tax policies, but also increasingly with foreign and security policies as well as policies to address climate change and to support transitions to more sustainable solutions and systems. Indeed, industrial policies are often articulated as objectives. A recent definition of industrial policy is provided by Rodrik (2019): “Industrial policy refers to policies that stimulate specific economic activities and promote structural change. As such, industrial policy is not about industry per se.” Such a definition of industrial policy illustrates the broad nature of policies that may be regarded as industrial policy and indicates that industrial policy is often associated with motifs that have to do with innovation, transitions, and measures to support industries to transform and “upgrade”.

Today, the European Union emphasizes the horizontal nature of industrial policy, whereas in the past, vertical industrial policies were advocated, that is, policies aimed at picking winners by actively shaping and subsidizing specific industries. What defines industrial policy is not – as emphasized in Chapter 3 – merely its impact on markets. Instead, it is its underlying objective and motifs. Among contemporary motifs, we count climate change and 2030 sustainable development goals, productivity slowdown across the OECD, loss of industrial production

3. The original Washington Consensus listed ten reforms: 1) Fiscal discipline, 2) reordering public expenditure priorities, 3) tax reform, 4) liberalizing interest rates, 5) competitive exchange rates, 6) trade liberalization, 7) liberalization of inward foreign direct investment, 8) privatization, 9) deregulation and 10) property rights. For details see Williamson (1990 and 2008). This policy reform agenda was in many ways implemented by Sweden in the late 1980s and early 1990s. The so-called Lindbeck-commission, for example, drafted more than 100 policy reform proposals (Ekonomikommisionen, SOU 1993:16).

and manufacturing jobs, and new geopolitical/economic confrontations with new security concerns, to mention a few.

Thus, due to the failure in the past to achieve its objectives, industrial policy became tainted by a bad reputation and has sometimes been referred to as the “policy that shall not be named” (Cherif and Hasanov, 2019).⁴ However, industrial policy has experienced a renaissance over the last couple of years. This is true not only within policy circles but also among some economists. Van Reenen (2020) puts it as follows:

Economists are traditionally skeptical about this industrial policy style approach. The conventional view is that markets are generally efficient, and even when they are not, governments rarely have nimbleness and foresight to effectively intervene. In addition, an effective industrial policy requires that bureaucrats be well intentioned and not captured by vested interests. The experience of European industrial policies in which governments threw money at national champions, such as the failed Leyland Motors in the UK auto industry, is not a promising model.

Two things have changed in recent years, however. First, there is more causal evidence on the positive effects of industrial policies (e.g., Criscuolo et al., 2019). Second, the slowdown of growth in Western countries and the perceived success of such policies in East Asia has caused some to reevaluate the case for industrial policy (Rodrik, 2015). (Van Reenen, 2020, p.16).

While it may be debated how widely accepted industrial policy is among economists, it is clear that some high-level economists have started to discuss such policies more frequently.

Governments and policy organizations are again reconsidering industrial policies and are even putting them high on the agenda. In Germany, a proposal for a new industrial strategy by Peter Altmaier, Minister of Economic Affairs, sparked an intense policy debate (see Chapter 2), Chinese economic and industrial ambitions have drawn attention to Chinese industrial policies (see Chapter 8), and policy-makers are also looking toward industrial policies to strengthen competitiveness and attract foreign direct investment and multinational enterprises (see Chapters 6 and 7).

This Swedish Economic Forum Report assesses this new interest in industrial policy from a Swedish and international perspective. The various chapters in the report describe the experiences and impacts of conducting industrial policies in Sweden, the UK, Germany, and China. The chapters address different theoretical and empirical

4. Mancur Olson (1986) on this issue: “Those publications that I happen to have seen advocating industrial policy are also relatively vague. Some are so vague that they invite the reaction that industrial policy is neither a good idea nor a bad idea, but no idea at all; that it is the grin without the cat (pp. 268).”

perspectives of industrial policies. In this introductory chapter, we will highlight three overall observations that have emerged from the different contributions. We close with short summaries of each chapter.

2. WHY HAS THE INTEREST OF INDUSTRIAL POLICIES RISEN?

We see several reasons for why industrial policies are back on the agenda of policy-makers around the globe.

To a large extent, we view the Washington Consensus as a reaction to a significant failure of economic policy in the West coupled with the failure of centrally planned Soviet and Eastern European economies, as well as significant failures of vertical industrial policy and state interventionism in the 1970s and 1980s. The collapse of the Soviet Union and the sense of an “end of history” meant that geopolitical and geoeconomic considerations played a dwindling role in advocating for industrial policy.

Today, the situation is at least partly reversed; geopolitical considerations are back on the agenda with China asserting its position on the global stage. This has resulted in not only an interest in China's industrial policies but also an intense global “struggle” over the next generation of digital technologies (Chapter 8). China's use of massive industrial subsidies to foster competitiveness has also triggered EU discussions about the need to use industrial policies to advance structural change.

This has, for example, resulted in high-level policy-makers challenging EU competition policies and advocating industrial policies to make European industries more competitive, maintaining their role as drivers of sustainable growth and employment in Europe.⁵ The EU industrial strategy, for example, stipulates that its objective is 1) “speeding up the adjustment of industry to structural changes”; 2) “encouraging an environment favorable to initiative and to the development of undertakings throughout the Union, particularly small and medium-sized undertakings”; 3) “encouraging an environment favorable to cooperation between undertakings”; and (4) “fostering better exploitation of the industrial potential of policies of innovation, research and technological development” (EU, 2021).

Another reason for the comeback of industrial policies is the concern about the threat from climate change. The United Nations Sustainable Development Goals

5. The Digital Market Act and the Digital Service Act, which are two significant pieces of new legislation being drafted by the European Commission are example of how EU competition policies are changing. In our opinion this is closely intertwined with industrial policies and a wish to make the EU economies more competitive.

(SDGs) have sparked renewed interest in industrial policy, and at both the national and international levels, policy-makers are debating how industrial policies can be used to transform and provide new direction to economic development. Governments around the world are implementing a wide variety of industrial policy tools to achieve the SDGs. Benchmarking policies in the seven OECD countries (2021b) found no less than 173 policy instruments categorized into three groups: 1) “Rewards and incentives,” which includes loans, subsidies, and investments aimed at reducing risk associated with sustainable investments; 2) “government assistance,” which refers to access to information and legal framework fostering sustainability, and 3) mandatory “compliance instruments,” which include regulatory instruments.

Bloom et al. (2019) even argue that some societal problems and challenges, such as climate change, are so pressing that they may justify mission-oriented moonshot policy programs. This refers to mission-oriented R&D policies focused on supporting particular technologies or sectors, i.e., a type of policy reminiscent of sector-focused industrial policies, of which many economists are often skeptical. They provide two justifications for such policies in the context of innovations to address societal challenges (ibid, p.179): (i) “there is a pressing need to avoid environmental catastrophe, and obvious market failures exist around carbon emissions. The solution requires new technologies to help deliver decarbonization of the economy; moonshot strategies may result in the most valuable innovation in this case,” and (ii) “moonshots may be justified on the basis of political economy considerations. To generate significant extra resources for research, a politically sustainable vision needs to be created.” Although economists in general agree on increasing investments in new and green technologies, the moonshot approach has been widely debated. Some Swedish examples of failed industrial policy investments in green technologies are described in Chapter 5.

Thus, it seems that industrial policies may be here to stay in the coming decade. It should, however, be noted that the OECD understanding of industrial policy differs somewhat from the “old view”, namely, its taxonomy of industrial policy includes both supply- and demand-side instruments. OECD includes, for example, labor mobility, skills, and education as well as functionally efficient capital markets as central instruments in the industrial policy toolbox (OECD, 2021a). To us, this broader and partially new approach to industrial policy illustrates a shift in economic policies and an awareness of at least some of the past failures. However, as discussed in the various chapters, the pro and cons of industrial policies are still up for discussion.

3. SWEDISH EXPERIENCES OF THE EFFECTIVENESS OF “OLD” INDUSTRIAL POLICIES ARE NOT OVERWHELMING

Although some recent research does suggest that industrial policy can have positive causal effects (Criscuolo et al., 2019), Sweden learned the perils of traditional active industrial policies in the postwar era, for example, by failing to protect its steel and shipyard industry from competition of newly industrialized countries such as South Korea and China. Such experiences are reminiscent of the traditional critique of industrial policies from many economists, i.e., (i) governments cannot pick winners and (ii) governments are unlikely to be able to withstand lobbying from powerful firms and prevent industrial policy from becoming an instrument of rent transfer to incumbents (cf. Rodrik, 2019 and Sandström in Chapter 5).

Since then, like many other small economies, Sweden has embraced free trade and competition as well as horizontal industrial policies advancing high-tech sectors, small and medium-sized enterprises, and investment in R&D. Recent estimates indicate that approximately a SEK 30.135 billion has been spent on industrial policies, defined as providing support (grants and loans) for R&D and innovation.⁶ Increasingly, government support industries by lowering the tax bill and where the main motive is to support activities associated with a high potential of positive spillover effects. Another industrial policy used in many countries is various forms of tax relief. The motivation for tax relief rests on efficiency grounds and the urge to boost activities with positive externalities or with high spillover effects, thereby advancing structural change. However, the analysis made by Åsa Hansson (Chapter 3) indicates that only 39 percent of all tax expenditures are deviations from the norm that are difficult to promote as providing positive externalities. Only three percent of total expenditures can be allocated to activities with clear positive externalities. Again, the different tax expenditures toward industry have been poorly and systematically evaluated, at least in Sweden.

These numbers going to industrial policies are not negligible, yet only a handful have been evaluated with modern randomized trial methods. In addition, existing empirical evidence suggests that there is no guarantee that an industrial subsidy program will generate innovation and growth; the outcomes are sometimes positive, but very often insignificant, and negative growth effects have also been established (Tillväxtanalys, 2015).⁷

In a Swedish (and in the EU) industrial policy context, collaboration between universities, firms and government has become a major policy priority, and many new

6. Data may be acquired by request from Swedish Entrepreneurship Forum.

7. Most innovation policies, for example, remain without adequate impact evaluations. A study by Edler et al. (2016) found that out of almost 15,000 evaluations, approximately 2.4 percent were deemed credible and 0.6 had a positive impact.

national and EU-initiated R&D and innovation programs are based on intensive collaborative and co-creation arrangements. After reviewing a recent large-scale collaborative program in Sweden, Christian Sandström (Chapter 5) concludes that regulatory capture is common where most funding goes to universities and research institutes, where small and medium-sized enterprises receive limited amounts of funding and where foreign companies receive hardly any funding. Hence, despite all the virtues assumed about collaboration, rent seeking and regulatory capture are prominent. In addition, examples from Sweden show how the presence of government money have initiated collaborations and industrial efforts concerning the wrong technology, particularly in sustainability.

4. IS THE WASHINGTON CONSENSUS OUT OF FASHION?

The dominant geopolitical goal under the Washington Consensus has mostly been toward a trade-friendly “equilibrium point” with increased global mobility of capital, products, and labor. The focus has been on fostering economic gains. It also included a relative separation of security and economics. Some argue that we are seeing the rise of a new emergent order, as discussed in Chapter 8, portrayed by a higher degree of convergence between security and economics and the use of industrial policies to promote and defend national interest to reach geopolitical goals. The new industrial policy strategies of the U.S. and the EU-first policies, as well as China’s massive subsidies to industry, are rather different from the baseline arguments of the Washington Consensus.

Navigating this changed global terrain and finding an optimal policy path is challenging, not the least for a small, open economy such as Sweden. In Sweden, many of the policy recommendations of the Washington Consensus were followed in the form of substantial policy reforms starting in the late 1980s, culminating with large reforms in the first half of the 1990s. The so-called Lindbeck-commission, for example, put forth several recommendations that, in our opinion, linked up to the Washington Consensus by emphasizing the importance of horizontal framework conditions. Some new versions of industrial policy are, in fact, much more in line with the Washington Consensus than one might think at first glance. The EU principle for industrial policy, for example, states that it “aims at secure framework conditions favorable to industrial competitiveness” (EU, 2021). This is in line with international research on the pro and cons of industrial policies.⁸

8. It has been argued that the development of COVID-19 vaccines under Operation Warp Speed was a successful example of “industrial policy”. On the one hand, it was a policy that led to a product – so that appears to be an example. However, in a broader sense, the production of the vaccine was a narrow effort. It did not transform any particular U.S. industry, much less the broader industrial base as a whole. See, e.g., Lincicome and Zhu, 2021.

However, managing structural change cannot be achieved solely by individual national governments. It must rest on the willingness of international and European coordination and governance. The chapter by Czernich and Falck (Chapter 2) argues that technological progress, international trade relations and the mitigation of global warming are “classic examples of public goods that involve the classic problem” that incentives to contribute are too low, both on a national and European scale. They argue that to manage these problems, coordination between national governments is essential. Although it is easy to talk about cooperation and coordination, what is at stake is compromise and sacrifice in the near term to gain or survive in the long term. This is politically difficult in Beijing, Washington, Brussels, and Stockholm.

In summary, from the evidence of the pros and cons of industrial policies presented in the various chapters, we make several conclusions. Despite the increasing signals for a more active industrial policy in Europe, one should remain skeptical about its effectiveness. Hence, to cope with a more volatile and adverse international business order, western firms should not embark on China-inspired industrial policies. Instead, they need to formulate viable strategies and shape the business environment in more favorable ways through market and nonmarket activities.⁹

Industrial policies that focus on preserving existing structures or that target specific sectors do not promote growth and welfare in the future. Change and conflict have always existed and will always be the essence of thriving and dynamic economic development. As in the past, change will produce winners and losers. The central objective of a successful industrial policy must be to create the right framework conditions that enable large gains, allowing as many stakeholders as possible to participate in these gains and mitigating the effects on those who are negatively affected by change. Preventing structural change, however, will limit opportunities. We argue that structural changes in world markets and the associated challenges for industrialized countries do not mean that the Washington Consensus has become discharged. On the contrary, open markets, trade openness and macroeconomic stability are still very valid policy objectives.

9. As suggested by Czernich and Falck (Chapter 2), dealing with competitors playing a non-rule-based game such as China will first require coordination at the European level to leverage the size of the EU internal market in negotiations, and second, reciprocity and a focus on open markets rather than increasing barriers to trade and investment.

5. SUMMARY OF CHAPTERS

This Swedish Economic Forum report addresses different aspects of industrial policy. A brief summary of the remaining seven chapters follows.

Chapter 2: Made in Germany 2030: What could Sweden learn from Germany's new Industrial Policy?

by Nina Czernich and Oliver Falck

Czernich and Falck take the initially heavily criticized new German industrial policy as a starting point. In February 2019, the German Minister for Economic Affairs Peter Altmaier presented a draft for a new industrial strategy, “Made in Germany 2030,” which was met with criticism from various sides. Among the most criticized aspects was the strategy’s focus on industrial production: while accompanying services play an increasingly important role in industrial production, preferential treatment is given to large companies, disregarding the importance of German small- and medium-sized enterprises (SMEs) as a key success factor for the German economy, and the selective protection or promotion of specific industries and technologies inhibits or steers structural change. After much public debate, a revised version of the industrial strategy was published in November 2019 that focused more on framework conditions than on active industrial policy and was complemented by a strategy to support SMEs. In this article, the proposed measures and arguments that were put forward during the related discussions are described. Further, the authors outline what Sweden could learn from the German approach, as the industrial structure of the two countries is quite similar. The ways in which industrial policy overlaps with other policy areas are also addressed, such as trade policy, competition policy, environmental policy, and innovation policy.

From the debate surrounding the introduction of a new industrial strategy in Germany, one can conclude that despite the increasing calls for a more active industrial policy, one should remain skeptical about its usefulness. Structural changes in world markets and the associated challenges for industrialized countries do not mean that the Washington Consensus has become void. Criticism of the proposed active industrial policy from academia and industry was unanimous, and few of the active policy measures were, in fact, included in the final version. In contrast, most of the measures in the final version focus on economic framework conditions, which do not qualify as classical industrial policy but are nevertheless the better way to move forward. Frequently, unwanted economic outcomes fall into the domain of other economic fields, such as trade, innovation or environmental policy, and can and should be addressed with the instruments of those fields.

Addressing challenges that are caused by global phenomena is a task that requires international and European coordination. However, current EU governance structures are not well suited to this task. For example, China is currently establishing a

network of bilateral trade, finance and investment agreements with individual EU states, which threatens the ability of member states to stand together and take a common political position. Another example is the promotion of disruptive innovation and the new European Innovation Council. It must be ensured that this agency is able to act independently and that its decisions are detached from regional proportionality.

Chapter 3: Modern Industrial Policies: Agenda, Challenges and Opportunities

by Philip McCann and Raquel Ortega-Argilés

McCann and Ortega-Argilés examine current industrial policy thinking in different national and international settings. They highlight how the interactions between technological, environmental, and place-based influences provide powerful undercurrents reshaping the role of industrial policy in the wider economic policy settings available to countries.

According to them, a main backdrop is that, in recent years, we have seen a rekindling of interest in different aspects of industrial policy. Changing macroeconomic, political, and technological shifts have led to something of a rethinking regarding the role the state may play in certain arenas of the national and international economy, and the whole field of industrial policy is now somewhat in flux.

McCann and Ortega-Argilés put forth several societal-wide drivers of public concern, which have the potential to fundamentally change how we think about industrial policy: (i) public concerns about increasingly rapid technological changes, changes which themselves raise concerns about the employment implications of artificial intelligence and Industry 4.0 as well as issues of cybersecurity, (ii) widespread environmental concerns regarding our ability to mitigate climate change and the extent to which market mechanisms are able to address such challenges without being explicitly directed to do so by industrial and public policy, (iii) an increasing sense in many quarters that governments need to be part of the solutions to these issues, and that reliance on market mechanisms alone cannot address many of these challenges and (iv) growing awareness that place is a fundamental aspect of the workings of the economy, which also directly links market processes to individuals and their communities.

In their view, discussions about industrial policy are currently not simply framed within a siloed sectoral basis regarding the support of individual firms or industries; rather, they are discussed as part of a broader debate regarding the ability of societies to effect meaningful changes in a context where wider and potentially adverse societal forces are at play.

They set place-based policy center stage and examine how such policy agendas, including public procurement, can help to address challenges associated with innovation and technological change and climate change mitigation. The final part of the chapter reflects on the ambiguities still inherent in these approaches and some new aspects of policy programs that are currently being piloted.

Chapter 4: Industrial Tax Subsidies: Effectiveness and Magnitude

by Åsa Hansson

In this chapter Åsa Hansson examines the use of tax subsidies in Sweden. Hansson argues that it is common to provide preferential tax treatment for certain activities and industries, and there are several reasons to do so. The main theoretical motivation is that activities associated with positive spillover effects will be underprovided without government support. Another motivation is to mitigate the negative effects of existing distortions. For instance, the negative impact of high marginal tax rates on labor income can be lessened by tax relief for those activities for which the negative aspects of high marginal tax rates are especially great as a second-best solution. However, second-best solutions are second best; the best approach is to take care of the underlying problem and reduce existing distortions when possible.

Despite the general norm of uniformity that has guided the Swedish tax system since the tax reform of 1990–1991, there are substantial deviations from uniformity. The value of tax expenditures granted in 2020 was 343 billion SEK or 16 percent of total tax revenues. Many of these tax expenditures are motivated as second-best solutions rather than by the promotion of activities with positive spillover effects. For instance, the harmful effects of generally high marginal tax rates on labor are partly mitigated by giving tax relief to foreign experts, the EITC, lower social security fees and lower taxes on household services. Lower energy taxes for industry are also motivated by second-best solution arguments to prevent Swedish energy-intensive industries from losing competitiveness.

Rough calculations of tax expenditures indicate that 53 percent of all tax expenditures are explained by second-best solutions, and 39 percent are deviations from the norm that are difficult to promote as providing positive externalities (e.g., lower property tax and differentiated VAT). Only three percent of total tax expenditures can be allocated to activities with clear positive externalities.

It is not easy to design efficient tax deductions even when they are theoretically motivated. In addition to the general design problems involved, there are also political-economy issues and a risk that politicians use tax incentives to mitigate problems rather than deal with the underlying sources of such problems. The cost of providing tax-preferred treatment is quite high. Apart from the cost of lost revenues,

the design can spur behavioral responses and distort competition in addition to administration costs.

Together, there are strong arguments for uniform and neutral tax systems based on broad tax bases and low tax rates, at least in the absence of large externalities. Hence, there is room to shift to a tax system with fewer tax expenditures using a broader tax base and lower tax rates. However, tax benefits stimulating activities with large positive externalities, such as tax incentives for R&D, are motivated. Compared to other countries, Sweden follows a slightly different path and is more defensive in offering tax relief than other countries that promote high-tech growth sectors, small- and medium-sized enterprises, and research and development more offensively. There may be a need to enhance tax incentives supporting R&D to ensure that the knowledge- and R&D-intensive Swedish industry stays competitive.

In addition, to promote systemic change and the transition toward a greener and more digital economy, government involvement will likely be required. This transition will entail more than just fixing market failures but rather creating new markets and infrastructure with clear public good features. However, care needs to be taken when designing policies, and support and sustainable collaboration between the public and private sectors must be created to avoid choosing the wrong path. Past experiences tell us how difficult it is to design effective tax incentives even in cases where they may be supported.

Chapter 5: Innovation through Collaboration to meet Grand Challenges? A Critique of Current Trends in Industrial Policy

by Christian Sandström

Within politics, research and large parts of Swedish industry, collaboration has been a buzzword for several decades. The importance of close collaboration and partnerships – between academia and industry, state and industry, all three sectors at the same time, or between suppliers and customers – is always taken for granted and seldom questioned. It seems to be assumed that such collaborations will result in innovation, increased productivity and sustainable development. With few exceptions, these claims are taken as given and seem so self-evident that no evidence for such effects or any description of the underlying causal mechanisms are ever given. The recent and ongoing shift across Europe and Sweden toward more interventionist industrial policies aimed at accomplishing system transformation and renewal constitute examples of how these ideas have gained even more popularity (Mazzucato, 2015).

Within Swedish industrial policy, collaboration has become a buzzword—a term that is used and reused in public discourse without ever being questioned or problematized. There are plenty of buzzwords circulating in any society, and perhaps this is a natural phenomenon that may not necessarily be a problem. On the other

hand, such buzzwords may reflect inherent ideas and taken-for-granted beliefs that are ingrained into our way of thinking. If these ideas contain oversimplifications, hidden assumptions and flawed thinking, the buzzword is not that harmless as it is a manifestation of a distorted discourse in society, which in turn creates and reinforces misguided ideas that will dominate our thinking. A critical look at such ideas may, therefore, be necessary to accomplish development.

In this chapter, Christian Sandström argues that the term collaboration is a buzzword that has not only become overused and diluted but perhaps more importantly reflects underlying ideas about economic and social development that are, in a more fundamental sense, vastly exaggerated and in many ways incorrect. Moreover, recent trends in industrial policy toward even more state involvement have exacerbated these problems, as the theories underpinning collaborative efforts have been poorly understood.

The chapter begins by describing the role of collaboration in Swedish industrial policy and some recent trends in this area. Here, industrial policy is defined as government efforts to increase the competitiveness of firms. Next, dominant theories underpinning ideas on collaboration are briefly covered. The subsequent sections provide a collection of different theoretical perspectives on the topic that explain problems related to current ideas on collaboration, mixed with empirical illustrations. A concluding remark is provided at the end.

In summary, the author presents a critical discussion of large collaborative schemes to accomplish innovation and sustainability. In Sweden, the idea that collaboration results in innovation and development is so ingrained that it has remained largely unquestioned.

The chapter provides one of the first stepping stones toward a more systematic critique of ideas related to collaborative policy schemes for innovation. Having reviewed some of the trends and literature underpinning the collaboration idea, the author has described and applied some alternative theories that shed light on problems inherent in ideas about collaboration.

First, theories on the division of labor would suggest that firms collaborate to the extent that they find collaboration to be useful; otherwise, they specialize in their own businesses and capabilities. Why should we expect that the presence of government money and efforts toward bringing actors together who had little business with each other in the first place would create so much unrealized value? Evidence suggests that few positive effects are seen from such collaborations, and an important reason for this could be that firms and universities are, in fact, too different to collaborate productively. Incentives, capabilities and cultures are developed for very specific purposes and may diverge to such an extent that collaborations are fruitless.

Second, government efforts to create innovation by facilitating collaboration are based on the underlying assumption that innovation is primarily a process not characterized by conflict. Applying classical Schumpeterian thinking around innovation as a process of creative destruction, it is argued that collaboration efforts are likely to extend the dominance of established actors, effectively blocking institutional entrepreneurs from renewal efforts.

Third, collaboration efforts may simply be directed toward the wrong technologies, as they do not have enough information. Several contemporary examples of this dilemma have been described, and more systematic documentation of such cases is welcomed.

Fourth, government funds aimed at collaboration and innovation may distort incentives to such an extent that firms effectively become dependent on support and end up as subsidy entrepreneurs. Incentive structures may, in the end, become so skewed that the presence of large amounts of public money makes it rational to pursue financially and technologically hopeless initiatives.

Chapter 6: Industrial Policy and the Location of International R&D Activities by Multinational Enterprises

by Davide Castellani

Professor Davide Castellani maintains that MNE international investments in R&D activities have the potential to significantly increase innovation in the economies where they are directed. For this reason, R&D investments by multinational firms are prime targets for industrial policies aimed at improving long-term development.

Against this backdrop, Professor Castellani discusses the factors that attract R&D investments by MNEs, highlighting the role of the geographical scale of analysis, the role of geographic distance, of nonlocal linkages and of colocation between production and R&D.

Based on a careful overview and assessment of recent research, a main argument is that beyond the traditional country-level factors that can attract MNE R&D activities, location decisions are also based on conditions at a very fine geographical scale (such as the city-region). Nevertheless, connections at the local and global levels are of paramount importance for MNEs deciding where to locate R&D.

An overall conclusion is that policy should combine intervention at the national level with measures that operate at a very fine geographical scale (e.g., city-regions). The locus of industrial policy thus relies on a *combination of national and local interventions*.

As an example, MNEs' investments in R&D are attracted by relatively low tax and stricter IPR regimes, which are normally under the control of national governments. While lower taxes certainly encourage R&D investments by MNEs, they are not able to compensate for poor local conditions, such as agglomeration economies or availability of talent. This calls for *industrial policies that operate at a very granular geographical scale, such as the city-region*. The importance of city-regions does not negate *the importance of national-level policy-making*. Strong city regions, such as Stockholm, Gothenburg and Malmö, are, in other words, not only an issue for the cities themselves but also an issue for Sweden's attractiveness as a location for the R&D of MNEs.

Relating to the discussion of the links between production and R&D, he also argues that in the case of countries such as Sweden, which has suffered a significant offshoring of production activities to low-wage countries, the way forward is to target industries and firms where R&D can be decoupled from production. These are typically industries whose *knowledge base is more codified and analytic and firms that master capabilities in organizing, managing and taking advantage of globally dispersed operations*.

Chapter 7: Industrial Policy and Foreign Direct Investment

by Fredrik Sjöholm

Foreign direct investment (FDI) can benefit host countries by facilitating access to sophisticated technologies, good management, and global value chains. However, multinational firms have many alternative locations from which to choose. Consequently, countries trying to attract inflows of FDI need to consider what types of industrial policies will increase the country's attractiveness to foreign firms. Moreover, different types of FDI are of different value for the host country and might require different policies. This chapter starts by examining and discussing the global evolution of FDI. It continues by examining determinants of FDI and the types of industrial policies that effectively attract FDI. It ends with a discussion on quality FDI and how host country governments can maximize the benefits of FDI.

The first conclusion from the literature review on FDI determinants is that any improvements in the general business climate will positively affect the inflows of FDI. Hence, good economic policies will benefit both domestic firms and attract inflows of FDI. Such policies include improvements in education, taxes that are not substantially higher than neighboring countries, good infrastructure, stable macroeconomic policies, and an open trade regime. The quality of education in Sweden has deteriorated in recent decades, and the debate on how to change this development is very active. Poor education will first and foremost be negative for wages and living standards. Our survey shows that it will also harm the inflows of FDI. Taxes in Sweden are high, although they have declined in recent decades. In particular, income taxes remain higher than in most other countries. This will have a negative impact on FDI, partly because it makes it more difficult to transfer foreign personnel to Swedish affiliates. Infrastructure is an area where large investments

will be necessary for the years to come, not least concerning roads, railroads, and electricity systems. Moreover, Sweden has had significant economic and political stability since the economic crisis in the early 1990s. Public debt and inflation are low, and economic growth has been comparably high. Finally, trade policy is decided at the level of the EU. Sweden has traditionally been an advocate for a liberal trade regime. Unfortunately, it is plausible that this view has lost strength with the exit of the UK, another free-trade champion. New alliances have been formed, but it is quite likely that the EU will be less open in the future.

Other factors affect MNEs more than domestic firms. For instance, good FDI policies would focus on abolishing various regulations and red tape that can be cumbersome and cause MNEs to invest in other countries. Finally, it can be difficult for MNEs to gather good information, which means that government agencies (IPAs) have a role to play. This is probably more important in developing than in more developed countries such as Sweden. Nevertheless, IPAs such as *Business Sweden* have a role to play and can be particularly important for investment from small- and medium-sized foreign firms, which may lack resources to collect the necessary information.

Attracting FDI can be seen as a first step, ideally followed by policies aimed at maximizing the benefits of having foreign MNEs located in the country. Such policies should aim to make MNEs develop linkages with the local economy and continuously upgrade their activities in the country. The first requirement is the right conditions for such linkages to develop. This means FDI in industries where Sweden has good conditions for production and growth. It is unlikely that more substantial linkages will develop if a good supply base does not already exist. The government can play an important role in implementing policies that foster competitive suppliers. These are similar to the general good business climate discussed above. Finally, there might also be a matchmaking role for the government; the likelihood of linkages will increase if foreign MNEs and local suppliers are aware of each other's existence.

Chapter 8: Toward a Geoeconomic Order: Risk and Challenges for a Small Country

by Enrico Deiano and Christer Ljungwall

Restrictions on Huawei's international activities have been implemented in Sweden, the U.S. and the UK. These restrictive decisions and Chinese industrial policies to curb activities from competitors have sparked a discussion and fear of how it may induce unfair competition in world tech markets. One response in the west has been to discuss whether there is a need for more industrial and regulatory policies

(European Commission, 2020).¹⁰ Recently, an editorial in Sweden's largest business paper even raised the question of disputing majority foreign ownership in sectors considered strategic for industrial development.¹¹ Thus, we are witnessing a significant structural reshaping of the international business order, partly as a result of China's geopolitical and geoeconomic ambitions.

The authors, therefore, raise questions on how to address the challenge from China and how well Sweden and Swedish companies are prepared and equipped to meet the next stage of the global research and innovation game. In the 1980s, there was a similar discussion and fear that small open economies would not be able to keep up with technological and industrial competition from emergent countries or from large and developed economies. It was framed in the literature as the risk of "a small country squeeze" and was used to describe and analyze the geopolitical and geoeconomic tensions in the 1980s.

The question explored in this chapter is whether there is again a risk of a "small country squeeze" in an era of paradigmatic economic power struggles compared to the era of free trade that prevailed during the Washington Consensus. The authors argue that international conditions in the last two decades and the global mobility of various input factors have favored small open economies that have taken advantage of specialization opportunities that opened in the wake of global value chains. However, this will be more difficult as countries and regions revert to nonmarket geoeconomic measures to reassess their geopolitical power. The risk of a squeeze is more prevalent today than in the 1980s.

In particular, China's tech policies feature a heavy government role in directing and funding Chinese firms in areas where the West, including small, advanced economies such as Sweden, has strong competitive advantages. The result is that small, advanced economies risk becoming exposed to pressure from several directions, i.e., they are double-squeezed in a bind. The double-squeeze is more than about technology. It is also about increased economic and political pressures from changing models of national, regional, and global economic integration. In such a way, small economies are more exposed to international economics and politics than perhaps ever before. In the chapter the authors argue that response and reciprocal measures must be taken to unfair industrial practices in general, but the major issue is how not to underestimate China's rapid technological development and the formation of new competencies.

10. The fear of China's large strategic industrial investments led the EU and Germany (Chapter 2) to propose a more activist industrial policy by, among other things, nurturing national champions (European Commission, 2020).

11. <https://www.di.se/ledare/volvo-maste-hem/>.

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MADE IN GERMANY 2030

– WHAT COULD SWEDEN LEARN FROM GERMANY’S NEW INDUSTRIAL POLICY?

NINA CZERNICH AND OLIVER FALCK

1. INTRODUCTION

The European economy is facing major challenges: digital transformation and decarbonization are causing substantial structural change. At the same time, the economic rise of China is fundamentally changing the structure of global markets. Digitalization fundamentally changes the economy. It affects production processes, (global) value chains, how we work, and the content of occupations, and it enables new business models that frequently have disruptive effects on entire markets, e.g., platform-based businesses such as Amazon, Uber or Airbnb. These changes due to digital transformation affect nearly all industries and workers.

With decarbonization, another transition has recently gained momentum. This is especially important for industries that currently still cause high emissions such as the steel industry or the mobility sector. The conversion to hydrogen technologies for steel production or e-mobility leads to fundamental structural change within industries but also in related industries, e.g., increased demand for electricity, which requires new infrastructure.

Technological development leads not only to changes in European economies but also to geopolitical changes, most notably China’s rapid economic development in recent decades and the fact that Chinese companies are increasingly present in global markets. This is a common development for an emerging country in a globalized, market-based world. However, if Chinese companies enjoy advantages over domestic companies in foreign markets due to preferential access to resources in their home country, this is a cause for concern. European companies may fall behind in competition with state-supported Chinese companies. Moreover, access to the Chinese market is heavily regulated, and European companies do not have the same

opportunities in China as Chinese companies in Europe. This creates an imbalance to the disadvantage of European companies.

In recent decades, the Washington Consensus has been the guiding principle for (international) economic policy. There has been agreement that free and open markets, trade liberalization and the privatization of state companies lead to the greatest welfare gains. Recently, the abovementioned challenges of structural change and China’s active industrial policy have given rise to calls for more active industrial policy in many industrialized countries. However, the question arises as to the answers that should be provided by economic policy in industrialized countries. Calls for simple answers, such as those arising out of protectionism or that imitate Chinese industrial policy, point in the wrong direction. Numerous aspects must be taken into account when assessing industrial policy, especially the level of economic and technological development.

In this chapter, we trace the recent discussion about a new industrial policy in Germany. We describe the proposed policies, the arguments that were put forward, and the final measures. In the second part of the chapter, we deduce what Sweden could take away from the German discussion and policy.

2. THE PROPOSED NEW INDUSTRIAL POLICY IN GERMANY WAS HEAVILY CRITICIZED

2.1 Minister for Economic Affairs proposed a new industrial strategy

In February 2019, the German Minister for Economic Affairs Peter Altmaier presented a draft for a new industrial policy “Made in Germany 2030” (BMW, 2019a). It formulated the goal of securing and regaining economic and technological competence, competitiveness and industrial leadership at the national, European and global levels in all relevant areas. One of the central means of achieving this would be to gradually increase the share of industrial production in gross value added to 25 percent in Germany (currently 23 percent) and 20 percent in the European Union. The strategy claimed that the success of the German economy is a result of its industry-based economic model. Without the high share of industrial jobs, Germany would not be able to maintain its high levels of income, education, environmental protection, social security, health care and infrastructure. Therefore, it was argued that Germany should continue to focus on its industry sector in the future.

However, it has been argued that this success model is at risk as the lead of the German industry in terms of technology and quality compared to emerging countries is rapidly decreasing. Emerging countries are quickly catching up and expanding their capabilities through research and development (R&D), joint ventures or corporate

takeovers in Europe. Slowly rising wages and social costs in the emerging countries only partly compensate for this shift.

To address these issues, the draft identifies several key points for a national industrial policy:

1. Industrial and technological sovereignty and capacity are identified as the decisive challenges for maintaining Germany's competitiveness in the future. Germany must keep up with global competition, especially in regard to key technologies and basic innovations.
2. The share of industry in gross value added shall be increased to 25 percent in Germany and 20 percent in Europe.
3. Preservation of closed value chains: If all parts of a value chain, from the production of basic materials to refining and processing, sales, services, and R&D, were integrated into one economic area, the individual links in the chain would become more resilient, and it would be more likely that a competitive advantage could be achieved or expanded.
4. Germany should build on existing strengths while catching up in areas where others are superior. Experience shows that once an industry has been lost to other competitors and production has been relocated, it is difficult or even impossible to regain it. Therefore, Germany should "fight" for every industrial job.
5. The industrial SME (small and medium sized enterprise) sector is of central importance to Germany and should therefore be supported. Many SMEs have a high level of technological competence and competitiveness and have gained significant world market shares with their specific products and applications "hidden champions". However, they face enormous challenges due to the rapid progress of innovation and, in particular, digital transformation. As their special technological skills often lie in other areas, they require tailored offers and support even more than before.
6. National and European champions that can compete in global markets are needed and should be promoted. It is argued that in certain industries, projects are so large, such as those involving the construction of commercial aircraft, the modernization of railway systems, internet platforms, plant construction, international finance and banking, that only companies above a certain size can carry them out successfully. It is therefore a cause for concern that hardly any new companies of this size have emerged in Germany in years. This lack of new companies could be because German or European mergers, which are sensible from the perspective of the global market, often fail because of the

focus on national and regional markets in current law. Therefore, it is argued that European and German competition law should be reviewed and amended.

7. The state should prevent the takeover of German companies by foreign buyers to avert threats to national security including critical infrastructure. In the case of takeover attempts involving technology and innovation leadership, it should be primarily up to the private sector and its actors to prevent such takeovers by making their own offers. In very important cases, the state should acquire company shares for a limited period of time. Therefore, the establishment of a national participation facility should be considered. For the ‘very important’ issue of battery cell production, state funding up to and including support for the formation of consortia seems sensible and sufficient. In the case of the ‘extremely important’ issues of the platform economy, artificial intelligence and autonomous driving, direct government involvement appears necessary and justified to achieve a goal, e.g., the creation of an ‘AI Airbus’. (BMW, 2019a, p. 11-13)

Points 5, 6 and 7 were among the most heatedly discussed issues in the public debate following the publication of the draft (see Section 2.3 for further criticism of several aspects of the draft). While the draft addresses the importance of the industrial SME sector in only one paragraph (Point 5), the topics of national and European champions and public engagement and participation (Points 6 and 7) are covered on one page each. This has led to criticism that the interests of large companies are being favored at the expense of SMEs.

2.2 Background: The failed merger of Siemens and Alstom

The industrial policy draft was published shortly after the European Commission prohibited the merger of the railway divisions of Siemens and Alstom. This decision was considered wrong by the German Minister for Economic Affairs Peter Altmaier (as well as by his French colleague Bruno Le Maire). The respective sections on national and European champions in the industrial strategy draft were certainly heavily influenced by this development.

Siemens and Alstom justified their merger plans with the aim of creating a counterweight on the global market to the Chinese state-owned CRRC (China Railway Rolling Stock Corporation). The CRRC was formed in 2015 through the merger of the state-owned railway companies CSR and CNR and, with a turnover of 30 billion euros, is twice as large as the rail divisions of Siemens and Alstom combined. The CRRC still does the lion’s share of its business in the domestic market but is also increasingly pushing into international markets and has already gained a foothold in North America (Handelsblatt, 2019).

Siemens and Alstom intended to combine their transportation equipment and service activities in a new company that would be fully controlled by Siemens. As the

two companies are the two largest suppliers of railway and metro signaling systems and rolling stock in Europe, the European Commission was concerned that the takeover would create a market leader in some markets for signaling equipment and a dominant player in the market for high-speed trains. This would have significantly reduced competition in these markets, and the competitive pressure from remaining suppliers would not have been sufficient to ensure effective competition in Europe (European Commission, 2019).

The European Commission also considered the possibility of future competition from Chinese suppliers in the European market. It came to the conclusion that Chinese companies are not currently represented in the market for signaling systems in Europe and have not yet even participated in a tender. Therefore, it will take some time before Chinese companies become relevant competitors in this market in Europe. Furthermore, for the high-speed train market, the European Commission denies that new market entry from China would exert competitive pressure on Siemens and Alstom in the foreseeable future (European Commission, 2019).

In response, Minister Peter Altmaier and his French colleague Bruno Le Maire announced their intention to initiate a change in EU competition rules. They called for the competition rules to be modernized and adapted to 21st century global competition. Bruno Le Maire suggested a “Ministererlaubnis” at the EU level that would allow national governments to overrule decisions of the European Commissioner for Competition.

2.3 Strong criticism of the first draft of the industrial strategy

The first draft of the industrial strategy met with fierce criticism. A common denominator of the statements of various economists is that bigger does not automatically equal better and that creating European or national champions through mergers is therefore not the right way forward. If a company is declared a national champion only on the basis of its size, there is no adequate distinction between size and innovativeness or competitiveness. Furthermore, European merger control does not prevent the emergence of European or national champions if a merger involves sufficiently strong synergies and complementarities. However, a merger that does not create efficiency gains is likely to have anticompetitive effects due to the elimination of competition between the merging firms. In the short run, this means higher prices and less choice for customers. In the long run, reduced competitive pressure likely leads to less innovation and investment (Feld et al., 2019; Fuest, 2019; Motta et al., 2019; Mundt, 2019; Wambach, 2019; Wolff, 2019).

Jean Tirole, Nobel Prize laureate, further points out that it is incorrect to call the project “Railbus” in open reference to the creation of the European aircraft manufacturer Airbus in 1970. Airbus was a new competitor for Boeing, which at the time

held a virtual monopoly in the aviation market. In contrast, the merger of Alstom and Siemens would have reduced the number of players in the European railway industry (Rey und Tirole, 2019).

Germany’s industrial success to date is largely due to its "hidden champions": industrial SMEs that are global market leaders in their respective markets because of their innovative strength and specialization. It is therefore not clear why industrial policy should focus on large companies and favor them over SMEs, which form the backbone of the German economy.

The most comprehensive criticism of the industrial strategy draft was voiced by the Board of Academic Advisors at the Ministry for Economic Affairs, which expressed its concern in an open letter (Gersbach et al., 2019). In the letter, the Board agreed that there are situations in which industrial policy is justified but that it was skeptical of how those situations were defined in the draft. While accepting market failure such as externalities, imperfect competition or public goods as reasons, the Board pointed out that to avoid distortive, inefficient or non sustainable policies, it is necessary to accurately identify the market failure and to carefully assess whether an intervention can actually improve the situation.

The Board did not agree with the second rationale, specifically, the redistribution of value-added gains in international, oligopolistic markets to domestic producers and workers. The German industry is a technology leader in many markets and can therefore generate profits that benefit companies and workers. This situation, however, is not the result of an active industrial policy. When ‘national champions’ urge politicians to support them in international competition, especial caution is called for. Usually, it is not the national interest that is at stake but rather the interests of the companies. Furthermore, the Board was critical of the use of industrial policy to compensate for mistakes in other policy areas.

The Board addressed several specific points of the draft that should be reconsidered:

- The goal of increasing the share of industrial production in gross value added to 25 percent is not substantiated and is not in line with other goals formulated in the draft. Most of the innovations and key technologies mentioned (AI, platform economy, digitalization) belong to the service sector, and companies such as Google, Microsoft, Amazon, and Facebook, which are cited as role models from the USA, are in fact service providers. It is not decisive to which sector a company belongs but whether the respective jobs generate high value added, productivity and thus high wages. This is not achieved by increasing the share of manufacturing but by investing in the skills of the workforce.

- A forward-looking strategy must be open to change. However, the draft explicitly names several industries and national champions of today. If these are placed under protection, technological change is not promoted but impeded. A successful industrial strategy must improve framework conditions instead of promoting specific sectors, technologies or even companies.
- There are problems with the argument that Germany must pursue an active industrial policy because other countries such as the USA, Japan and China do so:

The US industrial policy protects traditional sectors such as steel, aluminum, the automotive industry, and agriculture from international competition through higher tariffs, and it is certainly not a model for Germany. The much-vaunted technological development in Silicon Valley was primarily driven by private corporations, not by the state.

The draft refers to the Japanese Softbank Group and its “Vision Fund”, a private company that is predominantly invested outside of Japan. Therefore, it is not an example of a successful industrial policy.

In China, the boundaries between business and state are fluid and very active, and in some areas, successful industrial policy is pursued. China’s industrial policy, however, also ensures the preservation of a highly subsidized heavy industry, the decline of which is prevented for political reasons. The banking system is showing the first signs of being overburdened by loss-making loans. Whether China’s industrial policy will still be successful when the race to catch up with the West has concluded remains an open question. In any case, this policy has nothing to do with a social market economy. Germany must defend itself against China’s aggressive practices, but the German government should not declare China to be the model for successful industrial policy.

- The draft emphasizes the dangers of structural change, but structural change is not new and has brought prosperity to Germany in the past. Even though Germany is not a leader in all basic innovations, e.g., in the fields of computers, the internet and communications technologies, it has nevertheless benefited from the structural changes they have triggered. Of course, structural change also produces losers. It is the task of the social market economy to cushion the negative effects of structural change and to qualify the people affected for new occupations. However, it is not the task of the federal government to create an equally well-paid job in battery cell production for every job lost in the automotive industry.
- Maintaining or creating closed value chains in Germany is not a sensible goal. Due to the international division of labor, there are virtually no closed value chains in any industry. This has contributed significantly to the high level of

prosperity in Germany. Closed value chains would undermine the foundation of this prosperity.

- In the case of a takeover of highly innovative German companies, the Board considers EU legal control, and if necessary, the amendment of European legal norms, to be sensible. There is no perceived need for a state participation facility for industrial policy reasons.
- Loosening the strict state aid and merger control rules in the European Union is a step backwards. These rules have saved European states from being blackmailed for aid by their national industries, and they have promoted competition in the European market and the competitiveness of European companies in international markets.

2.4 Revised version of the industrial strategy

Following the criticism of the first draft of the industrial strategy, the Ministry initiated a dialog with stakeholders from industry, business, trade unions, science and politics. On this basis, an updated version of the strategy was developed and published in November 2019 (BMW, 2019b). The new version was significantly revised and followed a less active approach. It mainly focused on the economic framework conditions that relate to different policy areas such as taxation, competition, and labor market policy – and they are to be assessed based on their criteria.

The new industrial strategy ‘Made in Germany 2030’ is based on three pillars:

1. Improving framework conditions for Germany as an industrial location
2. Strengthening new technologies and mobilizing private capital
3. Safeguarding technological sovereignty

The first pillar, improving framework conditions, includes aspects from various fields of economic policy and does not truly classify as industrial policy:

- reforms corporate taxation to reduce the tax burden on retained profits of partnerships and corporations to 25 percent
- limits social security contributions to a rate below 40 percent
- transitions to a flexible labor market
- increases the share of the workforce with vocational training (modernizing training regarding digitalization, skilled immigration)
- ensures competitive electricity costs and prevent carbon leakage
- expands infrastructure (energy, traffic, transportation and digital infrastructure)
- secures supply of raw materials and advances the circular economy
- reduces bureaucracy

- modernizes competition law to facilitate mergers of SMEs (raising threshold for merger control)

The second pillar, strengthening new technologies and mobilizing private capital, focuses on technologies as drivers of structural change. Developments such as those in AI, biotechnology and nanotechnology, lightweight construction or new materials are called "game changer" technologies that fundamentally change business models and the economy. However, in Germany and Europe, investment in these technologies is relatively low and needs to be increased. Therefore, the goal is formulated to make capital investments in technology-intensive companies more attractive, especially in the case of digital and platform-based business models. The pillar includes the following measures:

- develops and adopts technologies (innovation funding, real world laboratories)
- promotes venture capital funding
- exploits the potential of digitalization (AI strategy, European data infrastructure GAIAX, IoT, support for SMEs in these areas)
- advances the mobility of the future (promoting battery cell production in Germany, strengthening R&D for electric drive systems, promoting hydrogen and synthesis technologies, improving the legal framework for autonomous driving)
- supports new technologies for low-CO₂-emission production (R&D for low-emission technologies, lead provider for climate-friendly technologies)
- develops and refines CCS/CCU technologies for implementation (carbon capture and utilization/carbon dioxide utilization)
- further develops the bioeconomy
- promotes lightweight construction

The third pillar, maintaining technological sovereignty, stresses that losses of know-how should be avoided and self-determination in central technological fields should be maintained. An increased need for scrutiny by the German government is needed when third-country investors try to take over critical infrastructures or defense technology companies. In cases where the outflow of sensitive or security-relevant technologies does not fall within the scope of foreign trade law, private sector actors "white knights" could acquire stakes in the companies. This procedure lends itself to situations where technology and leadership, rather than primarily state security interests, are concerned. The state can accompany this process in a moderating role. As a "last resort", the German promotional bank KfW can provide temporary state participation in companies to secure sensitive or security-relevant technologies.

Another aspect of the third pillar is increasing cybersecurity. Protection against cyberattacks is considered part of safeguarding technological sovereignty. Starting points are the revision of the European Community Framework for Critical

Infrastructure Protection and projects that strengthen the competencies of SMEs in the area of IT security.

2.5 “Mittelstandstrategie” – Strategy to support SMEs

In response to criticism that “Made in Germany 2030” focuses disproportionately on large companies, a “Mittelstandstrategie” strategy to support SMEs was developed in parallel with the revision of the industrial strategy. Its aim is to address the specific needs and challenges of SMEs (BMW, 2019c).

In line with the industrial strategy, one of the main objectives of the “Mittelstandstrategie” is to improve the framework conditions for the economic activity of SMEs in Germany. Most of these points are in line with the industrial strategy (reduction of taxes, social security contributions and bureaucracy; establishment of more flexible labor regulations; development of high-performance infrastructures; ensuring a secure and affordable energy supply) but are especially targeted at SMEs. Further framework conditions that are especially relevant for SMEs are ensuring SME finance (facilitating loans and equity) and promoting entrepreneurship.

In addition to the improvement of framework conditions, the “Mittelstandstrategie” strategy includes several other points:

- attracting, training and qualifying skilled labor (facilitating immigration, modernizing training curricula)
- supporting SMEs in innovation and digitalization activities (project funding, tax incentives for R&D, 4.0 competence centers for SMEs, cybersecurity)
- supporting SMEs in rural regions to ensure equal living conditions throughout Germany (extension of programs to more regions, improving broadband and mobile networks)
- supporting SMEs in tapping new markets in Germany and abroad
- setting up a “Committee of Secretaries of State” that reviews projects of all ministries for their compatibility with SME activities and needs

2.6 Reactions to final industrial strategy and further developments

The final strategy focuses much more on framework conditions than on active policies, and the reactions to the new version of the industrial strategy were rather positive. This is not particularly surprising as all points that were heavily criticized are no longer included, e.g., promoting national or European champions, closing value chains or increasing the share of gross value added of industrial production to 25 percent.

Since the strategy was published, several initiatives and regulations related to aspects of the strategy have been implemented. The following sections give an overview of several of them.

2.6.1 Production of battery cells

To trigger investment and become independent of imports, the Federal Ministry for Economic Affairs and Energy (BMWi) has allocated three billion euros to support innovative projects along the battery value chain. This is intended to bundle and strengthen the technological expertise for battery cells in Germany and establish large-scale production in Germany and Europe. To this end, two “Important Projects of Common European Interest” (IPCEI) involving battery cell production have been initiated in close cooperation with France, bringing together several companies from Europe. The start of battery cell production in Germany from the funded projects is planned for 2022. Production on a larger industrial scale is then planned for the mid-2020s.¹

These measures have been heavily criticized. While there are good reasons for supporting research and development (externalities, spillover effects), this cannot be said for subsidizing production at politically chosen locations. Private companies have decided not to build production capacities for battery cells in Europe, and it is not clear why governments should know better. Battery production requires considerable electricity and is therefore cheaper and more sensible in places where wind and solar energy are available. Politically driven production has not proven successful in the past, e.g., Airbus production is expensive because parts must be flown across Europe, and the highly subsidized solar cell production in Germany was not competitive and is now mainly conducted in China, supplying Europe with cheap solar panels.

2.6.2 National Hydrogen Strategy

In June 2020, the German government passed the National Hydrogen Strategy with a total budget of nine billion euros to make the energy carrier marketable. The goal of the Hydrogen Strategy is to make Germany the world’s leading supplier of modern hydrogen technologies. Several ministries are involved in the implementation of the strategy (Economic Affairs, Research, Infrastructure, Environment, Development). For the implementation and further development of the strategy, a National Hydrogen Council, an interdepartmental State Secretary Committee for Hydrogen and an Innovation Office of “Green Hydrogen” at the Federal Ministry of Education and Research were established.²

1. <https://www.bmwi.de/Redaktion/DE/Dossier/batteriezellfertigung.html>

2. <https://www.bundesregierung.de/breg-de/themen/klimaschutz/wasserstoffstrategie-kabinett-1758824>

The strategy can be considered a long overdue initiative as it enables an alternative technology to e-mobility. The current focus on electromobility is not entirely unproblematic. While electromobility is currently prevailing, technological progress might make hydrogen power or synthetic fuels more efficient and eventually the superior technology.

2.6.3 Tax incentives for research and development

In January 2020, the law on tax incentives for R&D went into effect. All types of R&D projects and all taxable enterprises are eligible. The allowance amounts to 25 percent of eligible expenses, i.e., the wages and salaries of employees who are involved in R&D projects. In the case of contract research, 60 percent of the remuneration paid to the contractor is considered an eligible expenditure. The eligible assessment basis was initially capped at two million euros per year and was temporarily raised to four million euros in 2020 (until 2025) due to the COVID-19 pandemic. If the R&D allowance is higher than the tax due, this amount is paid out as a tax refund. This means that R&D activities in companies that are in a loss-making phase are also supported, which is especially relevant for companies in the growth phase such as start-ups.³

Generally, this is a step in the right direction as it provides technology-open, bottom-up R&D funding. However, its effectiveness in Germany has yet to be proven. Compared to other countries that already employ R&D tax incentives, Germany also has a large system for direct innovation project funding. It must be evaluated whether R&D tax refunds lead to additional R&D activities in this setting.

2.6.4 Skilled Workers Immigration Act

In March 2020, the Skilled Workers Immigration Act came into force. It makes it easier for skilled workers with vocational, nonacademic training to immigrate to Germany for work purposes and expands the framework for the immigration of skilled workers from countries outside the EU to Germany. One of the most important changes is the abolition of the so-called priority check by the Federal Employment Agency. This means that it is no longer necessary to check whether an alternative applicant from Germany or the EU is available for a specific position. Furthermore, skilled workers are now also allowed to enter the country to look for work. For this purpose, they receive a residence permit for up to six months.⁴

The increasing demand for skilled workers in Germany cannot be met by qualifying only the domestic population. Therefore, recruiting skilled workers from abroad is also necessary. However, the Skilled Workers Immigration Act can still be improved,

3. <https://www.bundesfinanzministerium.de/Content/DE/Standardartikel/Themen/Schlaglichter/Forschung-Entwicklung/2020-11-09-Foerderung-Forschung.html>

4. <https://www.make-it-in-germany.com/de/visum/fachkraefteeinwanderungsgesetz>

e.g., by accelerating the visa process or expanding employment opportunities to earn a living during the search (Poutvaara, 2021).

2.6.5 New funding agency to promote disruptive innovation

SprinD, a new agency to promote disruptive innovation inspired by the US Advanced Research Projects Agencies, was established in 2019 for an initial term of ten years. Funding of 100 million euros per year is currently earmarked for this term. Disruptive innovations involve radical technological novelties that solve a massive technological, social or environmental challenge and create completely new markets or fundamentally change an existing market. The agency promotes innovation through competitions on societal challenges and screens existing R&D activities for their potential for disruptive innovation.

Currently, this new agency, which in itself is a disruptive innovation in the field of innovation funding in Germany, is struggling with bureaucratic obstacles and political rivalry. The German Federal Audit Office (Bundesrechnungshof) monitors how tax money is spent and expects immediate results from expenditures. However, developing disruptive innovation takes many years, and many projects will prove to be dead ends. This is an immanent feature of disruptive innovation research, but it is not considered in the audit of public spending. Therefore, evaluation of disruptive innovation funding should consider a longer timeframe and accept that it is not a failure of the policy that a certain share of funding will not lead to success. Furthermore, to obtain approval from the coalition partner, SprinD had to be divided into two divisions – one for civilian use and one for military use. However, there is much overlap in the development of technologies for both purposes, and this division diminishes the agency's potential. Moreover, the agency struggles with EU rules on public procurement and state aid.⁵ Not only for this reason but also because disruptive innovations address societal challenges that extend across borders, the promotion of disruptive innovations should take place at the European level. However, bureaucracy and political rivalry are equally challenging at this level, and constructive solutions are needed (Bunde et al., 2020).

2.6.6 Program to support the transformation toward e-mobility

A program to support the transformation of the mobility sector toward e-mobility has been launched. The funding program “Future Investments in the Vehicle Industry”, with a budget of two billion euros, is designed to support the industry's transformation process toward climate-friendly and autonomous driving, digitalized production and the innovative use of data. In particular, small and medium-sized suppliers that are particularly challenged by structural change are to benefit from the funding. The funding program includes three modules: modernization of

5. <https://www.n-tv.de/wirtschaft/Merkels-Erfinder-Agentur-droht-zu-scheitern-article22717956.html>

production, research and development for competitive and innovative products, and regional innovation clusters with real laboratories.⁶

The support of an industry undergoing fundamental change is well justified, and the design of the program seems quite sensible. It focuses on suppliers that are smaller and more specialized than large car producers and for which it is therefore very challenging to adapt to the new circumstances. The large car producers in Germany have extensively recruited personnel with high competencies for digital transformation in the industry, while the smaller suppliers still must catch up in this regard (Czernich et al., 2021). Furthermore, the program focuses on digital transformation, R&D, and innovation rather than on directing production or technology selection.

2.6.7 Technological sovereignty initiative

In a discussion paper published in April 2021, the German Federal Ministry of Education and Research (BMBF) addresses the concept of technological sovereignty (BMBF, 2021). The BMBF understands technological sovereignty as the claim and ability to cooperatively (co)shape key technologies and technology-based innovations. This includes the ability to identify requirements for technologies, products and services in accordance with Germany’s values; to (further) develop and produce key technologies in line with these requirements; and to help determine standards for global markets. Technological sovereignty requires targeted investment in key technologies. A prudent selection of relevant technologies based on a discussion of the questions of which technologies have a key function today and in the future and under what conditions the state should support technology development is needed. A Council for Technological Sovereignty has been established to support the ministry in its further development.

This interpretation of technological sovereignty is fairly broad and does not involve a political decision on production location. Rather, it simply requires the competence to shape technological developments and standards in a way that Germany benefits from them, regardless of whether production takes place in Germany or abroad. This development, which relies less on steering and more on support, is a promising strategy.

3. LESSONS LEARNED AND POSSIBLE IMPLICATIONS FOR SWEDEN

Why is Germany’s industrial strategy and the discussion about its development relevant for Sweden? The Swedish economy resembles the German economy in

6. <https://www.bmwi.de/Redaktion/DE/Pressemitteilungen/2020/11/20201119-2-milliarden-euro-fuer-zukunftsinvestitionen-in-der-fahrzeugindustrie.html>

several respects. Both rely on technological progress, innovation and a highly skilled workforce to achieve growth and prosperity. Furthermore, they have similar industry structures, with the automotive and engineering industries making up a significant part of the economy. Both are open economies that are strongly involved in international trade and global value chains. Therefore, many of the arguments and findings that apply to Germany also apply to Sweden. Thus, what could Sweden learn from the German discussion on industrial policy?

Despite new calls for a more active industrial policy, one should remain skeptical about its chances of success. Before opting for an active industrial policy, i.e., a policy that selects industries, companies or technologies to support or impede structural change, one should explore the cause of a certain undesirable result. Frequently, the problems are attributable to other economic fields, such as trade, innovation or environmental economics, and can and should be addressed with the instruments of these fields. This is likely to be one of the most important lessons learned from the revision of the draft of the German industrial strategy. Criticism of the first draft, which suggested an active industrial policy, was unanimous, and few of the active policy measures remained in the final version. In contrast, most of the measures in the final version focus on economic framework conditions, which are not part of classical industrial policy but are the more promising path. Reducing bureaucracy, corporate taxation including R&D support, modern infrastructure, and the predictability of the development of energy prices are among the most important framework conditions. Moreover, companies need planning reliability in all these areas to make investment decisions.

Nevertheless, the challenges of structural change due to digitalization, decarbonization and changing geopolitical structures remain. How can these be successfully addressed and mastered?

3.1 How to deal with China?

Chinese state capitalism causes partly unfair competition between Chinese and foreign companies in China as well as on world markets. In the public debate, various suggestions are repeatedly made on how to react to China's economy, but, in reality, many are not effective. Then, how should Western industrialized countries deal with China?⁷

The new growth theory (Aghion and Howitt, 1997) distinguishes between countries at the global technology frontier and the countries behind it. Countries at the technology frontier can only grow through innovation, thereby pushing the global

7. This section is based on the recommendations developed by the authors in Czernich et al. 2020.

technology frontier further. Countries behind the technology frontier can grow through imitation, i.e., copying and adapting existing technologies. In this way, they learn and catch up with technology leaders. For the two types of countries, however, there is no single suitable industrial policy that fits all. For countries at the technological frontier, competition, openness to technology, protection of intellectual property, and excellent universities and research institutions are the best framework conditions for keeping pace with the development of the technology frontier. In contrast, countries behind the technology frontier profit from active industrial policies in their catch-up process, e.g., competition restrictions that protect domestic firms from competition from advanced firms from countries at the technology frontier or copying technologies and products (Falck, 2019).

What does this imply for the relationship between Europe and China? What approach should European countries take to ensure fair competition with China? Two principles should guide interactions and negotiations with China: first, coordination at the European level to leverage the size of the EU internal market in negotiations, and second, reciprocity and a focus on open markets rather than increasing trade and investment barriers.

The EU internal market is the largest market in the world. The ability to control access to this market means great leverage in negotiations to ensure that European companies are granted access to foreign markets, that there is a level playing field and that trading partners abide by fair competition rules. However, China is currently creating a network of bilateral trade, finance and investment agreements; it is also pursuing such agreements with individual EU states. This has far-reaching implications for the EU: under direct political pressure such that the ability of member states to stand together and take a common political position is challenged (Fuest and Pisani-Ferry, 2019).

The takeover of European companies by foreign investors is not problematic per se. What is problematic is the fact that European companies do not have the same opportunities to invest in Chinese companies. The EU should work together to ensure that China opens its market to European companies instead of closing off its own market. The introduction of European screening for foreign direct investment, which applies to investments in critical infrastructure and technologies (EU, 2019), is therefore to be welcomed. However, it is essential that the screening is based on clear predefined criteria and that such criteria must be defined independently of political influence.

3.2 The ambiguous perception of large companies – national champions versus digital giants

In the public debate about industrial policy, it is frequently argued that national or European champions should be promoted since only such large companies can

compete with Chinese state-owned enterprises. However, this is a fallacy as size is not synonymous with competitiveness and innovativeness, and forcing mergers mainly harms competition and customers in Europe (see Section 2.3).

Simultaneously, other large companies, namely, US digital giants such as Facebook, Google and Amazon, are seen – by no means necessarily by other individuals – as having too much market power and having anticompetitive effects on global markets. A typical strategy of these companies is to buy innovative start-ups that develop business models that could either complement the business model of the large companies or become a competitor. Against this background, changes in competition law, i.e., raising the threshold for merger control, as was done in the 10th amendment to the German Act against Restraints of Competition that came into effect in January 2021⁸, should be viewed critically.

At the same time, this amendment (also referred to as the “digitalization amendment” or “competition law 4.0”) has brought about many sensible changes that enable authorities to take actions against the (imminent) market power of digital companies such as platform companies. One of the most significant changes is the fact that competition authorities no longer have to wait until anti-competitive behavior has occurred to sanction it afterward but can prevent companies from gaining market power in advance. They can preventively prohibit companies that are of particular importance for competition due to their strategic position and resources from engaging in certain types of conduct (e.g., preferential use of their own services or the obstruction of market entry by processing competition-relevant data). Furthermore, the authorities can order that data access be granted for an appropriate fee, and there are possibilities for intervention in the event that a platform market threatens to “tip” in favor of a large provider (so-called tipping of a market).

3.3 Future key technologies

The promotion of specific presumed key or future technologies, e.g., steering toward a specific technology that will substitute the combustion engine, is not a promising strategy for a developed economy. For countries that are in the process of catching up and are behind the technology frontier, it is easy to identify the world-leading technologies. For countries at the technology frontier, however, it is difficult to identify which will be the successful and important technologies of the future. This identification process should therefore be left to researchers and companies. A better way to find the best solutions is to promote R&D in a way that is open to technology. This does not determine the path but only the goal or the problem to be solved.

8. https://www.bgbl.de/xaver/bgbl/start.xav#__bgbl__%2F%2F*%5B%40attr_id%3D%27bgbl121s0002.pdf%27%5D__1628239645576

An example of such a mission-oriented and technology-open funding scheme is the US agency DARPA (Defense Advanced Research Projects Agency). It funds innovation challenges that are intended to solve a problem or mission but does not specify how or with which technologies this should be accomplished. Similarly, the US NIH (National Institutes for Health) issued broad calls for proposals to address certain diseases without specifying a particular approach. In the context of the decarbonization of the mobility sector, this would mean that the goal of a particular emission reduction is specified but not the ways or technologies to achieve that goal.

3.4 Shaping structural change and coordination at the European level

Policies that focus on preserving existing structures do not usually promote growth and welfare in the future. Change has always existed and always will. As in the past, change will produce winners and losers in the future. It is the central task of a successful policy to (i) create conditions that enable large gains and allow as many stakeholders as possible to participate in these gains and (ii) mitigate the effects on those who are negatively affected by change. Preventing structural change, however, will limit opportunities.

The successful management of structural change caused by global phenomena cannot be accomplished by individual national governments. It is a task that requires international and European coordination. One could consider these phenomena and their responses to be global public goods. Technological progress, international trade relations and the mitigation of global warming create benefits that are nonexcludable and nonrivalrous, which are classic characteristics of public goods and involve the classic problem that incentives to contribute are too low.

To overcome these problems, coordination between national governments is essential. However, the question arises as to whether the current EU governance structures are suited to meet these challenges. As noted above, China is in the process of building a network of bilateral trade, finance and investment agreements and pursuing such agreements with individual EU states. This has far-reaching implications for the EU: when faced with direct political pressure, the ability of member states to stand together and adopt a common political position is at risk (Fuest and Pisani-Ferry, 2019). Another example is the promotion of disruptive innovation and the new European Innovation Council. While it makes sense to establish a supranational agency to address supranational challenges, this agency should be able to act independently, and its decisions must be detached from regional proportionality (Bunde et al., 2020).

3.5 Global value chains create prosperity

Another policy that is repeatedly suggested in the public debate about industrial strategies is the creation of closed value chains in Europe. However, Europe's integration into global value chains and the associated benefits of the international division of labor have strengthened Europe's competitiveness in the past and will continue to do so in the future. The outbreak of the coronavirus pandemic and the initial shortage of medical protective equipment led to renewed calls for production relocations. However, the relocation of supply chains would have a strong negative impact on economic performance and lead to enormous income losses. The extent of these real income losses was calculated for Germany by Flach and Steininger (2020): assuming that trade costs between all trading partners in the world increase by 100 percent, this would result in a decrease in real income in Germany of nearly 20 percent. Since Sweden has a similar economic structure with a high share of foreign trade, it seems reasonable to expect an effect of similar magnitude for Sweden.

To increase the resilience of supply chains in the face of rising protectionism, the diversification of supply chains is key. In most cases, it is precisely the international procurement of goods and services that makes it possible to diversify country-specific risks and make supply chains more robust (Caselli et al., 2020). This is exactly how companies plan for the future as shown by a survey of 5 000 German companies conducted in May 2021. Only ten percent of the companies stated that they plan to rely more on domestic supply chains in the future (Flach et al., 2021). Policy-makers should therefore work to reduce trade costs through bilateral trade agreements and strengthen the multilateral, rule-based trading system (Flach, 2021).

3.6 Conclusion

From the debate surrounding the introduction of a new industrial strategy in Germany, one can conclude that despite the increasing calls for a more active industrial policy, one should remain skeptical about its usefulness. Structural changes in world markets and the associated challenges for industrialized countries do not mean that the Washington Consensus has become void. Criticism of the proposed active industrial policy from academia and industry was unanimous, and few of the active policy measures were in fact included in the final version. In contrast, most of the measures in the final version focus on economic framework conditions, which do not qualify as classical industrial policy but are nevertheless the better way to move forward. Frequently, unwanted economic outcomes fall into the domain of other economic fields, such as trade, innovation or environmental policy, and can and should be addressed with the instruments of those fields.

However, addressing challenges that are caused by global phenomena is a task that requires international and European coordination. However, current EU governance structures are not well suited to this task. For example, China is currently

establishing a network of bilateral trade, finance and investment agreements with individual EU states, which threatens the ability of member states to stand together and take a common political position. Another example is the promotion of disruptive innovation and the new European Innovation Council. It must be ensured that this agency is able to act independently and that its decisions are detached from regional proportionality.

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CHAPTER 3

MODERN INDUSTRIAL POLICIES: AGENDAS, CHALLENGES AND OPPORTUNITIES

PHILIP McCANN AND RAQUEL ORTEGA-ARGILÉS

1. INTRODUCTION

In many parts of the world, the recent years have seen a re-kindling of interest in different aspects of industrial policy. Changing macroeconomic, political, and technological shifts have led to something of a re-thinking regarding the role which the state may play in certain arenas of the national and international economy, and the whole field of industrial policy is now in something of a state of flux.

Prior to the 1980s, for much of the post second world war era, industrial policy was evident to different degrees in different countries, associated variously with different elements of trade protectionism, industry barriers to entry, the public ownership of parts of industry, restrictions on cross-border ownership. In addition, major areas such as defence contracting, health contracting, and energy provision systems, often distorted market mechanisms, but at least ostensibly, these were for non-market security and social reasons. Obviously, it can be argued that these defence contracting, health contracting and energy provision arenas are simply specific examples of industrial policy motivated by other goals, but the point remains, that what is or is not industrial policy is not simply a question of the impacts on a market or market structure, but also the goals and motivation for the policy.

For four decades since the 1980s, however, these earlier forms of industrial policy were largely eschewed by OECD countries as a mainstay of the economic management. Industrial policy, as it has been practiced in earlier decades, had largely gone off the political and policy agenda in most industrialised countries. Instead, the focus of economic policy was largely on ensuring that horizontal framework

conditions were in place to ensure a good balance between consumer and producer surplus which provided both for competitive prices and consumer choice and also profitability and gainful entrepreneurial and investment opportunities. In this regard, most countries emphasised the roles that well-constructed competition law and policy settings play in facilitating regulatory systems which are consistent with the lessons from industrial organisation theory. The underlying political bargain between government, international institutions and the wider general public was that well-functioning markets will maximise medium and long term economic growth and the benefits of this growth will be most widely shared across incomes and skills groups, communities and regions, and nations. Indeed, around the turn of the New Millennium these principles had become almost ubiquitous across OECD countries, and also formed the basis of the supranational industrial policy settings of the European Union regarding competition law, governing issues relating to the access to member states' markets, regulatory design, cross-border ownership, and state subsidies to firms and industries. While there were still provisions and policy agendas within the European Commission regarding entrepreneurship and also innovation and Research and Development (R&D), these were still tiny relative to the size of the EU markets. However, this consensus was about to come under enormous pressure due to the impacts of the 2008 global financial crisis.

The 2008 global financial crisis instilled doubts in many areas regarding the efficacy of markets' ability to generate stable economic growth which was widely shared. The sub-prime mortgage crisis which was at the heart of the broader 2008 financial crisis was in effect, a regulatory failure, and the apparent inability of contemporary regulatory systems to perform their essential roles, especially in the global financial services sectors, meant that their design and enforcement was fundamentally questioned. Moreover, the subsequent financial responses involving quantitative easing have contributed to growing inequality in many countries, because asset owners were the main beneficiaries of these policies. The political bargain inherent in the 1990s' and early 2000s' economic settlement appeared to many observers to have been broken, and the political economy of the post-2008 crisis era has been one characterised by instability and sluggish growth. The weaker growth record allied with growing inter-personal and inter-regional inequality in many countries has generated pressures for governments to re-think the options around industrial policy. Increasingly polarised economic growth and development has undermined some of the confidence policy-makers and the general public previously shared in their institutional set-ups, and overlayed on these financial and distributional concerns there are nowadays also several additional societal-wide drivers of public concern which have the potential to fundamentally change how we think about industrial policy.

Firstly, there are widespread public concerns about increasingly rapid technological changes, changes which themselves raise concerns about the employment

implications of artificial intelligence and Industry 4.0. In addition, these technological concerns also raise questions regarding issues such as cyber-security, and the functioning of democratic processes.

Secondly, there are widespread environmental concerns regarding our ability to mitigate climate change and the extent to which market mechanisms are able to address such challenges without being explicitly directed to do so by industrial and public policy.

Thirdly, there is an increasing sense in many quarters that governments need to be part of the solutions to these issues, and that reliance on market mechanisms alone cannot address many of these challenges.

Fourth, there is a growing awareness that *place* is a fundamental aspect of the workings of the economy which also directly links market processes to individuals and their communities.

In particular, these issues regarding place cut across both the technological and environmental concerns and also underpin many of the political shocks observed in recent years in OECD countries. The growth in *place-based* economic approaches has been a key component in the rethinking of many aspects of industrial policy, and the often rather blurred links between industrial policy and regional economic development policy are now a major driver of modern industrial policy thinking.

In this paper we examine these various influences on current industrial policy thinking in different national and international settings and highlight how the interactions between the technological, environmental and place-based influences provides powerful undercurrents reshaping the role of industrial policy in the wider economic policy settings available to countries. Discussions about industrial policy are nowadays not simply framed within a siloed sectoral basis regarding the supporting of individual firms or industries, but rather they are discussed as part of a broader debate regarding the ability of societies to effect meaningful changes in a context where wider and potentially adverse societal forces are at play. Importantly, these wider influences and concerns have also changed how we think about the links between industrial policy and other economic policy arenas.

In order to illustrate these issues, in this paper we will draw on examples from the USA, UK and the European Union referring to three sets of challenges, namely technological challenges, environmental challenges, and also policy-design challenges. The next section will discuss the changing ways in which consider the nature of, and case for, place-based industrial policies, and we will then move on to examine how such policy agendas, including public procurement, can help to address challenges associated with innovation and technological change and also climate change

mitigation. The final part of the paper considers some of the ambiguities still inherent on these approaches and also some new aspects of policy programmes which are currently being piloted.

2. INDUSTRIAL AND PLACE-BASED POLICIES

One of the key drivers of thinking about industrial policy is the new or renewed interest in thinking about place-based economic development policies, which has increased markedly and across all continents during the last five or six years. The major stimulus for the growth in place-based thinking has been the inability of space-blind frameworks to facilitate broadly based patterns of local economic development. Prior to the global financial crisis, so-called ‘space blind’ thinking dominated the international policy discourses (World Bank, 2009; Glaeser and Gottlieb, 2008), and these lines of thinking emphasised galvanising agglomeration economies and spatially concentrated growth in more prosperous locations and warned against economic development policies aimed at enhancing local development in economically weaker regions. It was often assumed, or rather asserted, that there was a natural efficiency-equity trade-off and that normative considerations should play no role in spatial economic policy. Rather, these space blind arguments posited that national growth and development were best served by facilitating the geographical mobility of factors of production via labour migration and capital adjustments in response to local price signals to places where their returns were highest, and these arguments held sway in the first dozen or so years of the New Millennium. However, in the aftermath of the 2008 global financial crisis, doubts as to their validity started to emerge as economic growth flatlined along with interregional factor mobility. Credit withdrawals constrained capital investment in many economically weaker regions and dwindling job opportunities severely curtailed labour mobility in many countries. The ability of factor mobility to respond to the shocks appeared to be very limited while weaker regions became further entrenched in low productivity traps.

In response to these observations, three reports were published (Barca, 2009; OECD, 2009a;b) which posited that place based policies were potentially an effective remedy for countering the development challenges facing weaker regions, and this led to a new way of thinking about the nature and role that place-based policies may be able to play in helping regions recover from the shocks (Barca et al., 2012). The interest in place based policies grew slowly at first, but in more recent years more evidence regarding their long-term impacts has emerged (Kline and Moretti, 2014; Schweiger et al., 2018; Ferrara et al., 2017) from different quarters. Moreover, the evidence on the assumed efficiency-equity trade-off in regional development appeared not to support these contentions. However, alongside these data, the major spur in interest for these approaches were the political shocks of 2016, most notably the UK Brexit Referendum, the US presidential election, and other plebiscites in Italy

and Austria, in which the geography of anti-establishment voting was closely related to the economic geography divides in each respective country (McCann and Ortega-Argilés, 2021a). The ‘geography of discontent’ (McCann, 2020) which was associated with the divergent development paths between regions in the same country generated profound institutional and governance instability in each case (Hendrickson et al., 2018; Dijkstra and Rodriguez-Pose, 2020), and it is these political economy concerns which have given rise to a renewed interest in industrial policy as people from very different political arenas begin to question the efficacy of prior existing policy settings. There are many different examples of this shift, but here we will confine ourselves to three specific areas, namely innovation and new technology, environment and climate change mitigation, and the links between place and sectors.

3. INNOVATION AND TECHNOLOGY

In terms of advanced technologies and leading-edge innovations, one of the most marked observations over recent years are the growing spatial concentrations of activities in these fields. Research by the Brookings Institution on the USA case shows that more than 90 percent of new jobs in innovation intensive activities are generated in just five city-region agglomerations (Atkinson et al., 2019), with the rest of the country trailing increasingly further behind (MGI, 2017). This implies that as we move forward to embrace the new generations of technologies which are coming on stream, including artificial intelligence, machine learning, big data and the internet of things, a plethora of new technologies generally grouped under the umbrella heading of ‘Industry 4.0’, only certain locations will be able to take full advantage of these technological changes, leaving other regions in their wake. The risk of economic partitioning is further accentuated by the fact that many of the economically weaker regions are also more at risk of job losses from these new technologies (Crowley et al., 2021) as firms will be able to shift away from many lower-skilled, non-cognitive and routinised activities and occupations towards more highly-skilled, cognitive and non-routinised activities and occupations (OECD, 2018). The real winners from these new generations of technologies appear to be certain types of places, most of which are already successful regions, while more peripheral, rural, and economically weaker regions are increasingly vulnerable to technological change. Furthermore, the Covid-19 pandemic lockdowns in many countries have actually accelerated the shift towards these new technologies as millions of workers have shifted to online working (Dingel and Nieman, 2020), and will increasingly embrace post-pandemic hybrid working practices, which allow them to better weather employment and technological shocks.

These divergent technological pathways were already a cause of concern in the European Union prior to the onset of the 2008 global financial crisis. The growing transatlantic divide in technological arenas which emerged from the mid-1990s

onwards had already raised concerns in European circles regarding the speed with which the technological frontiers in Europe were moving forward in comparison to the United States’ firms (Ortega-Argilés, 2012). Work coordinated by the European Commission and involving many different experts and stakeholders had already raised these issues and were beginning to develop and shape policy responses to these challenges. In particular, it became apparent that the potential solutions to these technological challenges inherently also involved questions about local and regional economic development, and the fusion of these two dimensions of industrial policy led to what became known as the ‘smart specialisation’ agenda (McCann and Ortega-Argilés, 2015). The smart specialisation agenda is essentially a fusion of two types of policy schema, namely industrial policy and regional policy, but they are combined in a different manner to traditional industrial or regional policy. The new schema is essentially a bottom-up rather than a top-down framework in which directionality is provided by sets of principles rather than by rules or allocations (McCann and Ortega-Argilés, 2013a). The aim of smart specialisation is to help regions foster entrepreneurship-led local development in areas of technologies and competences in which they have potential scale, embeddedness and connectivity (McCann and Ortega-Argilés, 2015). The relatedness between new innovations and the existing industrial fabric is important, a feature which is known in the literature as ‘related variety’, in the sense that increasing the local variety of activities and skills which are still related to the underlying technological and skills profile of the region is important if growth is to be long-lasting and genuinely embedded in the locality. In order to achieve these patterns of growth, in contexts where policy plays a constructive role, this typically involves flexible and locally tailored governance arrangements, ex ante goal-setting strategies allied with outcome-oriented policy actions and interventions, and ongoing monitoring and ex post evaluation (McCann and Ortega-Argilés, 2016).

TABLE 1 TRADITIONAL REGIONAL POLICY VERSUS AND MODERN PLACE-BASED APPROACHES TO REGIONAL POLICY

	Traditional Regional Policy	Modern Regional Policy
Objectives	Compensating temporarily for location disadvantages of lagging regions	Tapping into underutilised potential in all regions to enhance development in all regions
Unit of Intervention	Administrative units	Functional economic areas
Strategies	Sectoral approach	Integrated development projects
Tools	Subsidies and state aids Hard capital (infrastructure)	Mix of hard capital (infrastructure) and ‘soft’ capital (business support, credit availability, networking systems)
Logic	Top-down centrally orchestrated	Mix of bottom-up and top-down – locally designed and delivered
Actors	Central government	Multi-level governance involving different tiers or level of local, regional and national government working in partnership and alongside the private and civil society sectors

Source: OECD (2009b); McCann (2013).

These features are very different to traditional regional and industrial policy, which tended to be top-down, sectoral and based on subsidies, whereas modern regional innovation policy has much more of a bottom-up logic (McCann and Ortega-Argilés, 2013b), and the different approaches can be summarised in Table 1.

Traditional regional policy was largely a geographically-demarcated industrial policy based primarily on sectoral subsidies to support ‘hard’ capital investments in machinery and infrastructure, and these policy schema tended to be heavily top-down in terms of the decision-making and allocation logic, essentially driven by central government priorities regarding the overall management of the economy. In contrast, modern regional policy is much more bottom up in nature, mixing different forms of soft and hard capital investments, and designed and delivered primarily in the local and regional context based on local knowledge. Modern industrial policy in the regional context typically prioritises entrepreneurship and innovation as the drivers of growth and seeks to enhance and exploit local complementarities in these fields. One of the key elements of these place-based industrial and regional policy approaches is the better enabling of knowledge spillovers and their links to locally-based research and development (R&D) capabilities. In modern policy approaches, policy resources are often used to try to galvanise these knowledge linkages in the local economy in situations where the market appears to under-supply such complementary linking and bridging mechanisms and facilities. Such approaches may involve leveraging the assets of research intensive organisations such as universities and research centres, or by directly linking research-related activities to the needs of local firms and businesses. Alternatively, the upgrading of local skills supply and the reducing of local skills mismatches may be a priority, via targeted placements or local educational curriculum re-designs, and are often key elements of such place-based industrial policy approaches. Given the types of actions being initiated, these types of policies often also require local and national institutional and governance settings to be reconfigured specially for these purposes. In particular, local policy-makers need to be given the freedom and autonomy to be able to design policy interventions and actions in conjunction with local stakeholders in a manner which is explicitly based on local knowledge. As such, these types of industrial-regional policy approaches tend not to work well in governance and policy settings which are very top-down in nature, and instead they are better suited to governance contexts where there is more of a decentralised system of decision-making.

The smart specialisation agenda became a mainstay of the post-2013 EU regional and industrial policy approaches aimed at driving innovation in the post 2008 global financial crisis period. This also involved genuinely new levels of cooperation and coordination across different directorates within the European Commission, as well

as between the EU institutions and the respective member states.¹ A key part of this new industrial policy schema is the role of learning, whereby different regions can learn from the experience of other regions, and especially those which share many of the same types of features. Such learning is crucial part of the smart specialisation agenda, and there are formal mechanisms whereby regions and sectors can set up various forms of alliances to help foster both industry learning and policy learning. These policy transfer practices are aimed squarely at enhancing the scale of knowledge spillovers being shared within the EU economic arena, and raising the level of aspiration, collaboration and coordination between stakeholders in local and regional settings.

4. ENVIRONMENT AND CLIMATE CHANGE MITIGATION

Across Europe, the levels of aspiration and coordination in these policy arenas are now being challenged on an even greater scale, in response the rapidly increasing awareness and concerns regarding climate change. Since the 2015 Paris Accords, there has been a growing sense of urgency regarding the speed with which global temperatures are rising, and it is only in very recent years that countries have begun to make very serious and binding commitments to climate change mitigation strategies. As part of this agenda, in early 2020 the European Commission announced its flagship Green Deal, which aimed to prioritise climate change mitigating technologies and policies as the core EU-wide industrial policy agenda. Some aspects of this ‘green industrial policy’ approach are inherently top-down in nature, in the sense of providing a clear mission-oriented directionality regarding the policy priorities. However, as with smart specialisation, it is also obvious that the local and regional dimensions are essential features of this Green Deal industrial policy and there are two main reasons for this (McCann and Soete, 2020).

The first reason why local and regional dimensions are inherently part of any green industrial policy, is that for the Green Deal to be successful in reducing pan-EU carbon emissions, it must galvanise actions on numerous fronts across Europe. Small steps forward on numerous fronts are more important than individual flagship investments or actions, but such a multitude of carbon emission-reducing actions will only be fostered if all stakeholders, including households and consumers as well as producers, investors and policy-makers, develop a shared sense of ownership of the policy agenda. This cannot happen if the policy is seen primarily as being top-down and centrally-orchestrated in nature, because local stakeholders will lack this critical sense of ownership. Instead, a decentralised and devolved Green Deal framework, which encourages and incentivises local climate change-mitigating

1. <https://s3platform.jrc.ec.europa.eu/>

actions on the part of local entrepreneurs and innovators is the primary way to ensure that a local sense of ownership can be developed (McCann and Soete, 2020). A devolved green industrial policy set-up can help to maximise the much-needed local entrepreneurial actions which inherently build upon local knowledge and context, and thereby are best-tailored to the local context. The multiplicity of these climate change mitigating entrepreneurial activities at the local level will generate highly heterogeneous initiatives, which is exactly what is needed in order to ensure small steps on a wide range of fronts in a manner appropriate to the very different local contexts.

The second reason why local and regional dimensions are inherently part of any green industrial policy, is that across European Union (McCann and Soete, 2020), as with the United States (Muro et al., 2019) and the UK (Corfe and Norman, 2021), many of the economically weaker regions are also those which are most exposed and at risk of climate change-mitigating measures. Many economically weaker regions are both carbon intensive and carbon extensive in terms of their industrial structures, in the sense that local industries are often those which use large levels of energy. These carbon-intensive sectors typically include many areas of manufacturing as well as extraction industries, and also some agricultural sectors, and these are the industries which require the greatest levels of energy per worker or per unit of output produced. At the same time, many of the economically weaker regions are also carbon extensive, in the sense that a large number of their locally-based firms and sectors are carbon-intensive, and as such many of the additional local and regional inter-firm and inter-industry linkages are also dependent on inputs and outputs produced by locally-based carbon-intensive activities. These issues of industrial structure mean that particular regions are especially exposed to climate-change mitigation strategies, and while it may be the case that these same regions are also heavily exposed to the long-run effects of climate change, the costs of adaptation for them are relatively greater than for more prosperous regions, and this will disincentive local stakeholders from engaging with climate change agenda (McCann and Soete, 2020). In contrast, many prosperous cities and regions are well-positioned to take advantage of the new climate change mitigation technologies. Many of these cities already tend to have a lower per capita carbon footprint than other regions, and they also have many of the human capital and physical capital assets required for rapid adoption and adaptation of these new technologies. Dense agglomerations are ideal for trialling new forms of mobility-management or energy-management systems based on artificial intelligence, and the corporate sponsors of these technologies are typically happy to be associated with successful and high-profile places in their pilot schemes (McKinsey, 2017; 2021). The result is that many prosperous cities and regions are both less exposed to climate change mitigation technologies and strategies and also better placed to take advantage of the new technological opportunities associated with a green agenda.

This reality means that entrepreneurial and innovation incentives related to climate change mitigation are systematically skewed in favour of already more prosperous places and against many economically weaker places, and there are two interrelated elements to this. In business and commercial terms, the very firms and sectors for which their technological and behavioural changes are most needed for the overall success of the climate change mitigation agenda are typically more disincentivised from doing so, than firms in more prosperous places. At the same time, the intertwined social and economic fabric of a place means that whole communities also feel threatened by these potential changes, and this builds political resistance to change. In a sense, the tensions and debates regarding how to move forward on climate change mitigation that are taking place locally and regionally within advanced countries are something of a mirror image of what is taking place between developed and developing countries. Developing countries are often the most exposed to climate change risks and also heavy contributors to carbon emissions. At the same time, they are also most at risk from the required technological changes and also less able to pay for such adaptations, so there is an incentive misalignment. A similar pattern emerges in advanced economies, but instead the differences are across regions and localities.

Across the EU, North America and the UK, this is a major problem, because it means that the incentives for driving forward climate change mitigation strategies are not only misaligned economically and geographically, but also socially and politically. In already prosperous and economically dynamic regions, the incentives for entrepreneurial and innovation-related cooperation and engagement activities are very clear, and indeed, many such cities are already working on these types of policy schema aimed at tackling climate locally with innovative technological and governance arrangements (McKinsey, 2017; 2021). In contrast, in economically weaker regions there is often strong political resistance to change, and the incentives for institutional cooperation tend to point away from those same regions which require the most adaptation.

In terms of industrial policy, part of the solution to this geographical and institutional misalignment of incentives for climate change mitigation is to link the Green Deal actions directly to smart specialisation agenda (McCann and Soete, 2020); in other words, to link regionally decentralised industrial policy to the climate change agenda. The fundamental logic here for doing this has two key aspects to it.

The first aspect is that entrepreneurial and innovation-led responses to the climate change agenda are going to be essential if the agenda is to work. Entrepreneurs on mass working in numerous different sectors, technologies and locations are going to have to develop to a plethora of radically new products, processes, systems and organisations required to generate the innovation breakthroughs which are essential to drive effective climate change mitigation responses. Smart specialisation is the

very type of decentralised industrial policy implementable in all places which suits this simultaneously both all-inclusive and yet also highly heterogeneous agenda. Yet, as it is currently framed, the RIS3 agenda still needs to be re-purposed to underpin the Green Deal, and in order to do this it is important to understand the industrial policy context in which smart specialisation was originally forged.

Smart specialisation, or to give it its full policy title Research and Innovation Strategies for Smart Specialisation, is more typically known colloquially as RIS3 or S3, and originally emerged in the post-2008 crisis period, during which there was a great deal of re-thinking about the nature and role of economic growth and development processes. In particular, as well as encouraging strong growth, there was now also a greater emphasis on fostering growth which was both sustainable and inclusive. Indeed, the OECD growth agenda was about fostering ‘stronger, cleaner and fairer growth’, while that of the European Union Europe2020 Agenda was about fostering ‘smart, sustainable and inclusive’ growth. These policy framing remits explicitly encouraged policy makers, entrepreneurs and innovators to think more broadly and holistically when looking forward, and to seek to build complementarities between these different dimensions. However, the actual experience of the EU RIS3 agenda was somewhat different, in that many stakeholders treated the tripartite elements of ‘smart sustainable and inclusive’ as being, in effect, a menu of alternative policy options. Many regions developed locally-based RIS3 industrial policies which focussed almost entirely on the ‘smart’ dimension, with little if any real emphasis on either the ‘inclusive’ or the ‘sustainable’ dimensions of growth and development. The latter two dimensions tend to be longer term and slower in development, whereas the former smart dimensions can often be acted upon relatively quicker. Moreover, the ‘smart’ dimension of growth policy tends to lend itself more naturally and readily to the branding and marketing of a place as a knowledge-intensive economy, and thereby as more attractive for subsequent private sector investments, while links between the inclusive and sustainable dimensions of growth and development and the future attractiveness of a place for further investments are rather more amorphous.

In order for smart specialisation to effectively drive the green agenda it is therefore essential to import some clear mission-oriented directionality to the policy logic, in order that the policy does not continue to be treated as a tripartite menu of options. This can be done by redefining the current RIS3 or S3 industrial policy agenda away from simply a smart, sustainable and inclusive menu of options, to one which has a very clear directionality, which is smart *for* sustainable and smart *for* inclusive growth, or in terms of acronyms, to shift from S3 to S4+. The emphasis here is on smart entrepreneurial and innovation-led actions which are explicitly *for* driving sustainable growth and inclusive growth (McCann and Soete, 2020). In other words, entrepreneurial or innovation-led actions which are not designed explicitly for fostering sustainable and inclusive growth, should not be eligible for EU policy

funding or support. By introducing this type of top-down mission-oriented directionality to the decentralised and largely bottom-up regional industrial policy set-up, it is possible to explicitly link the top-down and centrally-orchestrated Green Deal agenda with the largely decentralised and place-based industrial policy agenda. This encourages local ownership or European-wide efforts to tackle climate change, while also spurring the essential technological changes required to make this happen.

Importantly, this approach also helps to address the problem of geographically misaligned incentives, because smart specialisation is inherently aimed at fostering development in economically weaker places. Given the fact that smart specialisation is a key feature of EU regional policy, it is also therefore explicitly aimed at helping economically weaker places to further develop their local economies. The last decade or so has already seen the establishment and mainstreaming of a well-developed institutional support scheme, the RIS3 Platform² hosted by the EU Joint Research Centre in Seville, which facilitates exactly the type of institutional learning generated by shared experiences, data building and policy monitoring across European regions. Innovative approaches to policy and governance are by definition, rather experimental in nature, and as such require monitoring and evaluation against explicit agreed criteria in order to evaluate their effectiveness. The knowledge and policy transfer lessons arising from the pan-EU sharing of experiences, activities, data and evidence, helps economically and also institutionally weaker localities to improve their entrepreneurial ecosystems (Szerb et al., 2020), and subsequently their overall innovation trajectories. Therefore, by linking the EU Green Deal programme directly to the S4+ smart specialisation agenda, it allows for an explicitly green industrial policy with clear mission-oriented directionality which also prioritises the localities where the challenges of climate change adaptation are relatively greater. As such, industrial policy and regional policy can help to overcome the problem of geographically misaligned incentives in the race to address climate change.

5. PUBLIC PROCUREMENT FOR INNOVATION

Another aspect of industrial policy which has generated increasing interest over recent years is that of public procurement. Interest in the role of government demand in industrial innovation and technological change started in the 70s, but it gained particular attention at the beginning of the 2000s onwards (OECD, 2000; 2011) because of the development of EU and Member States policy on procurement and pre-commercial procurement (European Commission, 2007), along with the Small Business Act for Europe (European Commission, 2008). These were also complemented by a ruling by the European Court of Justice that wider social criteria can be applied to public procurement contractual choices, such as fighting unemployment.

2. <https://s3platform.jrc.ec.europa.eu/>

These wider social criteria can be used when assessing the most economically advantageous tender if they are relevant to the contract and do not violate the principle of non-discrimination among EU member states. Given this wider societal setting, as with both the smart specialisation and climate change mitigation agendas, public procurement policies can be marshalled in order to provide demand-side policy initiatives aimed at spurring innovation in a manner which is also consistent with both top-down mission-oriented approaches while also connecting local and national industrial policy dimensions.

The managing of markets for competitiveness has become an important issue in recent decades (Caldwell et al., 2005), and public sector procurement mechanisms and agencies have been instrumental in influencing the development of competitive markets in many countries. Edquist et al. (2015) describe public procurement for innovation (PPI) as "a demand-side innovation policy instrument in the form of an order, placed by a public organisation, for a new or improved product to fulfil its particular needs". Across the OECD countries, public procurement has been critical in driving innovation in fields such as defence, health, aerospace, semiconductors, computers and software, but often these procurement policies were justified under the headings of national security or health, rather than an explicit industrial economic policy. However, amounting to between nine percent and 25 percent of GDP for OECD member countries (OECD, 2000; OECD 2011), public sector purchasing power dwarves many of the more limited funds available for traditional industrial, entrepreneurship and small business policy tools (Storey, 2003).

To some extent, the growing importance of demand-side innovation policies can be seen as a reflection of policy makers' and analysts' increasing dissatisfaction with supply-side innovation policies either in terms of spurring innovation or in terms of ensuring public expenditure cost efficiencies (Edler and Georghiou, 2007). The limitations of purely supply side policies relate to issues such as market failures, information asymmetries, a lack of technological diffusion and a lack of incentives for further R&D (Chicot and Matt, 2018; Edler and Georghiou, 2007). The majority of the empirical works on this topic have found broadly positive effects of the use of public procurement for innovation (Kundu et al., 2020). At the same time, the appropriateness and effectiveness of public procurement for innovation (PPI) also depends crucially on the existing innovation base and the nature of the PPI systems which are already in place (Edler and Georghiou, 2007).

On this point, given that the fostering of productive entrepreneurship is seen to be central to many recent approaches to industrial policy (Szerb et al., 2020), linking public procurement to SMEs would also appear to be a priority. Otherwise, there is a danger that procurement policies for innovation end up favouring large companies and unwittingly further entrench monopoly and monopsony positions. In contrast, SMEs are critical for economic growth and employment as well as enhanced social

inclusion (Audrestch, 2004; Thurik et al., 2008; Smallbone et al., 2010) through a contribution to regenerating urban areas (OECD, 2005) or addressing sustainability (Cohen and Winn, 2007). Although examples of procurement-induced entrepreneurship exist, the current direct or indirect assistance programmes to SMEs are largely supply-driven, particularly at the sub-national level (Edler and Georghiou, 2007; Preuss, 2011). Therefore, as we have already seen with smart specialisation, there has been a growing interest in the ways that more active government policies might be able to promote and enhance the scale and quality of entrepreneurship and SMEs and well-designed public procurement systems may offer an enhanced role for industrial policy in driving widespread innovation (Minniti, 2008; Szerb et al., 2020; Ortega-Argilés, 2021).

The use of public procurement for innovation as a modern form of industrial policy is, however, not without its risks. In many cases, public sector markets are often seen as uncompetitive in that they do not display many of the expected competitive features of efficient markets. In many settings, public procurement will also have to manage multiple stakeholder objectives that may be contradictory and varying over time and may even be incompatible with the achievement of public value for money (Erridge and Nondi, 1994). As such, the legacy effects of public sector contracts mean that today public procurement processes tend to take an arm's length approach to policies.

In terms of the good design principles for PPI, a demand-side approach to entrepreneurship and SME policy can therefore be classified as being based variously on: the regulations, which provide the legal authority for the policy; the market forces which drive the need for public procurement; or the stakeholder collaborative relationships and the network social capital which facilitate the processes (Preuss, 2011). However, the main barriers to overcome in order to facilitate the engagement of SMEs in these public procurement processes relate to issues around bureaucracy, increasing reporting and compliance requirements. In order to break through these barriers the kinds of policy actions which facilitate PPI are: creating a database of potential local suppliers and creating online guides to selling to the local authority, and these activities need to be specially tailored to the SME community (Preuss, 2011). These systems can also be tailored to address specifically local issues, via the use of different policy instruments such as the setting of targets or annual reporting for expenditures with local firms, the inclusion in contract award criteria of broader local community benefits, or the calculations of local multiplier effects (Preuss, 2011).

As with both smart specialisation and the climate change mitigation discussions, the appropriate levels of decentralisation and devolution in industrial policy decision-making are also critically important. In terms of the participation of local governments in these PPI programmes, especially as it links to their local innovative SMEs, the need to be innovative in how these mechanisms are applied and used, also

depends on having the right procurement capacity and capabilities in place such as e-capability and e-procurement systems. Moreover, finding ways to ensure that the quality and timeliness of the goods and services provided remains consistent and is underpinned by innovation for the life of the contract, is often a major challenge, especially where multiple organisations are involved in both sides of the contract. In order to address these challenges, the implementation of coordinated consortia purchasing and framework agreements have been seen as the potential way forward as they allow the central negotiation of a contract whilst still permitting devolved users to manage their spending (Haselmayer, 2021). The governance arrangements of the industrial policy, and how these links to the different local contexts, therefore become critical.

6. INDUSTRIAL AND PLACE-BASED POLICY AMBIGUITIES

The previous sections have outlined the opportunities associated with modern industrial policies to help society adapt to global challenges. However, there are still some important ambiguities inherent in these ways of thinking, and the UK provides an example of some of these tensions.

In late 2017, and partly in response to the Brexit vote, the UK government under Prime Minister Theresa May launched its Industrial Strategy (HMG, 2017), and this was a centrepiece of government economic policy for almost three and a half years, until early 2021. It was also the first time that an advanced OECD country had explicitly launched a formal industrial strategy for several decades. The 2017 Industrial Strategy aimed to build on what it termed were the five "foundations" of the economy, namely³: ideas, people, infrastructure, business environment, and places. The intention of the industrial strategy was to mobilise and galvanise all parts of the economy in pursuit of improved long-run productivity, efficiency and effectiveness of the whole of the UK's industrial fabric. As well as the launching of a formal strategy, an Industrial Strategy Council was also launched, whose role it was to check-and-challenge the roll-out and effectiveness of the strategy when evaluated against different criteria. This Industrial Strategy Council was comprised of senior business leaders, academics and experienced policy decision-makers, and their role was to take both a holistic and also a detailed consideration of the progress of UK industrial policy as it developed.

One of the key features of the UK industrial strategy, as it was initially articulated, was a rather ambiguous and partial role for the place foundation. The other

3. <https://www.gov.uk/government/publications/industrial-strategy-the-foundations/industrial-strategy-the-5-foundations>

four elements were rather more clearly defined, albeit in a rather siloed manner, than the place dimension, which was something of an afterthought. At the time of its publication in late 2017, the "place" dimension of the Industrial Strategy only accounted for some ten percent of the whole strategy document, down from some 15 percent in the earlier draft Green Paper. The clear impression from the document was that the place dimension of the industrial strategy was the least developed of the five foundations, and sat rather awkwardly as an afterthought, behind the other more siloed but well-defined foundations. Indeed, after the 2017 publication of the document and the launching of the Industrial Strategy Council, many aspects of the "place" dimension continued to be left largely undefined and rather unspecific, and little of any concrete substance was added to these discussions subsequently. It may be the case that this lack of specificity of the role of place in the industrial strategy was somewhat intentional, so as to allow for the flexible development of different industrial policy governance geographies in different contexts. However, the actual result of this ambiguity was to generate uncertainty on the part of many stakeholders regarding what was being intended and who was responsible for what. In reality, the lack of specificity on the role of place in the industrial strategy was probably more related to a lack of clarity on the part of the UK government as to the level of centrality it wished to give the role of place in the industrial policy. Indeed, during the 2016–2019 May government, this lack of clarity regarding the role of place was accentuated due to the fact that many of the regional issues embodied in the theme of place, including regional 'rebalancing', had largely gone off the political agenda, given that the government was almost entirely absorbed in trying to negotiate and deliver Brexit (Billing et al., 2019).

Since the formation of Boris Johnson's government in 2019, however, the political landscape in the UK has shifted dramatically, as has the previously rather under-developed theme of 'place' in government economic policy thinking. Within the UK, the 'Levelling Up' agenda has now moved to centre-stage in political narratives and debates, and this Levelling Up agenda itself was inherently forged by the Brexit process (McCann and Ortega-Argilés, 2021a). The enormous regional inequalities within the UK have become a core political and economic issue, and the Johnson government has prioritised addressing these social and economic imbalances as a cornerstone of its government policy. In effect, the recent shifts in UK government thinking mean that the role played by the 'place' foundation in the previous UK Industrial Strategy has arguably now taken on a prominence that was not evident in the Industrial Strategy when it was originally published. Indeed, in early 2021 the Johnson government abolished the Industrial Strategy and replaced it with a Plan for Growth (HMT, 2021) and an associated Innovation Strategy (BEIS, 2021) and a forthcoming 'Levelling Up' White Paper. In the 2021 Plan for Growth, 'place' is seen as a cross-cutting theme which interacts with the three pillars of 'skills, innovation and infrastructure', and as such, is given a much more prominent role in industrial

policy thinking than was previously the case with the 2017 Industrial Strategy. This is intentional in current UK industrial policy thinking, in which place is now seen as being a critical dimension which ties together all of the other dimensions of industrial policy.

7. CONCLUSIONS

A final issue which we have not directly touched upon is that of the Covid-19 pandemic. One of the most important implications of the Covid-19 crisis is that there are likely to be major medium and long-term shocks to the economic fabric of many countries, shocks which are likely to be more severe in the weaker parts of the economy (McCann and Ortega-Argilés, 2021b). This in turn is likely to amplify the importance of place-based ways of thinking in post-pandemic industrial policies, and also the role which directionality and mission-oriented strategies mediated via public procurement for innovation play. Each of these US, UK or European examples outlined above regarding technology, environment, public procurement and the role of place in industrial policy, all point to the fact that geography and regions are now becoming more important than ever in addressing industrial policy challenges and that government may have a critical role in fostering further innovations in critical arenas. The role of industrial policy in fostering entrepreneurship and innovation-led activities in a range of different places is now very much back on the agenda in many different countries, as is the wider role which "place" plays in shaping industrial policy. These key debates relate to the ways in which industrial policy of different forms can offer opportunities for new and better-tailored approaches to fostering entrepreneurship and innovation in different places and in the service of addressing wider societal goals.

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CHAPTER 4

INDUSTRIAL TAX SUBSIDIES: EFFECTIVENESS AND MAGNITUDE

ÅSA HANSSON

1. INTRODUCTION

Policy-makers worldwide are concerned about welfare and economic growth and thus economic policies that stimulate and enhance economic performance. Designing actual policies that promote economic growth in practice is difficult. John Williamson (1989) recommended ten policies that have become popular among market-oriented economists as means to improve economic performance (known as the Washington Consensus). In regard to taxation, a broad tax base is recommended, implying that exemptions and loopholes should be removed. Furthermore, public sector investment should be focused on education, health, and infrastructure.

Despite this, governments try to encourage certain activities and industries that fall outside of this scope. They do this in different ways. A common and perhaps more transparent approach is to do this on the public cost side by granting direct subsidies. Increasingly, governments are supporting industries or activities on the public income side by lowering the tax bill. Theoretically, the way in which and to whom the benefit is granted are irrelevant, and the effect is the same. This chapter focuses on the latter approach, that is, where certain industrial activities are encouraged by providing tax relief. Providing relief on the tax side can be done in many ways and is sometimes called tax expenditure (defined as deviations from the baseline tax system (OECD, 2003)). The economic impact of tax expenditures is the same as that of government expenditures but technically involves a reduction in tax revenues rather than an increase in government expenditures.

There is a long history of industry support from the government in the form of direct state ownership, direct subsidies or tax breaks but also through tariffs and other

trade policy-related instruments (Grabbas and Nutzenadel, 2014). In the postwar era, the aim with these methods was mainly to shield and protect domestic incumbent industries from international competition and protect strong national interests. During this period, the steel and shipyard industry and defense-related industries were typically protected. In recent decades, most countries have embraced competition and free trade and have prioritized the promotion of high-tech growth sectors, small and medium-sized enterprises, and research and development.

Tax relief can be intended, for example, by providing tax incentives for R&D, or unintended but nevertheless effectively giving support to certain types of industries. Most tax systems allow for interest deductions on loans but no allowance for the cost of equity. As a result, debt is tax preferred over equity, and consequently, firms that can borrow face lower costs than firms that cannot borrow and are effectively tax preferred.¹ In addition, energy-intensive industries obtain tax relief on energy taxes, while labor-intense industries lack similar tax-preferred treatment.

To help the economy transform into a more digital and environmentally friendly economy, the government may again have to take on a larger role to smoothly facilitate this transformation. For instance, new infrastructure may be needed and may require some government involvement to be coordinated and provided. Scholars such as Rodrik (2014), Aiginger (2014), Aiginger and Rodrik (2020), and Warwick (2013) advocate for industry policies to make systematic changes for environmental and social goals. Once in place, a system change can be seen as a public good with considerable positive externalities motivating government involvement. Public involvement in providing infrastructure is in line with the Washington Consensus. The question is how this support should be given and whether it can be designed in an efficient way.

This chapter discusses arguments for and against public support on the tax side. It also reviews tax incentives offered in Sweden by studying their magnitude and motivations. The chapter ends with suggestions on how the general tax system can be improved and what tax incentives should focus on.

2. REASONS TO PROVIDE TAX INCENTIVES FOR INDUSTRY SUPPORT

There are several reasons why the government may want to encourage certain industries or activities. A major line of argument stems from efficiency concerns. A common motivation is to encourage activities associated with positive externalities

1. Whether paying less in taxes is a form of tax relief or not can be debated and boils down to the underlying view of whether the return belongs to the government or to the individual.

or with spillover effects; that is, the social value of an activity is greater than its private value, and thus, the private amount provided is lower than the efficient amount. Subsidizing these activities either directly or through lower taxes increases the amount and brings it closer to the socially efficient amount. Subsidizing R&D, education, and entrepreneurship is commonly motivated by this positive externality argument. Similarly, tax reductions can be motivated to foster a shift away from production and consumption associated with negative externalities and to steer the economy toward a greener and digital economy. For instance, it is common to give tax relief for electric cars and bikes, solar cells, and the use of green energy. These activities are not in themselves providing positive externalities but rather reduce the production and consumption of activities that are close substitutes and give rise to negative externalities.

The efficiency argument can also be used to motivate certain subsidies as a second-best solution; that is, if the economy is already distorted, for instance, by high tax wedges or other aspects of the tax system, tax relief for these activities can increase overall efficiency. High marginal tax rates on labor income encourage individuals to perform household services, such as cleaning, painting, minor repairs, and gardening, either by themselves or by paying for undeclared work rather than buying the services on the market. Lowering the market price, by providing tax relief, reduces the incentive to do something oneself or to turn to the black market, causing the negative aspects of high marginal tax rates to diminish. Tax relief for certain activities such as household production "RUT" or repair and construction "ROT" and lower taxes on foreign experts are typically motivated by this efficiency argument. As preexisting distortions are caused by high marginal tax rates, the first-best solution would be to reduce the marginal tax rates. If this is not an option, a second-best solution can involve lowering taxes on activities for which distortions are particularly large. However, by doing this, one deviates from a simple broad-based tax system and creates room for rent-seeking behavior and a risk of entering a slippery slope with increasingly more tax reductions being offered.

Tax incentives or tax expenditures can also be motivated by competition aspects. It has become increasingly popular to provide tax incentives for R&D. In 2019, 30 of 36 OECD countries used some form of preferred tax treatment for R&D. Several countries in Europe have patent boxes that tax profits from patents at substantially lower tax rates than other corporate profits. In 2014, Sweden introduced tax incentives giving relief on social security fees for employees working in R&D. If some countries give these reliefs and others do not, countries that do not provide them may lose R&D activities to countries that provide incentives. This forces other countries to follow suit to not lose competitiveness. It can be rational for individual countries to provide tax incentives beyond the positive externality argument to gain competitive advantages over other countries, but overall, this tax competition erodes the tax bases and is considered to be a zero-sum game.

Another source of motivation for tax incentives is equity. The cost of the production or consumption of certain activities can be lowered to encourage the consumption of certain goods and services based on equity. Examples of these include lower VAT on food and transportation, or regional deductions on social security fees, and subsidized housing. However, it is generally not efficient to change the prices of goods and services to redistribute resources. Instead, it is considered more efficient to give direct income support to those in need rather than distorting prices, as this also benefits those not in need.

Currently, there is a discussion of how to transform the economy into a more sustainable green and digital economy and whether this requires systemic change. Many scholars do not believe that the market will handle this system change on its own and that coordination, government involvement, and subsidies are needed. Rodrik (2014) argues that for the transition to a greener economy, there are additional arguments in favor of tax relief for industrial support above the positive externality or spillover argument mentioned above. An additional argument is based on the second-best solution and the fact that CO₂ omission is mispriced, and consequently, the social cost exceeds the private cost. Subsidizing innovations or technology that reduce CO₂ omission hence reduces this externality and increases efficiency. The first-best solution is to price CO₂ omission correctly, but as international policy-makers seem to fail at this, subsidizing innovations and technology for a green industry could be a second-best solution. The second additional argument is based on the competition argument, but instead of being rational only for the first mover and a zero-sum game, the global nature of the climate crisis makes it rational to subsidize national green industries, as there are spillover effects for the rest of the world. Given these additional arguments for supporting green industries, Rodrik (2014) concludes that it should not be a matter of whether nations *should* subsidize and conduct green industrial policies but rather of *how* they should be designed.

3. ARGUMENTS AGAINST TAX INCENTIVES AND INDUSTRY SUPPORT

Economists, in general, argue against providing tax incentives and industrial policies for specific industries. There are two main arguments for this. The first is that the government cannot pick winners and does not know what industries or projects that will be successful. If anything, it is often argued that the government is worse at picking winners than the private market, as the government has an informational disadvantage. By selecting industries or projects for government support, competition can be distorted and industries may be forced to use inappropriate technology. The subsidies risk protecting industries and technologies that should not be protected, which can have long-term negative consequences. There are plenty of anecdotal examples of governments supporting costly projects or industries that have been

unsuccessful. In Sweden, the channel Göta Kanal, a costly project that was replaced by a more efficient means of transportation, namely, railways, and support for the shipyard industry are often mentioned as unsuccessful projects (for further details, see Sandström's chapter). There is also a tendency for government-financed projects to become more costly than initially budgeted (Davidsson and Hansson, 2019; Flyvbjerg et al., 2009).

The second strong argument against government subsidies is that they can create rent-seeking behavior and lead to lobbying and wasteful behavior both to qualify for subsidies and to increase the amount received. If some industries or activities are granted support, industries and activities in nearby areas will lobby to also qualify for support. Providing tax relief for certain costs or activities gives strong incentives for firms to try to reclassify activities to classify for tax relief. For instance, giving tax relief for R&D expenditures is likely to increase R&D expenditures by reclassifying expenditures rather than increasing productive R&D expenditures. In regard to subsidizing the transition to a greener economy, there is an obvious risk of greenwashing and substantial rent-seeking behavior to qualify for "being green".²

In addition, the general problems with all public involvement, the principal-agent problems between taxpayers and politicians, arise here as well, both in regard to the level of support and the design of such support. Politicians are handling taxpayers' money and should act in the interest of taxpayers, but for taxpayers, it is difficult to monitor what politicians do, and it may not be rational for them to monitor all public actions. Politicians may have incentives to react and show strength rather than do the right thing. There is a risk of policy-makers taking actions to show their political strength by applying policies that signal action rather than measures that are efficient. Policy-makers also tend to overestimate the ability to fine tune tax policies and underestimate incentives to misuse and abuse tax incentives (Miller, 2019).

It is also well established and along the lines of the Washington Consensus that a tax system that uses a broad tax base with lower tax rates is more efficient than a tax system with higher tax rates on smaller bases, presenting an additional argument for minimizing tax incentives. For these reasons, uniformity is often recommended as the desirable feature of a tax system in the absence of large externalities. Even when large externalities may theoretically motivate tax incentives, the problem lies in designing effective incentives.

2. An EU initiative screening websites found that in 42 percent of cases claims were exaggerated, false, or deceptive (EU, 2020) https://ec.europa.eu/info/live-work-travel-eu/consumer-rights-and-complaints/enforcement-consumer-protection/sweeps_en#2020-sweep-on-misleading-sustainability-claims.

4. DESIGN ISSUES – HOW TO DESIGN TAX INCENTIVES SO THE BENEFITS OUTWEIGH THE COSTS

Tax incentives can be designed in many ways and give relief for different taxes and at different stages of a firm's life cycle. How such incentives are designed impacts what effect they have and ultimately how efficient they are.

Ideally, tax incentives should close the gap between the social return to an investment or activity and the private return. If the gap is zero, the efficient level of investment is reached without support; hence, there is no need for government support, and providing it is a waste of public resources. The closing-the-gap argument argues for targeted and differentiated support for different firms depending on the size of the gap. However, general support is generally preferred, as it comes with lower administration costs (less information is also required) and does not encourage strategic behavior in the same way as specific and targeted support. Hence, there is a trade-off between broad support that does not distort behavior but with the downside of being more costly and inefficient and targeted support that is less expensive but in practice more difficult to design and administer.

To try to minimize government costs and ensure that investments that would have taken place regardless receive support, the support can be incremental rather than volume based. Many incentives are based on the volume of expenditures, e.g., R&D, and not on the increased volume of R&D. Volume-based incentives may not be efficient in generating additional investment but instead finance already existing investments at a high public cost. An incremental-based incentive, on the other hand, only grants relief when investments or expenditures are increased and therefore only subsidizes additional activities. This method is less costly but can lead to strategic behavior as timing becomes important. To qualify, this year's level is often compared to last year's level or an average over several years and can thus affect the timing of investments. For symmetry, declining investment or expenditures should result in negative tax relief that can be deducted against future tax relief. The downside of incremental-based incentives is that the rules for qualification may be complex and lead to strategic behavior in regard to, for instance, the timing of investments.

Along the same reasoning, supporting already existing R&D may be less efficient than targeting R&D projects by new firms (Veugelers, 2016). Stimulating more R&D spending in already existing firms is likely to have lower marginal returns, as they likely will do more of the same with diminishing returns compared to the returns of R&D spending in new firms.

Another issue concerns whether support should be granted on the cost or income side. The incentive could either be linked to firms' costs or to their income. It is common for investment expenditures for socially desirable goals, such as R&D, to

be more generously deductible against corporate taxes than other investment costs. The problem with this is that it provides incentives to reclassify costs to increase the deduction value. For instance, Swedish R&D support that grants relief for R&D employees creates incentives for firms to define employees as R&D personnel. The incentive can also be granted on the income side. Recently, several countries have implemented patent boxes where revenues from innovations and patents are taxed at lower rates than other revenues. One advantage of this design is that it only rewards successful R&D investments. On the other hand, the approach rewards R&D that has already taken place rather than new R&D and can be expensive in terms of lost revenues. Moreover, the method can lead to increased tax competition, as revenues from patents and innovations are mobile tax bases. This will alter where patents are located rather than increase the volume of patents and innovations.³

The last issue to resolve regarding tax incentive design concerns when to grant support. For a newly started innovative firm, it may take many years before the firm makes a profit, and a tax break in the form of less tax on profits may never be used if the firm goes bankrupt beforehand. Tax relief on tax that is paid regardless of whether the firm makes a profit may therefore be of more use for that firm. For this reason, the R&D tax incentive in Sweden is designed to give tax relief for social security fees rather than for profit (which is the case for patent boxes). On the other hand, supporting firms early on will likely be more costly and assist firms that will not become successful. To give relief on profits guarantees that only firms with profits benefit, but then it could be argued that the relief is less needed.

To conclude, the design likely effects how efficient tax incentives are. There is a trade-off between well-targeted and cost-effective support and the complexity and behavioral and administration costs this gives rise to compared to more general tax incentives. In general, it is difficult to design effective support even when support is theoretically motivated. Supporting new and incremental R&D spending is likely to be more cost efficient than general R&D support.

5. EVALUATING TAX INCENTIVES - HOW EFFECTIVE ARE THEY?

Even if there may be reasons for tax incentives, they can be hard to design in an efficient way. An additional problem is that it is far from obvious how tax incentives should be evaluated or even measured. Theoretically, tax incentives are motivated if they close the gap between social and private benefits. A more pragmatic test is to

3. Existing research tends to find patent boxes inefficient in creating new patents and activities that give rise to positive externalities but instead effective in attracting profits and in leading to increased tax competition (Alstadsaeter et al., 2018; Griffith et al., 2010).

determine if total benefits exceed total costs. Unfortunately, it is difficult to evaluate both the benefits and costs of tax incentives.

To evaluate tax incentives, it may be useful to first ask whether there is a good reason to change the market outcome. That is, is there a market failure that needs to be corrected? Typically, as already mentioned, externalities or spillover effects are used to motivate tax incentives. Ideally, the government should only subsidize activities or projects for which social value exceeds private value. Projects for which private returns are sufficient to cover costs should not be subsidized, as such projects will be undertaken without help and are a waste of government resources. Hence, the most cost-efficient approach would be to identify projects for which the social but not the private benefits exceed the social cost and then help finance them. This requires the government, or other agencies, to evaluate projects and identify those for which the difference between private and social returns is the greatest and help fund these but not others. However, there is no guarantee that the government is better at evaluating projects than the market. In contrast, the market is often thought to do a better job at valuing returns to investment projects than the government.

The second question concerns whether taxation is the right tool to use to incentivize. There are other ways to change or affect the market outcome. For example, regulations, bans or information campaigns can be used to change behavior or more direct subsidies on the expenditure side. Tax incentives are good measures to use when prices should be altered, e.g., with externalities. The problem lies in finding the right amount, which should equal the gap between social and private benefits. An additional advantage with tax incentives is that they are handled by the Treasury, which seems to be less exposed and vulnerable to pressure from lobby groups and hence keep incentives at lower costs than when support is given in the form of subsidies and handled by other government agencies (Dharmapala, 1999).

A third question concerns whether tax incentives can be designed such that the benefits outweigh the costs. The answer to questions one and two can be yes, but the actual design of the tax incentive can create inefficiencies.

Even if this framework for evaluating tax incentives is a good starting point, many issues remain. Determining who benefits from tax incentives is not straightforward. The individuals or industries that formally receive tax breaks do not necessarily benefit from them. For instance, lower social security fees may encourage employers to hire more workers to reduce unemployment, but the effect can be higher wages for existing employees and no effect on employment. This means that instead of helping individuals find jobs, existing employees may benefit. Who benefits from tax incentives depends on how prices are influenced by tax incentives. If lower social security fees lead to lower wages, then employment may rise, but if such fees increase wages, there is no effect on employment. Who benefits depends on bargaining strength. In

Sweden, it has typically been assumed that unions have strong bargaining power and that a decrease in social security fees results in higher wages. However, more recently, this result has come to be questioned and modified (Saez et al., 2019; Daunfeldt et al., 2021).

The costs of tax expenditures may be even more difficult to determine, as they are more spread out across the economy. Of course, the taxpayers that must make up for lost tax revenues lose. Reducing taxes is generally politically easier than increasing them, even though those that must cover for the lost tax revenues lose. Other losers include agents in competing or close industries that do not receive tax relief and, hence, face a comparative disadvantage. Society as a whole loses from rent-seeking behavior and distorted competition.

Efficiency may not be the only aspect to take into consideration; if equity reason is the motivation for the tax incentive, then the effect on equity and overall welfare must also be considered. However, as already mentioned, equity issues should preferably be dealt with in other ways than by providing tax incentives.

Rodrik (2014) argues that it is unfair to evaluate tax incentives or industrial policies individually and that they instead should be evaluated as a portfolio of industrial policies. The government cannot select individual projects just as most investors cannot select individual stocks; rather than evaluating individual projects or stocks, a portfolio of projects or stocks should be evaluated. Another issue that needs to be resolved is determining the reference point or counterfactual to compare with. Is it optimality, that is if the government a priori only selects the best projects, or should the comparison be having done nothing? Perhaps the latter is more reasonable.

Due to such caveats, there is a lack of empirical research that evaluates industrial policies and tax incentives. Ideally, it is desirable to measure whether the tax incentive closes the gap between the social and private return to an investment. It is difficult to do this, so most evaluations instead focus on how the incentive affects the volume of expenditure and compare this to the cost of the incentive, that is, the “bang for the buck” or cost effectiveness ratio measured, for instance, as the increase in R&D generated by the tax incentive divided by the net tax revenue loss due to the incentive. A value over one indicates that the incentive generates more R&D than it costs.⁴ Existing studies tend to give mixed results and are not able to prove incentives efficient (Hall and van Reenen, 2000).

4. It is difficult to determine whether the increase in R&D actually is caused by incentives. To address this, it is common to compare changes in R&D activities of firms that receive incentives to those that do not.

Hansson et al. (2018) study a number of different tax incentives across several OECD countries and find that they are generally ineffective. Instead, the general corporate tax rate and policy and tax certainty seem to have a positive effect on investment. Ideally, we want to estimate the long-run macrolevel effects of tax incentives. Unfortunately, few models estimate the overall macrolevel effect. Hanson and Brokelind (2014) examine the effect of R&D incentives on a more aggregate level and study how incentives affect the number of patents, investment, and economic growth. There seems to be a positive correlation between R&D incentives and the level of investment but not between incentives and the number of patents or economic growth, suggesting that the incentives boost the volume of investment but not other, perhaps more desirable, measures.

Several researchers have focused on the design of tax incentives. Hall and Van Reenen (2000) and Lokshin and Mohnen (2010) evaluate the difference between volume- and incremental-based incentives and find the dead-weight-loss value to be greater for volume-based incentives but that incremental-based incentives lead to strategic behavior and involve high administration costs. This result is consistent with Parsons and Phillips' (2007) meta-study of the US and Canada. The authors find that incremental-based incentives in the US are more cost efficient than volume-based incentives in Canada.

There is also research indicating that tax incentives for R&D geared toward small and start-up firms rather than toward larger and established firms are more efficient (Veugelers, 2016). This could be an indication of the gap between social and private returns being larger for small firms than for larger firms (Haegeland and Moen, 2007).

It could be that tax incentives do not solely have intended benefits. As already mentioned, part of the effect could be increased wages for those working in the industry receiving the benefit. Several papers find that there may be a spillover effect of tax incentives on higher wages. Goolsbee (1998) finds a positive and significant relationship between R&D spending and R&D wages, implying that conventional estimates of the effect of R&D policies are overestimated as the wage effect is neglected. Haegeland and Moen (2007) estimate that this effect could amount to as much as one-third of the tax relief in Norway. Note that higher wages for R&D employees are not necessarily a bad thing; higher wages will lead to an increased supply of researchers and a long-term increase in the economy's R&D capital.

In summary, existing evaluations provide no strong support for tax incentives being effective despite them being theoretically motivated. This could be due to problems with measuring the right outcome and methodological problems with estimating an effect. The design of incentives does seem to matter, however. Incremental-based

incentives seem to be more efficient than volume-based incentives, as do incentives geared toward small and new firms.

6. TAX INCENTIVES IN SWEDEN: HOW MUCH DO THEY AMOUNT TO AND WHAT MOTIVATES THEM?

Defining and measuring tax incentives or industry support given through the tax system is not straightforward. One way to define tax incentives is to count deviations from the norm of the tax system as tax incentives; deviations from the norm are typically called tax expenditures. In Sweden, the norm is considered a uniform tax system. Tax expenditures are measured as the reduction in tax revenues stemming from these deviations. Such expenditures are normally positive when revenues decline due to tax relief, but they can also be negative when taxes exceed the norm and increase tax revenues. Note that deviations in tax revenues are measured in a static manner; behavioral effects are excluded.

Table 1 presents some of the major tax expenditures in Sweden for 2020 divided into different tax bases (labor, capital, and consumption) measured as lost tax revenues in billions of SEK.⁵ Total tax revenues amounted to 2,123 billion SEK in 2020 (ESV, 2021), and the sum of tax expenditures was 343,6 billion SEK (Regeringen, 2020; ESV, 2021). This means that tax expenditures amount to substantial quantities, namely, 16,2 percent of total tax revenues in 2020.

TABLE 1. MAJOR TAX EXPENDITURES IN SWEDEN 2020 (IN BILLIONS OF SEK)

Labor income:	
Earned income tax credit ¹	126,8
Deductions for increased living expenses	0,78
Deductions for traveling to and from work	5,4
Lower tax for foreign experts	0,68
Tax favored fossil free cars	1,48
Tax favored free food	0,02
Sum labor income	135,2
Corporate capital income:	
Lower capital gains tax on corporate property	3,43
Higher property tax on premises, industries, and electricity production	-12,5
Sum corporate capital income	-9,05

5. Some tax expenditures are not measurable and therefore not reported. The sum is, hence, most likely an underestimation.

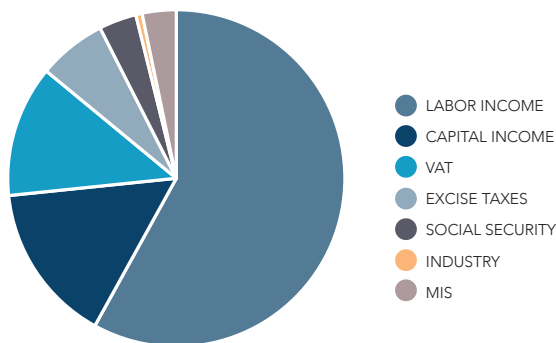
Individual capital income:	
Lower taxes on owner occupied housing	28
Lower capital gains tax on owner occupied housing	12,48
Lower taxes on small businesses	10,35
Lower tax rate on pension savings	3,09
Investment savings account (ISK)	31,94
Investor reduction	0,03
Sum individual capital income	87,6
Social security:	
Regional reduction	0,52
General reduction	1,71
Reduction for R&D employees	1,41
Reduction for the first hired employee	0,42
Reduction for young employees	0,77
Temporary reduction for young employees	8,74
Reduction for self-employed persons and employees over 65 years of age	7,01
Social security paid above benefit levels	-19,03
Sum social security:	1,55
VAT:	
Reduced rate - 6% (transport, media, etc.)	14,7
Reduced rate - 12% (food, restaurants, and hotels)	45,2
Sale of property exempt from taxation	2,31
Lottery	5,96
Medicine	2,98
Sum VAT	72,1
Excise taxes:	
Lower energy tax for transport and industry	37,2
Lower CO2 tax	0,19
Sum excise taxes	37,4
Miscellaneous:	
Reduction for sailors' income	0,05
Reduction for sickness payments	0,71
Reduction for house services	15,75
Limited property tax for retired persons	0,39
Reduction for microproduction for renewable energy	0,1
Reduction gifts to nonprofit activities	0,08
Reduction for installing green technology	0,2
Reduction for individuals living in some remote areas	1,35
Sum miscellaneous:	18,86
SUM ALL	343,6

*Note: The earned income tax credit is not counted as a tax expenditure according to the government.
Source: Regeringen (2020).*

The earned income tax credit (EITC) was one of the largest tax expenditures. However, the Swedish government does not consider the EITC to be a tax expenditure but rather part of the general design and norm of the tax system. It is not obvious what should count as the norm of the tax system and what a deviation from the norm of uniformity is. An argument for counting the EITC as a tax expenditure is that the EITC was not part of the 1990/91 tax reform, a reform that was founded on uniformity. Apart from the EITC, the largest tax expenditures in 2020 were deviations in individual capital income taxation and VAT. The reduced VAT rates gave rise to substantial tax expenditures, and the reduced six and twelve percent rates together amounted to a reduction in tax revenues of almost 60 billion SEK.

To understand how important tax expenditures are for different tax bases and industries, Figure 1 shows the distribution of tax expenditures by tax base. Tax expenditures specifically designed for industry are minor and hardly noticeable in the figure. Instead, labor taxation is the tax base that receives the most tax expenditures, followed by individual capital taxation and VAT. However, it is not obvious how to distribute the different tax expenditures based on the tax base that benefits from the tax expenditures. As mentioned above, a tax incentive does not necessarily benefit the agent or industry who is granted the benefit.

FIGURE 1. TAX EXPENDITURES FOR DIFFERENT TAX BASES, 2020



*Note: The earned income tax credit is included.
Source: Government of Sweden (2020).*

In regard to individual capital taxation, the investment savings account (ISK) - where a fictional return of the stock of capital is taxed at the general rate of 30 percent - is a major deviation from the norm of capital taxation. The reason for this is that the fictional return is low (based on the government borrowing rate, which is currently very low). In times when the stock market increases more than the government borrowing rate, returns on the investment savings account are taxed lower than if

the actual returns were taxed.⁶ In 2020, the investment savings account resulted in lower tax revenues, accounting for almost 32 billion SEK. Taxation of owner-occupied housing is another area with substantial deviations from the norm; the lower property fee together with the lower capital gains tax on owner-occupied housing amounted to a loss of 40 billion SEK in 2020. Tax incentives for small businesses "fåmansbolag", where dividends and capital gains are taxed at 20 and 25 percent instead of 30 percent, give rise to a static loss in tax revenues of ten billion SEK.

Another major tax expenditure is the lower energy tax in some industries (amounting to a static revenue loss of 37 billion SEK in 2020). Sweden has high energy taxes. The country also has a large energy-intensive industry that would be at a disadvantage competitively if faced with high energy taxes; hence, such taxes are reduced for these industries. There is also tax relief in the transport sector for the use of fossil free fuel. Another substantial tax expenditure is tax relief given to house services "ROT" and "RUT", amounting to nearly 15 billion SEK. Even if not designed to benefit certain industries or sectors, these tax expenditures impact industries and sectors in the economy.

Tax expenditures can also be negative, that is, when taxes are higher than the norm. Some of the larger negative tax expenditures in Sweden are social security fees taken out on income above the level that grants benefits (19 billion SEK in extra tax payments) and property tax on corporate premises and industries (twelve billion SEK in extra tax payments).

6.1 What motivates these tax expenditures?

As discussed above, there are different reasons to give tax relief or tax incentives. Many of the more substantial tax expenditures are motivated as a second-best solution and a consequence of generally high tax rates in Sweden. The EITC is motivated by high extensive marginal tax rates for individuals at the lower end of the distribution that disincentivize them to find jobs. The EITC reduces the extensive marginal tax rate and is a measure taken to increase work incentives at the lower end of the income distribution. Providing work incentives and combating the negative effects of high marginal tax rates also motivate lower social security fees for young employees.⁷ In addition, tax relief on house services "ROT" and "RUT" is motivated by high marginal tax rates on labor income that incentivize individuals to either use these services themselves or turn to the black market. However, it is unlikely that these tax expenditures solely benefit individuals and not industries. "ROT" is likely

6. When the stock market return is lower than the government borrowing rate, the tax on ISK will be higher than the tax on actual returns.

7. As mentioned above, the agent that actually benefits from lower social security fees is not clear.

to provide support for the building industry and “ROT” firms providing domestic services. As mentioned above, the best solution would be to reduce the high marginal tax rates and thus the need for these tax expenditures.

The lower rates on small businesses can be motivated by efficiency arguments, as small businesses’ and entrepreneurs’ capital incomes are mobile and create positive spillover effects. Such rates also compensate entrepreneurs for taking risks. Active owners take more risks than passive owners and need some compensation for this. The lower effective tax rate on the investment savings account is motivated by the fact that the general rate of 30 percent causes lock-in effects and makes it costly to change portfolio compositions.

Energy taxes were initially fiscal in nature but are increasingly being motivated on their merit to steer resources toward less energy use (Fi2020/04247). However, for this to happen, all energy should be taxed uniformly. It can also be questioned whether taxing energy is an efficient and well-targeted tax policy for reducing negative externalities. Energy and electricity taxes hit broadly regardless of the type of energy or source of electricity involved. Brännlund and Kriström (2020) argue that energy taxes should be removed and replaced with more targeted CO2 taxes when motivated and that remaining lost revenues from energy taxation should be obtained from a broader tax base such as VAT. Energy-related tax expenditures are partly designed to encourage the use of less harmful fuels than fossil fuels, which illustrates the problem of targeting energy broadly rather than focusing on externalities. Other major energy-related tax expenditures are motivated to not put Swedish energy-intensive industries at an international disadvantage due to comparatively high energy taxes in Sweden. For instance, industry and computer halls receive substantially lower taxes on electricity, 0,6 öre/kWh compared to the general rate of 35,6 öre/kWh. This benefits these industries by giving them a cost advantage and distorting competition. Tax expenditure is substantial and amounts to 14,5 billion SEK. If energy taxation is motivated on externality grounds, the tax should hit externalities. If energy taxes are fiscal in nature, they should be based on a broad tax base, and exemptions should be avoided. Providing tax relief for some industries is difficult to endorse and distorts competition.

Lower VAT rates are difficult to motivate on efficiency grounds, and even the redistributive argument can be questioned. It is argued that a 25 percent VAT on food consumption would disproportionately hurt low-income individuals. It is costly to redistribute by changing the relative price for food; a better approach is to give income support that can be targeted to the right group. Consumption is a broad tax base and therefore a relatively good tax base to tax.

It is also difficult to find arguments for lower tax rates on property; this cannot be promoted as a second-best solution or to stimulate behavior that creates positive spillover effects. In contrast, efficiency arguments motivate higher taxes on property. More likely, these tax expenditures are a result of successful lobbying and political aspects.

Tax expenditures that are clearly motivated by positive spillover effects are less common and of a lower magnitude in Sweden. In many countries, tax incentives for R&D are substantial. In 2014, lower social security fees for employees working in R&D were introduced (this tax expenditure amounted to 1,4 billion SEK in 2020). Another tax incentive introduced in 2013 is investor tax relief that provides a tax reduction to individuals investing in small and newly started firms. This tax expenditure is not measurable but probably of minor importance, as the tax incentive is not widely used. Other tax expenditures that can be motivated on the grounds of positive spillover effects are personal options offered to key workers in new firms and taxed as capital rather than labor. The cost in terms of lost tax revenues is not measured but is also likely to be relatively small. The reduced tax rates on capital gains and dividends for small entrepreneurs mentioned above can also be seen as a mean to encourage entrepreneurship and motivated by the potential positive spillover effects of entrepreneurship.

In sum, most of the tax expenditures in Sweden seem to be second-best solutions and a mean to deal with generally high marginal tax rates. Rough calculations based on the tax expenditures presented in Table 1 suggest that 53 percent are second-best solutions, and 39 percent are difficult to promote on efficiency grounds.⁸ More recently, a few tax incentives to stimulate R&D and entrepreneurship have been introduced, but these incentives are of minor magnitude (three percent).

6.2 Further issues to consider

Tax incentives take many forms, and they are not easy to measure or evaluate. Tax relief for certain industries can also be unintended and a consequence of the structure of the tax system but effectively resulting in certain types of firms or industries receiving preferred tax treatment. An example of this is the tax treatment of debt and equity. In the Swedish tax system, as well as in many other countries, financing an investment with debt allows interest payments to be deducted as a cost, reducing taxable profits and the tax bill. The same investment financed by equity does not result in deductible costs, and hence,

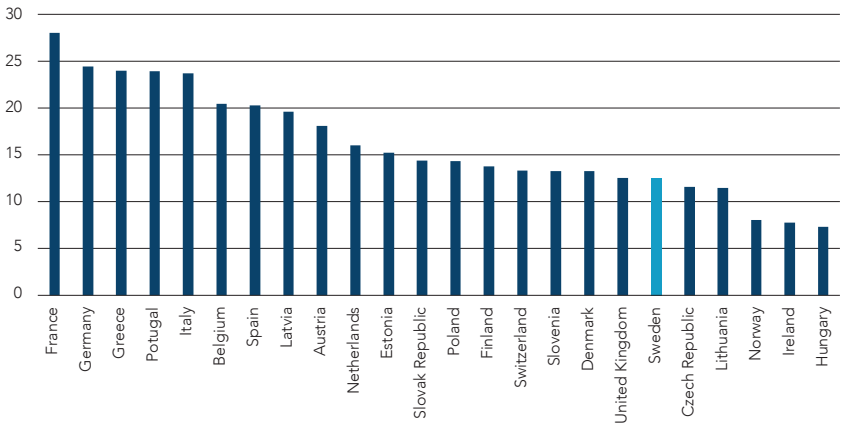
8. Tax expenditures that are considered to be of second-best-solution nature are, e.g., EITC, expert tax, tax relief for house services, lower taxes on energy, and lower social security fees. Tax expenditures that are hard to motivate on their efficiency merits are lower VAT-rates and lower taxes on property. Finally, small business and R&D incentives are considered to be motivated by their positive externalities.

the tax payment is higher than if the investment were financed with debt. Firms and industries that can borrow and finance their activities through debt are tax preferred over firms that cannot borrow. Consequently, as capital-intensive firms with property, other real capital assets or a history of being profitable have an easier time borrowing than new innovative start-up firms, they are tax preferred. There are not sound reasons to encourage firms to use debt rather than equity; if anything, the opposite.

Other features of the tax system similarly, but unintentionally, treat different firms and industries differently. For instance, loss offsetting rules require profits to be able to deduct losses against. This means that firms that never make a profit cannot use the loss-offsetting rules. Some industries are exempt from VAT. EU VAT directives exempt the financial and public sectors from VAT. Whether this is an advantage or disadvantage for a firm depends on firm-specific factors. On the one hand, being VAT exempt means that VAT on inputs cannot be deducted, which increases the cost of production for firms that use many inputs and which is a disadvantage for VAT-exempt industries. On the other hand, the consumer price is lower, as VAT is not incorporated, which favors VAT-exempt consumption over VAT-levied consumption and consequently benefits VAT-exempt industries. This also distorts competition and can be a disadvantage for industries and firms that pay VAT and produce the same or similar services as VAT-exempt firms.

Measuring all aspects of tax relief that the tax system provides the business sector is nearly impossible. One way to obtain an estimate is to compare the difference between how much tax revenues would have been obtained if all profits were taxed uniformly to the value of tax revenues that actually are collected. This was done by Hansson et al. (2018). The difference can be seen as a broad measure of deviations from uniformity. Table 2 presents numbers for this difference as a share of profit for several European countries for 2019. Note that all deviations are included, tax incentives as well as tax evasion and avoidance. The amounts of revenue lost due to deviations as a share of profit range from 28 percent in France to seven percent in Hungary. Sweden is on the lower end of the spectrum at 13 percent. This finding supports the notion that Sweden gives relatively little support to industries. Not surprisingly, deviations from the norm are highly correlated with the statutory tax rate. The higher the corporate statutory tax rate is, the higher the amount of tax relief is. Hungary and Ireland have the lowest statutory corporate tax rates, and France and Germany have the highest. Hungary and Ireland also have the lowest deviations, and France and Germany have the highest.

FIGURE 2. DEVIATIONS FROM THE UNIFORM CORPORATE TAXATION AS A SHARE OF PROFIT IN 2019



Source: Own calculations based on Eurostat (2021) and OECD (2021) data.

In summary, Sweden provides substantial tax incentives and tax expenditures, but rather than encouraging behavior with positive externalities, many of the tax expenditures are motivated as a second-best solution and a means to limit the negative effects of high marginal tax rates. The best solution would be to reduce the high marginal tax rates and consequently the need for tax expenditures. The design of the Swedish tax system with interest deductions, losses being offset against profits, and relatively high dividend taxation effectively gives tax-preferred treatment to established profit-earning firms over new start-ups.

7. CONCLUSIONS

It is common to provide preferential tax treatment for certain activities and industries, and there are several reasons to do so. The main theoretical motivation is that activities associated with positive spillover effects will be underprovided without government support. Another motivation is to mitigate the negative effects of existing distortions. For instance, the negative impact of high marginal tax rates on labor income can be lessened by tax relief for activities for which the negative aspects of high marginal tax rates are especially great as a second-best solution. However, second-best solutions are second best; the best approach is to take care of the underlying problem and reduce existing distortions when possible.

Despite the general norm of uniformity that has guided the Swedish tax system since the tax reform of 1990/91, there are substantial deviations from uniformity. The value of tax expenditures granted in 2020 summed to 343 billion SEK or 16

percent of total tax revenues. A major part of these tax expenditures is motivated as second-best solutions rather than by the promotion of activities with positive spillover effects. For instance, the harmful effects of generally high marginal tax rates on labor are partly mitigated by giving tax relief to foreign experts, the EITC, lower social security fees, and lower taxes on household services. Lower energy taxes for industry are also motivated by second-best solution arguments, that is to prevent Swedish energy-intensive industries from losing competitiveness.

Rough calculations of tax expenditures indicate that 53 percent of all tax expenditures are explained by second-best solutions, and 39 percent are deviations from the norm that are difficult to promote as providing positive externalities (e.g., lower property tax and differentiated VAT). Only three percent of total tax expenditures can be allocated to activities with clear positive externalities.

It is not easy to design tax deductions that are efficient even when they are theoretically motivated. In addition to the general design problems involved, there are also political-economy issues and a risk that politicians use tax incentives to mitigate problems rather than deal with the underlying sources of such problems. The cost of providing tax-preferred treatment is quite high. Apart from the cost of lost revenues, the design can spur behavioral responses and distort competition in addition to administration costs.

Together, there are strong arguments for uniform and neutral tax systems based on broad tax bases and low tax rates, at least in the absence of large externalities. Hence, there is room to shift to a tax system with fewer tax expenditures using a broader tax base and lower tax rates. However, tax benefits stimulating activities with large positive externalities, such as tax incentives for R&D, are motivated. Compared to other countries, Sweden follows a slightly different path and is more defensive in offering tax relief than other countries that promote high-tech growth sectors, small and medium sized enterprises, and research and development more offensively. There may be a need to enhance tax incentives supporting R&D to ensure that the knowledge- and R&D-intensive Swedish industry stays competitive.

In addition, to promote systemic change and the transition toward a greener and more digital economy, government involvement will likely be required. This transition will entail more than just fixing market failures but rather creating new markets and infrastructure with clear public good features. However, care needs to be taken when designing policies, and support and sustainable collaboration between the public and private sectors must be created to avoid choosing the wrong path. Past experiences tell us how difficult it is to design effective tax incentives even in cases where they may be supported.

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CHAPTER 5

INNOVATION THROUGH COLLABORATION TO MEET GRAND CHALLENGES?

A CRITIQUE OF CURRENT TRENDS IN INDUSTRIAL POLICY

CHRISTIAN SANDSTRÖM

1. INTRODUCTION

Within politics, research and large parts of Swedish industry, collaboration has been a buzzword for several decades. The importance of close collaboration and partnerships – between academia and industry, state and industry or all three sectors at the same time, or between suppliers and customers – is always taken for granted and seldom questioned. It seems to be assumed that such collaborations will result in innovation, increased productivity and sustainable development. With few exceptions, these claims are taken for granted and seem so self-evident that no evidence for such effects or any description of the causal mechanisms behind are ever given. The recent and ongoing shift across Europe and Sweden toward more interventionist industrial policies aimed at accomplishing system transformation and renewal constitute examples of how these ideas have gained even more popularity (Mazzucato, 2013).

Within Swedish industrial policy, collaboration has become a buzzword – a term that is used and reused in public discourse without ever being questioned or problematized. There are plenty of buzzwords circulating in any society, and perhaps this is a natural phenomenon that may not necessarily be a problem. On the other hand, such buzzwords may reflect inherent ideas and taken for granted beliefs that are ingrained in our minds. If these ideas contain oversimplifications, hidden assumptions and flawed thinking, the buzzword is not that harmless as it is a manifestation of a distorted discourse in society, which in turn creates and reinforces misguided ideas that will

dominate our thinking. A critical look at such ideas may therefore be necessary to accomplish development.

In this chapter, I will argue that the term collaboration is a buzzword that has not only become overused and diluted but perhaps more importantly that it reflects underlying ideas about economic and social development that are in a more fundamental sense vastly exaggerated and in many ways incorrect. Moreover, recent trends in industrial policy toward even more state involvement have exacerbated these problems, as the theories underpinning collaboration efforts have been poorly understood.

The chapter begins by describing the role of collaboration in Swedish industrial policy and some recent trends in this area. Here, industrial policy is defined as government efforts to increase the competitiveness of firms. Next, dominant theories underpinning ideas on collaboration are covered briefly. The subsequent sections provide a collection of different theoretical perspectives on the topic that explain problems related to current ideas on collaboration, and these are mixed with empirical illustrations. Finally, concluding remarks are provided.

2. BACKGROUND: FROM PUBLIC-PRIVATE PARTNERSHIPS TO TRIPLE HELIX

Historians have often described how several of the larger technological and industrial breakthroughs in Sweden happened through interactions between the state and private corporations. The collaboration between Asea and Vattenkraft implied that the waters of Lule Älv and other vast rivers of the north could be tamed and give access to cheap, environmentally friendly and reliable electricity. Ericsson's large breakthroughs in electronic telephony (the AXE system) and the development of cellular technology (NMT) in the 1980s took place through collaboration between Ericsson and Televerket, the state-owned telecommunications monopoly. The state also had a significant role in the development of railways at the beginning of the 1900s. Some scholars have made use of these examples to propose that the state ought to take a more active role in public procurements for innovation (Wesseling and Edquist, 2018).

Based on these and other anecdotes, Swedish policy on research and innovation has to a large extent been built around the idea that renewal and development takes place through a process of collaboration within certain well-defined areas. In a consensus-oriented culture and in a small and open economy fighting to remain competitive on a global market, it makes sense to undertake focused and collaborative efforts. The idea of development through collaboration is also deeply rooted in Swedish ideas of a mixed economy.

Looking at Swedish R&D policy, it is also clear that collaboration is always put at the forefront of policy thinking. In the Swedish government's R&D budget proposal of 2016, the word collaboration (samverkan) was mentioned 101 times, and in 2020, it was mentioned 133 times.

3. RECENT TRENDS IN INDUSTRIAL POLICY: FROM MARKET FAILURE TO SYSTEM TRANSFORMATION

Innovation policy, industrial policy and environmental policy have converged over the past two decades. Environmental policy is not only about crafting regulations and incentive structures for the private market (Porter and van der Linde, 1995) but also increasingly about accomplishing system-wide transformation, i.e., radical renewal of established industries (Schot and Steinmuller, 2016).

Relatedly, innovation policy is no longer only about increasing R&D supply, correcting market failure and providing various support schemes firms can apply for. Innovation policy is increasingly interventionist and increasingly devoted to addressing grand challenges. This shift has been inspired by scholars such as Mariana Mazzucato (2013), who argued that the state ought to take a proactive role in shaping industries and in accomplishing path renewal. This is at times referred to as the third generation of innovation policy, or innovation policy 3.0, where the first generation concerned investments in basic science as inspired by Vannevar Bush's *Science the Endless Frontier*, and the second generation is the chain linked model by Kline and Rosenberg (1986). The third one takes a more active approach and seeks to steer various sectors of the economy toward accomplishing noble and desirable objectives such as economic growth, new jobs, innovation and sustainable development.

The increasingly popular way of doing so is via various collaboration setups where firms, governments and universities are brought together to join forces and solve larger societal challenges and leapfrog toward innovation, sustainability and economic growth.

4. THEORIES BEHIND COLLABORATION AND NEW INDUSTRIAL POLICIES

There are several theories in economics that point to the value of public-private collaborations to create innovation and increased competitiveness. These are briefly outlined below.

4.1 Technology as a public good

Technology development may in the early phases have more characteristics of a public good. A public good is a good that is nonrival and nonexcludable in terms of its

consumption. These goods differ from other goods in the sense that everyone can consume them at the same time, and it is very difficult to stop anyone from consuming them. Breathing clean air is one such example.

Once technology has been developed, it may be used and reused infinitely, and anyone can benefit from applying it. This fact, in combination with the significant upfront costs related to developing it, can result in limited incentives for technology development. As a consequence, free-rider problems may occur where no one is willing to put enough effort toward R&D (Arrow, 1962).

A problem with the theory of R&D as a public good is that it is no more than a theory. While technology has certain elements of a public good, it is not 100 percent of a public good. In fact, there is a large and growing body of literature on complementary assets (Teece, 1986) concerning how firms can reap the benefits from R&D efforts without a strong intellectual property regime in place. Brands, first mover advantages, economies of scale, customer lock-in, and network effects are well documented ways that firms can reap benefits from their R&D efforts. R&D is only partially a public good.

4.2 Transaction cost theories

Innovation is almost by definition subject to high levels of uncertainty. Put differently, transaction costs are significantly related to all attempts at renewal. Broadly speaking, transaction costs can be defined as the costs incurred by engaging with other actors in market exchanges (Coase, 1937; Williamson, 1975). In regard to the innovation and development of radically new technologies, it is important to have high levels of trust. Attempts at innovation may therefore be more efficient when initiatives for collaboration are made by the government. Creating arenas where suppliers, firms, customers and universities meet and develop a joint understanding can therefore contribute to the success of innovation efforts, as transaction costs would potentially be lowered.

4.3 The innovation systems perspective

Within the stream of literature often referred to as systems of innovation (Edquist, 2013) or technological systems (Bergek et al., 2008), the systemic and boundary-spanning nature of innovation is often emphasized. Regarding innovation processes as nonlinear and subject to distributed agency, these scholars sometimes point to collective action problems that may prevail. No single actor may have enough incentives to invest in early phase R&D (Glasmeier, 1992), and in this sense, a somewhat Keynesian perspective on renewal is maintained where systemic lock-in on suboptimal levels may be the case. From this perspective, it seems logical and rational to initiate various programs aimed at facilitating collaboration from the government's point of view, thereby contributing to the creation of positive feedback loops between

technologies, markets and institutions, and thereby instilling a process of cumulative causation (Jacobsson and Bergek, 2004).

5. ALTERNATIVE PERSPECTIVES ON COLLABORATION AND INNOVATION

While the theories above render support to ideas on collaboration, these theories do not tell the entire story. Theories must be related to reality, compared and contrasted with other theories, that potentially have more explanatory value. In the following sections, alternative theories are proposed, described and applied to illustrative examples.

5.1 Suboptimal fragmentation or natural division of labor?

It is often taken for granted that collaborations between universities and firms will result in innovation and renewal, as the innovation system would move away from suboptimal levels of fragmentation toward working more closely together. Firms are expected to become more innovative by gaining access to scientific research, and scientific research is expected to become more industrially relevant and useful by being tied more closely to the practical problems of industry. The triple helix model and its implementation across the European Union are built on this underlying assumption (Etzkowitz and Leydesdorff, 2000).

There are several problems with the idea that innovation happens through collaborations between firms and universities. To begin with, we must ask ourselves if there is such a large untapped potential in firms and universities collaborating, then why aren't they doing it to a greater extent? Of course, firms and universities collaborate out of free will and spontaneously precisely because they see many values created from doing so. The pressing question is why government money and efforts would be needed to deepen and increase the level of collaboration. Why wouldn't these actors be able to find an optimal level of collaboration on their own?

The answer provided by the literature on innovation systems would be that transaction costs are high, collective action problems may prevail, and there are barriers to collaboration in terms of cognitive biases, deeply rooted beliefs, path-dependent capabilities and related cultures and only a collaboration effort put forth by a government could break such a catch 22 situation (e.g., Mazzucato, 2013). As we shall see, there are numerous problems with this idea.

First, the idea that innovation emerges from collaborations between universities and firms is anecdotal at best. Stemming from a collection of histories related to innovation emerging from scientific research laboratories and military research efforts in the mid-20th century, it is often argued that breakthroughs happen at the intersection of

science and industrial firms. Rarely – if ever – are any studies cited or referred to that confirm such a pattern on the aggregated level.

Studies on the origins of innovations seem to suggest that the vast majority of innovations come from the private sector and that academic research rarely translates into new products, processes or services.

In a study from 2008, Block and Keller investigated where groundbreaking innovations were created in the American economy. They found that only seven percent of these originated from universities. Studying academic patenting, Bourellos (2013) showed that approximately seven percent of patents in Sweden came from Swedish universities. Estimations of universities' share of all patents in Western economies are normally in the mid single digits (e.g., Lissoni et al., 2008). In a report published in 2014, Sandström looked at the origin of 100 of Sweden's groundbreaking innovations, such as the ball bearing, pharmaceutical blockbuster drug Losec, safety matches, the milk separator and AXE electronic switches for telephony. He found that 20 percent of these were in different ways connected to university research but that these were primarily within the life sciences. In most sectors of the economy, such as the construction, telecommunication and IT and manufacturing industries, the share of university-related innovations was approximately ten percent, and in the majority of these cases, they were related to technical universities.

Similar conclusions were drawn by Johan P Larsson (2015) in a report written for Swedish Entrepreneurship Forum (Entreprenörskapsforum). Making use of the SWINNO database (Sjöo et al., 2014), Larsson found that the majority of these 4 853 innovations came from entrepreneurs who developed these offers to become or remain competitive on a market. Approximately one-third had any connection at all to science and technology. The number of innovations that had occurred through some form of collaboration amounted to approximately 20 percent, and approximately half of these innovations emerged from collaborations across firms or in collaboration with customers. Larsson also concludes that approximately 50 percent of the innovations came from firms with fewer than 50 employees and that one-third came from firms with more than 500 employees.

5.2 Explaining the absence of innovations stemming from collaboration

The data described above stand in stark contrast to expectations among policy-makers and many academics concerning the outcome of collaborative efforts. How can we explain this discrepancy and the relative absence of universities in the innovation process more generally?

At first glance, one would expect that it is at the intersection between different fields of expertise that innovations are created as different actors complement each other.

While true in an intuitive sense, the opposite might also be more true in some settings: skills, incentives and cultures diverge to such an extent that little value comes out of a collaboration. Research on innovation and creativity has shown that diversity within a firm may result in ideas of a higher quality but that too high degrees of diversity result in a lower quality of ideas (Björk and Magnusson, 2009). Similarly, research in psychology has developed the notion of cognitive distance to explain this pattern. If people are too different, the distance between their ways of looking at the world is so great that they will not understand each other.

Let us take a look at the incentives and capabilities in industry and how they differ from academia. In academia, the overarching objective is to create new scientific knowledge. This is usually measured in terms of research publications in prestigious academic journals. A researcher is assessed and promoted across his or her career based upon the publication of scientific papers. While universities increasingly pay lip service to ideas related to collaboration and make an impact beyond strict intra-scientific contributions, promotions, professorships, doctorates, etc., are governed by research merits and little else. Anyone who has applied for fixed positions at universities in Sweden could testify that this is the case.

Relatedly, scholars primarily build capabilities related to the publishing of academic papers. Academics often build a comparative advantage by specializing and spending most of their time work on a very specific sub-element of a larger and established research paradigm. Whether this subfield is of any practical relevance is secondary for most academics, as it is the degree of scientific novelty that counts and results in publications. Once a paper is published, academics are usually not incentivized to continue working on it, nor are they incentivized to build capabilities for doing so. One should therefore not be surprised concerning the findings that firms started by academics normally perform worse than firms started by students and that challenges related to collaboration at times seem to outweigh benefits (Sandström et al., 2018).

Conversely, firms are primarily interested in the commercial value of an innovation, not its scientific significance. Innovations that fuel the growth of corporations may be based upon scientific advances, but in most cases, they are not. Rather, they are novel combinations of existing and well-established knowledge. To succeed at this, R&D often needs to be combined with customer insight, market knowledge and the development of manufacturing skills. This process is much more holistic, industrial and boundary spanning than academic research.

In sum, the development of science and the development of innovation are different processes. Science is about turning old money into new knowledge. Innovation is about turning existing (or new) knowledge into new money. While science and innovation are often mistakenly lumped together, the processes for creating them differ greatly, as do the incentives, capabilities and cultures related to them. As a consequence, one

should not be surprised when high expectations of university-industry collaborations mostly fail to generate considerable breakthroughs. While we must acknowledge that there are many success stories and positive examples of how this has worked out well, it seems unwise and risky to make use of large sums of taxpayer's money to try to bring together actors that in reality have so little in common.

Many academics and people employed in industry have experience with collaborations across boundaries that failed to materialize. As an academic, you are interested in pursuing research questions that can generate new knowledge. Such questions are often too specific, abstract or hard to comprehend for anyone in industry. To create value for industry representatives, academics therefore often engage in activities that are only moderately scientifically interesting but are more practically relevant. They often feel like underpaid technology consultants subsidized by the government.

Conversely, industry representatives in private often describe that they see little value in the specific issues scholars want to know more about. As they need to put in so little financial resources themselves, they nevertheless engage in innovation collaborations and do so partly to obtain goodwill from the government or inexpensive R&D funding.

6. IS INNOVATION ABOUT COLLABORATION – OR CONFLICT?

A basic assumption underpinning the idea about collaboration is that innovation takes place through collaboration. While there are certainly many examples of firms, universities and other actors joining forces to pursue large leaps in technology, such a perspective is nevertheless both theoretically and empirically an oversimplification. In the preceding section, ideas related to the division of labor and specialization were applied to explain why collaborations at times fail to generate any results. Another body of literature that can be applied is the more elementary innovation theory.

The founder of innovation studies – Joseph Schumpeter – argued in the mid-20th century that innovation and economic development primarily occur through a process of creative destruction (Schumpeter, 1942). The term creative destruction is so widely known today that its original meaning is often lost or confused. If development happens through the introduction of new products, technologies and processes replacing established ones, this would necessarily imply that development will benefit certain actors in society at the expense of others. In the long run, an economy grows, and everyone benefits; however, in the short run, a certain degree of substitution takes place, meaning that there are both winners and losers in the short term.

There are many historical examples of capitalism as a process of creative destruction, i.e., value creation and destruction along with novel distributions of value. During the industrial revolution, tailors in England did their best to stop the widespread diffusion of spinning Jenny, and similar innovations as this group of workers could potentially lose their jobs. In the book *Innovation and its enemies* (2017), Calestous Juma describes a collection of cases where this pattern is obvious. In 1877, dairy farmers managed to obtain a law forbidding margarine. Thomas Edison did everything in his power to stop the emergence of AC current, a technology that was superior to his own solution. At the same time, his own lightbulb faced fierce competition from the incandescent lighting industry that nearly killed the lightbulb. In the 1940s, American musicians made large efforts to try to stop recorded music from being diffused in the market.

In many ways, the examples above suffice to debunk parts of the idea of collaboration. What would have been the effect of public policy initiatives aimed at facilitating collaboration in these cases? If the angry mob of tailors had gotten the opportunity to collaborate with the inventor of Spinning Jenny, it would be an understatement to say that diffusion of this innovation would have been slowed down. In the worst-case scenario, it would never have happened at all, and public policies aimed at creating collaborations would have strengthened the vested interest groups who now face competition from new technology. In fact, there are several reasons to believe this is the case, which we will see in the next section.

7. THE POLITICAL ECONOMY OF INDUSTRIAL POLICY AND COLLABORATION

Elements of collaboration are also needed even in a process of creative destruction. The small seeds of innovation that have still not grown into a viable business may require collaborations with other actors to be sheltered from vested interest groups. The question is, however, what the role of politics and policy-making tends to become when projects aimed at facilitating collaborations are initiated.

Theories in political economy can help us understand the mechanisms underpinning such political efforts. Within this literature, the term “rent seeking” is often used to describe how various interest groups tend to influence the political process to their favor. Established, resourceful and dominant actors are usually in a better position to influence politics. Not only do they have superior relational resources, with larger budgets, they are also able to hire more lawyers and lobbyists who can help them to influence public opinion and policy-makers.

With asymmetric information to their favor and strong incentives to influence the political process, the dominant and incumbent actors are usually better positioned to exert pressure on the political process, thereby engaging in an activity often referred

to as regulatory capture, which means that the policy-making process is captive. The cost for all these privileges is in turn distributed across a large population of firms and individuals who are generally immobilized and lack the ability to influence politics. As a consequence, special interest groups are able to obtain benefits such as tariffs protecting them from foreign competition, loopholes in the tax system, government bailouts, etc., while the general public and smaller firms pay for these benefits through higher prices, less tax revenues, lower economic growth, etc.

Why would all public efforts directed toward collaboration constitute an exception to the theories on rent seeking and regulatory capture? Programs and initiatives for collaboration are not designed in a vacuum. In contrast, they are usually shaped in close interaction with different interest groups. If we regard innovation as a process of creative destruction, then today's giants are more likely to be represented within politics, and public funds are more likely to be controlled by them and result in less structural change in the economy.

8. SUPPORTING RENEWAL OR SUPPORTING MORE OF THE SAME?

Based on notions of rent seeking and regulatory capture found in the literature on political economy, it is possible to delve deeper into the practical implications of various collaboration schemes. As described above, there may be good theoretical reasons for pursuing collaborative policies and support structures; reality may, however, end up in a different way than was intended.

In a book chapter recently published by Jerker Moodysson and colleagues (2021; Tillväxtanalys, 2020), it is argued that strategic innovation programs (SIPs) in Sweden suffer from precisely such a dilemma of regulatory capture. These programs will total 16 billion SEK over twelve years from Vinnova, which is in turn supported by considerable levels of effort from the private sector. SIPs are collaboration platforms for innovation that are centered around a collection of areas such as the Internet of Things (IoT), life sciences and aerospace. Here, university researchers collaborate with firms to become more innovative. Evaluations of the SIPs show that the vast majority of these resources are allocated to universities and research institutes. In most programs, small and medium-sized enterprises receive limited amounts of funding, while foreign corporations receive almost no funding.

These programs have been inspired by the literature on innovation systems and aim specifically to increase collaboration and knowledge transfer between universities and industry. If the presence of any conflicts or tensions had been assumed to exist in innovation processes, these public policy efforts would perhaps have been designed in a different way.

Consider a situation where path-breaking innovation is related to many conflicts and what effects a SIP program would have under such circumstances. The American platform company Uber's entry into established taxi markets across the globe would be one such example. Here, it has been very clear that Uber has tried to disrupt the market by introducing a platform logic, employing large amounts of IT and developing a business model previously unknown to the taxi industry. Threatened by not only technological but also institutional disruption (Laurell and Sandström, 2016), established taxi industries have been on strike in many different countries and in several cases have been able to block Uber's entry into markets. The consequence has often been an absence of technological and institutional renewal and a lack of new jobs created.

How would the dynamics above be affected by the presence of a large government program aimed at increasing innovation through collaboration? As this innovation process is characterized by conflict rather than collaboration, it seems very unlikely that Uber and the established taxi industry would meet on a joint arena to collaborate when they are bitter rivals. It seems much more likely that only one of these two actors would take part in such government efforts. As the taxi industry is already established, has legitimacy and well-developed connections to policy-makers, they are likely to gain the upper hand and be the one actor to receive support from the government via an innovation program. Here, collaborations with universities, suppliers and other researchers can become a real distortion of competition, and instead of instilling a process of creative destruction and renewal, the policies would end up sustaining and reinforcing the established industry structure, effectively hampering innovation (Tillväxtanalys, 2020).

There are other, historical examples of how innovation and renewal of an industry are more about conflict than about collaboration. Telecommunications was for many years a collaborative matter between Ericsson and Televerket. During the 1980s, however, the early advent of mobile communications implied a shift. The former government monopoly was increasingly challenged by private firms such as Comviq, a small firm back by Swedish industrialist Jan Stenbeck. The 1980s were characterized by several large and highly public conflicts between Comviq and Televerket, where Comviq argued that Televerket was misusing its power as the incumbent monopolist (Eriksson et al., 2018). Under these circumstances, one can only marvel at what impact the creation of a collaborative innovation program would have had on competition and renewal of the sector.

During the same time period, the world's first private exchange for options was created in Sweden. Founded by private entrepreneur Olof Stenhammar in 1985, OM (Optionsmäklarna) started operating next to the Stockholm stock exchange which had a monopoly on stock trading. In the next phase, several of the large incumbent banks in Sweden tried to launch a competing platform called SOFE. Again, it seems

plausible to assume in hindsight that an innovation and collaboration effort created by a government would have served to entrench the incumbent banks at the expense of an entrant firm such as OM (Ernkvist, 2015; Eriksson et al., 2019).

In the early 1990s, Sweden was the first country in the world to open up its postal market for commercial competition. While many *de novo* entrants challenged the government monopoly, the vast majority did not make it for a very long time. Citymail was the only new player to grab some market share, but Posten, the incumbent state monopolist managed in a series of efforts in the 1990s to stop competitors from accessing critical resources such as databases of addresses. Again, it seems very unlikely that any state initiatives for innovation through collaboration would end up as anything other than an extension of the incumbent monopolist's market power.

There are several contemporary examples of similar setups where there are considerable tensions and conflicts of interest between incumbent firms and entrepreneurial ventures. Consider Airbnb versus the established accommodation industry (Laurell and Sandström, 2017), autonomous and electric truck driver Einride, an entrant firm taking on established Swedish industrial giants like Scania and Volvo, and online gambling operators versus the Swedish gambling monopolist Svenska Spel.

9. COLLABORATION – BUT ON THE WRONG THING?

Collaboration and large innovation efforts by the state devoted to solving grand challenges face the apparent risk of being designed around the wrong technology or effort. If this is the case, investments will be distorted and destructive. Active, interventionist innovation policies have often resulted in these forms of problems. In 2009, Josh Lerner summarized his conclusions on the failure of innovation policies in the book *Boulevard of Broken Dreams* in the following way:

For each effective government intervention, there have been dozens, even hundreds, of failures, where substantial public expenditures bore no fruit.

An important reason for this failure is related to the limited information a government can have around choices concerning technology and innovation. Technological change is an inherently uncertain and emergent process subject to genuine, Knightian uncertainty (Dosi, 1982). Firms often make mistakes when choosing technologies to pursue, why then should we expect that governments are able and capable of choosing technologies that the market should engage with?

There are numerous examples of how the presence of government money has initiated collaborations and efforts concerning the wrong technology, especially in the area of sustainability. In Sweden, large efforts were made to diffuse ethanol cars on a large

scale from 2005–2010. In the end, the various support schemes, regulations forcing gas stations to offer ethanol, etc. turned out to be futile as ethanol-damaged engines went out of favor and eventually exited the market.

Another Swedish example would be efforts to manufacture ethanol from cellulose in northern Sweden. Billions of SEK in taxpayer money were channeled to public firms, and the prime minister inaugurated a testing plant in 2004 and referred to ethanol as “a gigantic industry that will create an entirely new outcome for northern Sweden”. The public firm, Sekab, collaborated with local universities and obtained EU funding and foreign aid funding. The leader of the Center party, Maud Olofsson, stated in 2005 that:

In a few years it will be commercially viable to extract ethanol from cellulose and waste from the forest industry. This will result in lower production costs and higher competitiveness for ethanol manufactured in Sweden.

The challenge of producing ethanol from the forest proved to be overwhelming, as major technological obstacles could not be overcome. The result was mounting public debt in these municipalities, accusations of corruption and an absence of sustainable development.

Municipally owned firms in Sweden have also made large efforts in recent decades to develop biogas. As gasoline prices have declined and biogas has lost its competitiveness, these investments have in many cases also resulted in underdeveloped technology, absent demand and mounting debt (Jörnmark and Sandström, 2020).

In sum, there are many examples of how large state investments for innovation and collaboration have basically resulted in technological lock-in around the wrong technology.

10. COLLABORATION OR INCENTIVE DISTORTION AND SUBSIDY ENTREPRENEURSHIP?

In some cases, it is unclear what is an initiative to create more collaboration and innovation and what is in reality a form of disguised industry support that would be incompatible with current competition laws.

In Sweden, some industrial support looks like subsidies to industries rather than attempts to create innovation. One such example would be Fouriertransform, a fund that was created during the financial crisis of 2008–2009. Roger Svensson at the Research Institute of Industrial Economics described it as “pure state support to the vehicle industry” (2011, p. 23). At the same time, politicians have often used Fouriertransform to state that they take responsibility for regions and cities where job losses occurred due to the recession.

The presence of large state funds creates an apparent risk that incentives are distorted and firms in effect become subsidy entrepreneurs, living off the vast amounts of public funds that are made available by states, the EU, municipalities and regions. Previous research has shown that firms receiving multiple subsidies tend to have lower productivity (Gustafsson et al., 2020). Beyond this study, little is known about the combinative effect of all this support, but there is evidence suggesting that firms become immune to risk, as the state is offering such abundant resources.

The examples regarding sustainability mentioned in the previous section illustrate this point clearly. Receiving billions in government support means that the individual firm does not take any risk and hence becomes immune to risk, investing too much. For a subsidy entrepreneur receiving “free” government money of 50 million SEK, it becomes rational to initiate efforts to spend an equal amount of money. If you obtain 50 MSEK for destroying 49 MSEK you have still hypothetically made 1 MSEK “for free”. Firms invest as long as the marginal revenue for investing is higher than the marginal cost. Money from the government must be regarded as a form of marginal revenue, hence justifying marginal costs. Incentives become so distorted that eventually, it becomes rational for firms to engage in the destruction of capital.

The biogas example mentioned above provides one example of precisely this pattern. When it had become obvious that the biogas effort in Gotheburg was turning into a financial disaster, efforts still continued because the municipality still had “Klimp funds that should not be wasted”. Klimp was a public support scheme run by the Swedish Environment Protection Agency.

While the argument of marginal revenues and marginal costs above may seem overly cynical, it helps us to explain the creation and continuation of financial disasters such as biogas and ethanol from cellulose. Along the way, there have been billions of “Klimp funds” and related money made available to these firms who faced an incentive structure where it became rational to continue spending money on financially and technologically futile initiatives.

Unfortunately, current initiatives in Sweden toward economic and environmental sustainability seem to be plagued by all the dilemmas highlighted above. Efforts in the northern parts of Sweden related to making steel from hydrogen gas are based on similar ideas on collaboration. There are considerable risks here with regard to incentive distortions, technological uncertainties and harmful effects on competition (Henrekson et al., 2021).

11. ALTERNATIVE APPROACHES TO INNOVATION AND SUSTAINABILITY

If public policy efforts toward innovation, economic development and sustainability through directed collaborative efforts are plagued by so many theoretical contradictions and empirical examples of failure, what would then constitute a viable innovation policy?

Working with regulation, taxes and the abolishment of pollutants has historically proven to be a more successful approach. During the 1990–2018 period, total domestic carbon dioxide emissions declined 27 percent while GDP increased by 90 percent, meaning that Sweden produces more GDP for less CO₂ emissions. While these accomplishments are not sufficient, it is nevertheless encouraging to see this trend over the past three decades.

Air has also been subject to considerable improvements over the past three decades. Out of 26 different air pollutants measured by the Swedish Environment Protection agency, 24 have been reduced in absolute figures. Emissions of sulfur dioxide, nitrogen oxides, particles and heavy metals have been reduced significantly since 1990. While the pace of this decline has levelled off in recent years, we can nevertheless see that many pollutants have been reduced by 80 percent. Lead has seen the greatest decline (97 percent) (Grafström and Sandström, 2020).

None of the positive changes described above have been made by large government efforts to collaborate with the private sector to develop ethanol, biogas, or ethanol vehicles. Guiding the market and remaining technology neutral has historically been a more successful approach.

12. CONCLUSION

In summary, this chapter has provided a critical discussion of large collaborative schemes to accomplish innovation and sustainability. In Sweden, the idea that collaboration results in innovation and development is so ingrained that it has become a buzzword and has remained largely unquestioned.

This chapter provides one of the first steps toward a more systematic critique of ideas related to collaborative policy schemes for innovation. Having reviewed some of the trends and literature underpinning the collaboration idea, I have described and applied some alternative theories that shed light on problems inherent in the ideas about collaboration.

First, theories on the division of labor would suggest that firms collaborate to the extent that they find to be useful, and beyond doing so, they specialize in their own businesses and capabilities. Why should we expect that the presence of government money and effort to bring actors together who had little business with each other in the first place would create so much unrealized value? Evidence suggests that few positive effects are seen from such collaborations, and an important reason for this could be that firms and universities are in fact *too different to collaborate productively*. Incentives, capabilities and cultures are developed for very specific purposes and may diverge to such an extent that collaborations are fruitless.

Second, government efforts to create innovation by facilitating collaboration are based on the underlying assumption that innovation is primarily a process not characterized by conflict. Applying classical Schumpeterian thinking around innovation as a process of creative destruction, I have argued that collaboration efforts are likely to extend the dominance of established actors effectively blocking institutional entrepreneurs from renewal efforts.

Third, collaboration efforts may simply be directed toward the wrong technologies, as they simply do not have enough information. Several contemporary examples of this dilemma have been described, and more systematic documentation of such cases is welcomed.

Fourth, government funds aimed at collaboration and innovation may distort incentives to such an extent that firms effectively become dependent on support and end up as subsidy entrepreneurs. Incentive structures may in the end become so skewed that the presence of large amounts of public money makes it rational to pursue financially and technologically hopeless initiatives.

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CHAPTER 6

INDUSTRIAL POLICY AND THE LOCATION OF INTERNATIONAL R&D ACTIVITIES BY MULTINATIONAL ENTERPRISES

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1. INTRODUCTION

Multinational enterprises (MNEs) are responsible for a large share of private research and development (R&D) investments and for the development of innovations and new technologies. While MNEs typically conduct their activities close to their headquarters, relying on ties with universities and research organizations in their home countries and exploiting economies of scale deriving from the geographical concentration of such activities (Belderbos et al., 2013), recent decades have witnessed an increase in the scale and pace of the internationalization of R&D (Papanastassiou et al., 2020). R&D investments by MNEs abroad now account for approximately one-third of all R&D investments (Dachs et al., 2014).

This chapter discusses the potential (direct and indirect) effects of such international R&D activities of MNEs. As also highlighted by Sjöholm (2021) in this report, there are different views on the contribution of FDI and the activity of MNEs in host countries, and not all MNE activities may be equally beneficial. This chapter argues, based on a discussion of the extant research (Section 2), that MNEs' R&D activities can provide a significant boost to local innovation and long-term development. From this perspective, attracting international R&D activities becomes an interesting target of industrial policy. With this in mind, this chapter explores the factors that MNEs consider important when deciding where to locate their R&D abroad (Section 3). This will provide important insights into which levers of industrial policy can be best used to attract such investments (Section 4).

We contend that beyond the traditional country-level factors that attract MNEs R&D activities, including fiscal policy and intellectual property rights (IPRs) regimes, location decisions are made by zooming in at a very fine geographical scale (such as the city-region); hence, policy needs to operate at a microgeographical level. Nevertheless, connections at the local and global levels are of paramount importance for the decision of MNEs on where to locate R&D. Furthermore, we discuss to what extent R&D can be attracted indirectly, inducing an incremental increase in MNEs' commitment and sophistication of their activities, moving from production activities to R&D.

2. DIRECT AND INDIRECT EFFECTS OF MNE ACTIVITY

2.1. What are the direct effects of MNEs in host countries?

MNEs have direct and indirect effects in the host countries where they locate their activities.¹ Direct effects refer to the fact that multinationals are different in many respects from local firms and generally bring a bundle of assets that can provide a positive contribution to the host economy in the form of higher productivity (Castellani and Zanfei, 2007; Girma et al., 2015), wages (Lipsey and Sjöholm, 2004; Heyman et al., 2007; Girma et al., 2019, van der Straaten et al., 2020), and innovative activity (Castellani and Zanfei, 2007, Guadalupe et al., 2012, Stiebale, 2016). In other words, when MNEs enter or expand in a host country, they increase the share of “high-quality” activities in the country. In the case of Sweden, Bandick et al. (2014) find robust evidence that foreign acquisitions lead to increasing R&D intensity in acquired domestic MNEs and non-MNEs.

MNEs can also help induce structural change in the economy. They tend to concentrate in sectors with relatively high knowledge intensity and are larger than domestic firms (Antràs and Yeaple, 2014; Barba Navaretti and Venables, 2006). This implies that inward FDI tends to change the structure of the economy, moving resources toward sectors where MNEs are active. The contribution of MNEs and FDI to structural change has been widely documented in developing (Mühlen and Escobar, 2020; Pineli et al., 2021) and transition (Kalotay, 2010) countries, but evidence on developed countries is also available. For example, the specialization of the UK and Spain in the automotive industry is fundamentally driven by the presence of foreign MNEs (Aláez-Aller et al., 2015; Pinkernell, 1998). Recent research has also highlighted the role of MNEs and FDI as agents of structural change at the regional level. With reference to Sweden, Neffke et al. (2018) found that new plants of nonlocal agents introduce more unrelated diversification than local start-ups and incumbents because they rely less on capabilities in the host region and more on those from other regions (including their home ones). From this perspective, these firms become a

1. See also Sjöholm (2021) in this report.

conduit of capability diffusion. Elekes et al. (2019) build on Neffke et al. (2018) to argue that foreign-owned firms are an exemplar actor of such capability diffusion. They show that in Hungary, foreign firms' capabilities are quite different from the region's average capability and, thus, induce significant structural change in regions.

2.2. What are the indirect effects of MNEs in host countries?

In addition to the direct effects discussed above, MNEs can also have indirect effects in the form of externalities for the economies in which they are embedded (Crespo and Fontoura, 2007; Girma et al., 2015; Girma et al., 2019; Meyer and Sinani, 2009; Rojec and Knell, 2018). These externalities derive from knowledge transfer, competition, backward and forward linkages and labor mobility. These are indirect effects because they affect the performance and behavior of other local firms. MNEs entering a host country can provide opportunities for local firms to improve productivity, have access to better-trained workers as well as cheaper and higher quality providers of intermediate inputs and services.

However, MNEs may have an incentive to limit positive externalities and may generate negative crowding-out effects as well (Castellani and Zanfei, 2006; Orlic et al., 2018; Rojec and Knell, 2018). On the one hand, since MNEs are very competitive firms in product markets, they may force local firms to shrink or exit. On the other hand, MNEs increase demand for local inputs (including labor and intermediates), thus bidding up wages and other input prices. This increases costs for local firms, forcing some of them out of the market.

Indirect effects are extremely important for industrial policy. If attracting MNEs boosts productivity and innovation in local firms, through knowledge transfer or by providing better workers, they can have a multiplier effect in the host economy. MNE activity can have ripple effects that reverberate through the rest of the economy, thus boosting growth and competitiveness beyond the specific direct contribution that MNEs make to the local economy.

2.3. Are there indirect effects of MNEs in host countries?

2.3.1. *MNEs and productivity in host countries*

The most common approach to identify these indirect effects is to relate host country firms' productivity to the activity of MNEs in the host country (Drifffield, 2001; Javorcik, 2004). This line of research has often referred to productivity spillovers from inward FDI and MNE activity, although it is well understood that spillovers are only one type of externality that MNEs may generate for the host economy. The extensive literature on this has found mixed evidence on the extent of such productivity effects of MNE activity in host countries (Lipsey and Sjöholm, 2005; Liang, 2017; Rojec and Knell, 2018). There is a certain consensus that these effects are not automatic and are contingent on a number of contextual conditions. The literature

has identified a number of factors that influence or limit the process of spillovers from foreign to domestic firms, including distance (Wang and Kafourios, 2020), operational environment (Ascani and Gagliardi, 2020) and the lack of absorptive capacity in the domestic sector (Girma, 2005, Castellani and Zanfei 2006; Meyer and Sinani, 2009). Some studies have observed that the characteristics of MNEs and their investments may play a crucial role. For example, Castellani and Zanfei (2006) show that MNEs engaging in R&D activities in host countries may be more conducive to productivity spillovers. Driffeld and Love (2007) show that UK firms gain substantially only from inward FDI motivated by a strong technology-based ownership advantage.

2.3.2. MNEs and innovation in host countries

Studies looking at the relationship between MNE activity and host country firm productivity have been criticized because they are not able to identify the mechanisms through which these effects unfold and because productivity measures may confound knowledge transfer with pecuniary externalities (Castellani, 2012). To overcome these limitations, some studies have looked at more precise measures of knowledge transfer by focusing on firms' patenting activity and, more generally, innovation performance. Crescenzi et al.'s (2015) findings on a large sample of UK firms included in the Community Innovation Survey (CIS) suggest that domestic firms active in sectors with greater investments by MNEs show stronger innovative performance. However, the heterogeneity across domestic firms in terms of internationalization of both their market engagement and ownership structure is the main driver of this effect. Crescenzi et al. (2020) reveal that R&D activities by foreign multinationals help in the formation and development of new innovation clusters. They show that R&D activities by foreign multinationals have a positive causal effect on local innovation rates. This effect is sizeable: foreign research activities can help a region climb 14 percentiles in the global innovation ranks within five years. Consistent with these findings, Castellani et al. (2022) show that inward FDI in R&D activities occurring in industries more prone to introduce green innovation contributes to the specialization of EU regions in environmental technologies.

2.3.3. MNEs and labor mobility in host countries

A different stream of research has focused on labor mobility from MNEs to local firms as a mechanism for externalities. Some studies have highlighted the significant footprints that the recruitment of skilled workers from MNEs leave on the hiring firms' performance in the form of productivity, exports, innovation, and growth (Andersson and Klepper, 2013; Balsvik, 2011; Csáfordi et al., 2018; Görg and Strobl, 2005; Poole, 2013; Song et al., 2013). Other studies stressed the important role played by MNEs as anchor-tenant firms, whose local presence thickens factor markets by increasing the local availability of workers with specific skills and experiences that would not otherwise be available or developed (Agrawal and Cockburn, 2003; Castellani, 2012; Giarratana et al., 2005). Admittedly, MNEs can also create

negative externalities in the local labor markets by inducing talent wars, bidding up wages, and crowding out local firms from hiring the most talented workers (Beechler and Woodward, 2009; Becker et al., 2020; Damioli and Marin, 2021). Using data on Swedish firms and workers, Andersson et al. (2022) show that employee mobility from MNEs is not a rare phenomenon: MNE workers are even more likely than similar workers in non-MNEs to leave their firms. Moreover, they show that this is especially true for managers and highly paid workers; this implies not only that mobility from MNEs is a relatively common occurrence but also that it involves employees with very high levels of human capital, hence adding to its relevance as a spillover mechanism. Finally, Andersson et al. (2022) show that there is a significant flow of MNE workers moving to start-up firms, a channel of mobility that has not been fully explored by the existing literature.

3. LOCATION OF R&D ACTIVITIES OF MNEs IN HOST COUNTRIES

Overall, the jury is still out on whether MNE activities have a positive effect in host countries. However, there seems to be a certain consensus around the idea that the likelihood of positive effects increases when MNEs engage in high-value-added activities, such as R&D, in host countries. To leverage MNEs' R&D activities, policy-makers need to understand what factors attract R&D in a certain location and how to use policy levers to attract such investments. This section will investigate some key aspects emerging in the literature on the location of MNEs' R&D activities abroad.

3.1. Traditional factors attracting R&D by MNEs: local factors vs. national and regulatory issues

The internationalization of R&D by MNEs has grown significantly in recent years (Branstetter et al., 2019; Papanastassiou et al., 2020), and foreign R&D investments are motivated by the need to tap into centers of excellence and acquire new knowledge assets, to support local manufacturing operations, to adapt products to growing local markets, and in some, to benefit from lower wage costs and an abundant supply of researchers and engineers (Kuemmerle, 1999). It is well understood that the attractiveness of a location for an R&D foreign affiliate increases with the presence of other firms (and other MNEs in particular) carrying out R&D activities, which determines so-called agglomeration economies (Siedschlag et al., 2013, Castellani and Lavoratori, 2020), but investors may be discouraged by a concentration of technology activities due to the presence of regional technology leaders (Belderbos and Somers, 2015). The level of human capital of the host location, as well as proximity to centers of research excellence, research and innovation capacity,

government R&D expenditure (Siedschlag et al., 2013), fiscal regime and the size of destination regions are also important determinants (Damioli and Vertesy, 2017; Damioli et al., 2019).

The role of IPR in the location of R&D affiliates by MNEs has also been discussed in light of the increasing trend of internationalization of R&D toward emerging countries, China and India in particular, where IPR protection is relatively weak. Indeed, in weak IPR regimes, foreign R&D operations face an increased probability of infringement and misappropriation by local rivals that can seriously threaten the MNE's market position and future profitability. This should discourage MNEs from locating R&D in weak IPR countries. However, MNEs possess alternative mechanisms for protecting their intellectual properties. For example, they can partition the knowledge generation process and distribute it across multiple locations, with internal linkages across units to ensure knowledge integration. Therefore, they may find it attractive to conduct R&D even at locations in weak IPR regimes (Zhao, 2006; Alcacer and Zhao, 2012; Belderbos et al., 2021).

3.2. Do R&D labs follow production plants?

A longstanding debate exists on whether R&D colocates with production or whether MNEs prefer to carry out these two activities in different locations. This is of crucial importance for industrial policy. In a country such as Sweden that has lost important production activities to mostly low-wage countries, if R&D follows production in the long run, there is concern among policy-makers that this may reduce R&D investments in Sweden. Conversely, if MNEs choose to locate R&D in different places from where they locate production, a shrinking production base does not necessarily limit a country's ability to attract R&D.

While several studies have shown that the R&D activity abroad of MNEs tends to colocate with production activities (Ambos, 2005; Ivarsson et al., 2016), evidence on foreign-owned R&D labs in the U.S. has suggested that the possibility of working with U.S. manufacturing facilities of the parent company is not correlated with R&D activities in the country (Florida, 1997). Other studies have also highlighted that this propensity to colocate production plants and R&D labs can be very heterogeneous across firms and industries (Mariani, 2002; Ivarsson et al., 2016; Alcácer and Delgado, 2016). Indeed, there are different theoretical arguments that can justify the different sets of findings. On the one hand, R&D and production activities are clearly attracted by different locational characteristics. For example, while locations with a high cost of labor discourage production activities, especially in more labor-intensive industries, they may attract R&D, as high wages are associated with a more talented workforce. Similarly, the role of agglomeration economies mentioned above suggests that R&D activities may be attracted where

other R&D labs are located, while production activities may be colocated with other production activities of other firms. These Marshallian agglomeration economies are created by knowledge spillovers between firms in the same industries, as well by the availability of specialized suppliers and workforce that generate pecuniary externalities (Castellani, 2012). R&D and production also represent distinct units with inherently different organizational and professional logics that may require structural and spatial separation (Gray et al., 2015). Overall, one would expect production and R&D to be attracted to different locations.

The discussion above suggests that production and R&D are drawn by different factors, and one should expect to find that firms disperse these activities in different places to benefit from the activity-specific factors that attract R&D or production, respectively. However, then why do we observe that firms often colocate R&D and production? Previous research has highlighted a substantial trade-off between benefitting from external agglomeration economies, which would lead to locating R&D and production in different places, and internal agglomeration forces that would lead to intrafirm colocation of activities across the value chain (Blanc and Sierra, 1999; Alcácer and Delgado, 2016). The colocation of different activities within the same firm has some advantages that may offset the gains from dispersion. Furthermore, dispersion can be quite costly to manage. The advantage of colocation is that physical proximity facilitates communication and improves coordination between activities (Giroud, 2013) by fostering knowledge flows between different establishments within the firm (Rawley and Seamans, 2015; Gray et al., 2015) and enabling face-to-face interactions. This can substantially reduce the costs incurred when firms need to integrate and coordinate knowledge residing in geographically dispersed locations (Ketokivi and Ali-Yrkkö, 2009). These are key arguments that have led researchers to hypothesize about the benefits of colocating R&D with production activities. However, the rapid advancements in information and communication technologies (ICTs) have led to the expectation that any challenges associated with coordination and knowledge transfer across distances would have diminished over the last two decades, thus reducing the need to colocate (Gray et al., 2015). Finally, there are a number of moderating circumstances that may affect the need for colocation or allow easier unbundling of these two types of activities and, consequently, determine a heterogeneous response of R&D locations to previous manufacturing activities. The need to colocate R&D and production can be higher for plants that use more tacit knowledge, while in the case of codified-intensive knowledge, unbundling is easier because the exchange of knowledge across space is facilitated (Gray et al., 2015). This may be the case in industries where product properties are closely related to production activities, such as engineering-intensive ones (Ivarsson et al., 2016), where the development of new technologies depends on familiarity with the production process, innovation follows manufacturing (Pisano and Shih, 2009; 2012) and production is an important source of new ideas (Florida, 1997).

Notwithstanding differences across industries, the propensity to collocate R&D with production activities can also vary substantially across firms within industries. In particular, firm capabilities in organizing, managing and taking advantage of a complex and global architecture can reduce the coordination problems and costs of a geographically dispersed global network of production and R&D activities. Instead, the lack of structured organizational processes for knowledge exchange across distant units and organizational routines and processes to manage the challenges of knowledge coordination may increase the need to collocate activities (Alcácer and Delgado, 2016; Gray et al., 2015). Such coordination capabilities can be associated with the international experiences and geographical dispersion of MNEs' global operations. On the one hand, international experience can be a key source of organizational learning for a multinational enterprise (Barkema et al., 1997; Barkema and Vermeulen, 1999), allowing MNEs to develop organizational and managerial capabilities that enable firms to better coordinate dispersed operations across distances and manage knowledge transfer across geographically dispersed units, in turn reducing the need to collocate different activities across the value chain. On the other hand, firms that operate across geographically dispersed locations face higher coordination, control and transfer costs, and they need to develop coherent coordination capabilities (Gerybadze and Reger, 1999). Consistent with this view, Alcácer and Delgado (2016) find that the effect of cross-activity internal linkages is higher for firms operating in a few locations, while geographically diversified firms have better managerial capabilities to disperse value chain activities across distant locations, thus reducing the need for collocation. Using data on a large sample of 1 483 greenfield cross-border investments in R&D-related activities in manufacturing industries in a location choice set composed of 587 cities worldwide, Castellani and Lavoratori (2020) find that previous production activities of the same MNEs are not significantly associated with a higher probability of locating R&D labs within the same city. Their findings underline substantial heterogeneity in firms' preferences. In particular, the need for collocation between production and R&D is higher for firms that have less international experience and lower geographical dispersion of international activities. This is consistent with the view that MNEs with greater international experience and geographical dispersion develop capabilities that enable them to better coordinate dispersed operations across distances and manage knowledge transfer across geographically dispersed units, in turn reducing the need for collocating different activities of the value chain. They also find that firms with a lower share of intangible assets (i.e., those that presumably rely relatively less on codified knowledge) are more likely to collocate.

3.3. How remote are R&D labs?

Another aspect that differentiates production and R&D activities is the importance of geographic distance. Sjöholm (2021), in this report, discusses why FDI flows are generally relatively higher between countries located in close

proximity. A short geographic distance typically means more similarities in consumer preferences and culture, easier traveling between countries and reduced transport costs. However, research argues that R&D activities are not significantly deterred by geographic distance. MNEs are willing to locate their R&D activities farther away from their HQ, thus bearing the cost of coordinating activities over a large geographical space (Castellani et al., 2013). Using data on a large sample of investment projects from the fDi Markets database Castellani (2018) finds that the distance between the home and host city is the largest when MNEs locate R&D activities abroad: 7 771 km vs. an average distance of 5 707 km in the case of production-related investments (36 percent higher). This has been attributed to various factors, including the fact that R&D activities involve the production and transfer of knowledge, which unlike the production and transfer of physical goods, is not subject to high transport costs. Furthermore, in the case of R&D, it is important for firms to ‘be there’ in centers of excellence and clusters where knowledge is produced (Gertler, 2003). At the same time, the ability of MNEs to coordinate and transfer knowledge over relatively large distances between their units allows them to leverage their presence in several local clusters (Castellani et al., 2013). In fact, MNEs can create communities of practice that allow sharing knowledge and overcoming the obstacles posed by geographic distance (Asheim and Gertler, 2005). Furthermore, locating R&D activities further away from home may become necessary due to the more limited number of choices available to an MNE that is interested in locating R&D to access cutting-edge knowledge in a foreign location. In fact, the geographical distribution of innovative activities and centers of excellence is very spiky. Using data from the OECD-REGPAT database, Castellani (2018) shows that the top 100 regions in the world account for approximately 70 percent of all patenting. Most notably, these regions account for only 20 percent of the world’s population, suggesting that innovation is indeed much more concentrated than other economic activities. This is confirmed by recent research on 353 metropolitan areas in the U.S., showing that complex human activities, such as research and innovation and industrial activities such as biotechnology, neurobiology and semiconductors, concentrate disproportionately in a few large cities. The ten most innovative cities in the United States account for 23 percent of the national population, 33 percent of gross domestic product, and 48 percent of patents (Balland et al., 2020). Patterns of R&D activities carried out by MNEs are not dissimilar. Using data on a large sample of cross-border investment projects from fDi Markets, Castellani (2018) shows that 60 percent of all R&D centers established in the period 2003–2014 are concentrated in just the top five percent of cities. In the U.S., the top 25 metropolitan statistical areas (MSAs) account for 85 percent of all MNE investments in R&D in the country. As a comparison, the top 25 MSAs in terms of GDP account for 55 percent of the country’s GDP, and the top 25 MSAs in terms of manufacturing investments account for 60 percent of all inward production investments by MNEs (Castellani et al., 2021).

3.4. Zooming in: the importance of cities for the location of MNEs R&D

Related to the discussion above is the emphasis on what the relevant geographical scale of analysis is for studying the location of R&D investments by MNEs. This is another aspect that has been highlighted in the recent literature, which bears key implications for policy. In fact, understanding the appropriate level of analysis helps define more effective policies. To the extent that MNE location decisions are made with the country or even supranational institutions as the relevant scale, policies need to be defined at this level and are mostly under the control of national (and supranational) governments. In contrast, if regions, clusters or even cities are the loci of MNE location decisions, a different array of policy-making actors and levers becomes relevant. In international business (IB) studies, the country has been the primary geographical unit of analysis for the location decisions of MNEs. Over the past two decades, different levels of geographic scales in defining MNEs' location advantage have emerged. One stream has begun to zoom in and use finer geographic units, i.e., city regions or clusters, to examine MNEs' location decisions (Beugelsdijk et al., 2010; Goerzen et al., 2013; Belderbos et al., 2020). In the second stream, researchers zoom out to argue that MNEs use supranational regions, such as the European Union (EU) and NAFTA, as the primary geographic scope of their businesses (Rugman and Verbeke, 2004). Mudambi et al. (2018) propose a framework that encompasses various geographical scales, integrating them with an approach based on global value chains. They argue that the relevant geographical scale may vary according to the stage of the value chain in which MNEs are engaged. On the one hand, for downstream activities, such as marketing, the national (and sometimes supranational) context is usually very important because tastes and preferences tend to be defined at this level. On the other hand, technological knowledge develops in narrowly defined geographies, fostered by the tacit nature of some relevant bits of knowledge, which require local connections and interactions (the 'local buzz') (Bathelt et al., 2004; Asheim and Gertler, 2005). Due to cumulative agglomeration processes, technological knowledge is increasingly concentrated in particular geographic locations (Audretsch and Feldman, 1996; Florida, 2005a). The literature suggests that the establishment of a foreign R&D subsidiary is often driven by the MNE's willingness to tap into such repositories of location-specific technological knowledge and centers of excellence in particular industries or technologies (Cantwell, 1989; Cantwell and Mudambi, 2011; Hannigan et al., 2015). This delivers the 'spiky' geography of innovation that we discussed earlier (Florida, 2005). This wide global dispersion of knowledge hotspots coupled with the necessity of leveraging locally rooted knowledge leads MNEs to disaggregate their innovation activities over geographic space (Mudambi et al., 2018). In other words, MNEs are expected to zoom out over larger geographical scales (national and supranational level) when locating downstream activities (such as production, sales and marketing) while zooming in to narrower geographies when locating innovation activities. As Mudambi et al., (2018) put it, "firms do not look for IT personnel in India, but

look in Bangalore”. Empirical evidence demonstrates that automotive firms tend to locate their R&D operations in Detroit (Hannigan et al., 2015), IT firms locate such knowledge-intensive activities in Silicon Valley and Boston (Saxenian, 1996), while biotech firms choose Boston, San Francisco and San Diego (Audretsch and Stephan, 1996; Coombs et al., 2006). Damioli et al. (2019) show that for MNEs, R&D investments in EU and North American regions are generally not bound by national borders, and subnational regions compete across borders to attract such investments.

In this respect, recent research has highlighted significant location effects at extremely small spatial scales. This approach has been termed microgeography (Feldman, 2014). The microgeography approach emphasizes the importance of “zooming in” to a much smaller scale to obtain a true picture of locational advantage for innovation- and knowledge-related activities. In other words, the beating heart of knowledge and innovation systems that generate location advantages can sometimes be traced to very small neighborhoods (Andersson et al., 2020; Lavoratori and Castellani, 2021) or even office locations within buildings (Catalini, 2018).

3.5. Global cities as hubs for MNEs R&D

Due to the increasing complexity of technologies and the overall innovation process (Gambardella and Torrisi, 1998) and the fine slicing of activities within the global value chain (Mudambi, 2008), it has become highly unlikely that all the know-how and technological competences needed to sustain the innovation process over time are available within a single location. Nonlocal linkages are crucial for innovation in regions because they provide access to new knowledge and ideas. This helps places avoid or overcome lock-in situations (Boschma, 2022). As argued by Bathelt et al. (2004), successful knowledge creation increasingly results from the combination of both local buzz and global pipelines. The latter allows access to knowledge sources located outside of an organization’s environs, which can magnify locally embedded learning processes. Locations that are more connected to geographically dispersed knowledge sources are characterized by high knowledge connectivity (Cano-Kollmann et al., 2016). An established stream of literature suggests that this is enabled by both organizational pipelines (such as those orchestrated by MNEs and their subsidiaries) and personal relationships among highly skilled individuals (e.g., academic inventors), who collaborate across space to generate new knowledge (Lorenzen and Mudambi, 2013; Cano-Kollmann et al., 2016). Through such geographically distributed channels, technological knowledge circulates internationally, giving rise to linkages that connect locations to the global knowledge environment and nourishing innovative local activities with infusions of foreign technological knowledge (Perri et al., 2017; Berman et al., 2020). Castellani et al. (2021) support this view by analyzing 3,101 greenfield investments of MNEs in U.S. Metropolitan Statistical Areas and showing that R&D activities are attracted to areas well

connected to the rest of the world by international networks of inventors. Belderbos et al. (2022) provide further evidence along these lines by illustrating the changing role of global cities in global collaborative innovation networks. They examine coinvention linkages across 125 global cities in 46 countries and find that international linkages of global cities have increased substantially over the last decade. These results confirm the importance of international collaboration for innovation and the key role of global cities as geographical spaces facilitating such collaboration.

4. CONCLUSIONS AND IMPLICATIONS FOR INDUSTRIAL POLICY

MNE international investments in R&D activities have the potential to significantly increase innovation in the economies where they are directed. This makes them prime targets for industrial policies aimed at improving long-term development. In this chapter, we have discussed some key factors that attract MNE investments in R&D in certain locations. We can now use what we have learned about these determinants to set out some implications for industrial policy.

First, MNEs zoom in at very granular geographical scales when they decide where to locate their R&D activities.

- While country-level factors may play a role in decision-making, the characteristics of city-regions and clusters are decisive determinants of the location of MNEs' R&D activities. This implies that the locus of industrial policy relies on a *combination of national and local interventions*.
- MNEs' investments in R&D are attracted by relatively *low tax and stricter IPR regimes*. These policy measures are normally under the control of national governments.
- However, MNEs have *other ways to protect their IP*. Therefore, they are not necessarily discouraged from locating R&D even in relatively weak IPR regimes.
- While lower taxes certainly encourage R&D investments by MNEs, they are not able to compensate for poor local conditions, such as agglomeration economies or the availability of talent. This calls for *industrial policies that operate at a very granular geographical scale, such as the city-region*. For example, policies to improve the *quality of life in cities* can be important levers that attract talented researchers and, more generally, what Florida (2005b) refers to as the creative class.
- To the extent that agglomeration economies play a role, *attracting innovation catalysts* such as MNEs, also providing specific subsidies, may be justified, as it may ignite a self-reinforcing process (Crescenzi et al., 2020). However, this policy needs to be tailored with care, as it has been shown that industry leaders may not always be the most effective vehicles of knowledge transfer for the local economy

(Crescenzi et al., 2020) and may discourage the location of other key players in the industry (Belderbos and Somers, 2015).

- The importance of city-regions does not negate *the importance of national-level policy-making*. Making Sweden attractive for the R&D of MNEs can be achieved through national policies aimed at developing strong city regions. In other words, a strong Stockholm, Gothenburg and Malmö is not only an issue for the cities themselves but also an issue for Sweden's attractiveness as a location for MNEs' R&D.

Second, in regard to local policies to attract R&D investments, the discussion in this chapter has highlighted the importance of connecting the local with the international level.

- Since it has become highly unlikely that all the know-how and technological competences needed to sustain the innovation process over time are available within a single location, *nonlocal linkages are crucial for innovation* in regions because they provide access to new knowledge and ideas. This helps places overcome potential lock-in situations (Bathelt et al. 2004; Boschma, 2022). *Policies that facilitate connections between places* and with geographically dispersed knowledge sources can foster both local production of knowledge and innovation and attract MNEs' investments in R&D that can further boost this global knowledge connectivity.
- Various policies can be leveraged to achieve this objective. On the one hand, the *mobility of inventors and entrepreneurs* is crucial to this task (Lorenzen and Mudambi, 2013; Coda-Zabetta et al., 2022; Murphree, 2022). This can be facilitated by *open border policies* and *efficient transport infrastructures* that allow such talented individuals to move across borders. In this regard, the role of *ethnic communities and return migrants* has been highlighted as a key vehicle for such cross-border knowledge transfers (Marino et al., 2020).
- On the other hand, international knowledge connectivity can be achieved through long-distance collaboration, which requires that places be endowed with an *extensive and efficient digital infrastructure*.

Third, research has shown that R&D investments can follow production in some cases, but it is not uncommon that these two activities are decoupled.

- Places that do not possess the features that typically attract R&D activities, climb up the ladder of sophistication in MNE investments by first attracting production activities. This is likely to be more effective in industries that use more tacit knowledge, such as engineering-intensive industries (Ivarsson et al., 2016) or where the development of new technologies depends on familiarity with the production process, in which case innovation follows manufacturing (Pisano and Shih, 2009; 2012) and production is an important source of new ideas (Florida, 1997).

- Notwithstanding differences across industries, the colocation of R&D with production activities may depend on the lack of firm capabilities in organizing, managing and taking advantage of a complex and global architecture. Therefore, industrial policies could aim *to target production activities by specific smaller and less internationally experienced MNEs*, which might lack such coordination abilities. This might eventually lead to an incremental engagement of such MNEs with the local context in the form of the establishment of subsequent R&D activities. *Interalia*, as noted by Crescenzi et al. (2020), these MNE activities might also lead to significant knowledge spillovers and innovative activities of local firms.

In the case of countries such as Sweden, which has suffered significant offshoring of production activities to low-wage countries, the way forward is to target industries and firms where R&D can be decoupled from production. These are typically industries whose *knowledge base is more codified and analytic and firms that master capabilities in organizing, managing and taking advantage of globally dispersed operations*.

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CHAPTER 7

INDUSTRIAL POLICY AND FOREIGN DIRECT INVESTMENT

FREDRIK SJÖHOLM

1. INTRODUCTION

Multinational firms (MNEs) are key actors in the global economy, accounting for more than one-fifth of global output and more than two-thirds of global trade (Qiang et al., 2020). Moreover, approximately one-third of global trade is between firms within the same MNEs (World Bank, 2020, p.33). MNEs also conduct a large part of private-sector R&D and are of crucial importance in developing new technologies. Sweden is part of this development with large outflows and inflows of foreign direct investments (FDI). For instance, foreign-owned firms account for one-fifth of the total private sector employment in Sweden (Tillväxtanalys, 2021).

Despite the importance of MNEs, the views on FDI differ between countries. The overall trend is that countries have become much more open to FDI in the last five decades. However, there has been a backlash to such liberalization in recent years. A previous strong desire to attract FDI is partly changing to more restrictions on FDI. This development can be seen as a demise of the Washington consensus, which encouraged free international capital flows and few if any restrictions on FDI. More negative attitudes toward FDI have corresponded with stagnating and even declining amounts of FDI. This stagnation is also seen in Sweden, where the foreign share of the economy has not increased in the last ten years (Tillväxtanalys, 2021).

The importance of MNEs is based on their characteristics; MNEs are large firms with high productivity levels. This strength has enabled firms to become multinationals and make investments in foreign countries, despite the high costs of

cross-border investments. It follows that a country can benefit from attracting these strong foreign MNEs. FDI will increase aggregate output and have other positive effects, such as increasing a country's involvement in global production chains and fueling the expansion of domestic suppliers. However, it is not easy to convince MNEs to invest in a country; MNEs tend to look carefully at different countries when deciding where to locate foreign affiliates. Hence, there is room and a need for industrial policies that increase FDI attractiveness.

Not all FDIs are equally beneficial for the host country. The MNE's behavior in the host country is important. For instance, MNEs that develop linkages with domestic firms will be more beneficial than MNEs that operate in isolated segments of the economy. Accordingly, MNEs that continuously upgrade their operations are of particular benefit to host countries. Hence, the second objective of industrial policy is to maximize the positive effects of FDI by providing an environment where MNEs, for instance, use local suppliers and bring in sophisticated technologies.

This chapter examines how FDI can contribute to growth and development in Sweden. We will draw upon the large empirical literature on FDI and from the experience of other countries. We start in section two with a description of how FDI has evolved in the last few decades. Section three summarizes the literature on FDI determinants and suggests several areas where industrial policies can be important. We continue in section four with a discussion on how policies can be used to maximize the benefits of FDI, and we conclude the chapter in section five.

2. GLOBAL FDI FLOWS

The growth in FDI increased rapidly in the late 1980s and the 1990s in particular, as seen in Figure 1. More precisely, FDI flows increased by more than 400 percent between 1990 and 1999. There are two main reasons for the growth in FDI. First, the global attitude toward FDI changed from largely negative to welcoming. This change coincided with a more favorable attitude toward globalization in general and a more hesitant view on regulations and import substitution.¹ The success of some of the early adopters on a development strategy based partly on foreign MNEs, notably some of the Southeast Asian countries, undoubtedly had an important impact on the policy change. Moreover, China opened up for FDI in the early 1990s, which had a large impact on global FDI flows because of China's large size and good conditions for manufacturing production.

1. Import substitution refers to industrialization and development with the use of tariffs and regulations to shield indigenous firms from foreign competition.

The second reason for increased FDI in the 1990s was the rapid development in communication over long distances. Computers and improved telecommunications have enabled surveillance of production chains that are spread out over countries and regions. Low and even falling trade costs spurred a fragmentation of production chains where some parts were being produced in foreign affiliates. Hence, firms pursue FDI as a way to place production of different parts in different countries.

Growth in FDI continued until the tech crisis in the early 2000s, severely negatively affecting FDI. However, the decline was relatively short-lived, and a new global peak in FDI was recorded in 2007. Levels of FDI declined again after the financial crisis in 2008–09, partly because banks and other financial institutions stopped providing credit for trade and investments (Bems et al., 2013). The financial crisis was largely over in 2010, but there was never any sustainable recovery of FDI. Instead, there was stagnation until the Covid-19 crisis in 2020.

This pandemic has had a sharply negative impact on FDI, which is not seen in Figure 1 because available data ended in 2019. However, FDI has been reported to have declined by 35 percent globally in 2020 (UNCTAD, 2021). This decline was substantially larger than the decline following the financial crisis in 2008–09, and FDI flows are now at the same level as in the 1990s. There are several reasons for the decline, one being that the pandemic increased uncertainty, which makes firms reluctant to pursue major investments. It also made travel more difficult, and travel is often necessary for the negotiations that precede a cross-country investment. Moreover, disturbances in global value chains occurred when factories were required to close down because of the pandemic. This made some MNEs concentrate and even reshore foreign production. Finally, profits have been falling in many MNEs, reducing FDI since reinvested profits are an important part of registered FDI flows.

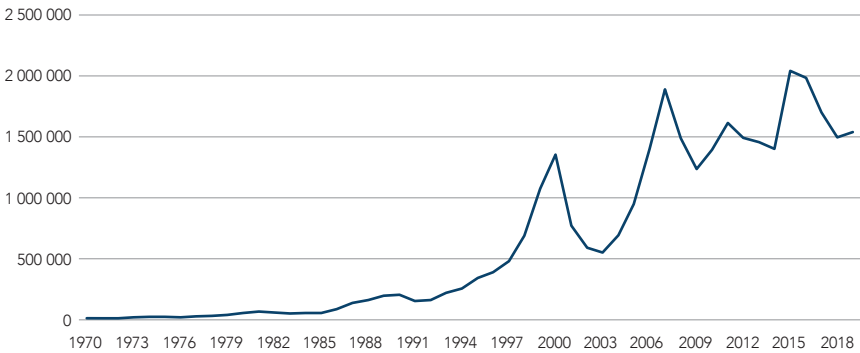
It seems that increased protectionism partly explains the stagnation in FDI. The positive views on globalization in the 1990s changed to more pessimistic views after the financial crisis. This was partly caused by the large income redistributions taking place as a consequence of increased globalization, which tended to hurt parts of the middle class in, for instance, the U.S. and the U.K. This had, in turn, political effects (Autor et al., 2020) and eventually contributed to both Brexit (Colatone and Stanig, 2018) and the U.S. trade wars.

The home countries of FDI have also changed over time with an increase from countries such as China. State-owned companies and sovereign wealth funds are also large sources of FDI. This has triggered fear among some host countries that FDI is not done only for commercial reasons (Cuervo-Cazurra, 2018). As a result, the screening of FDI to address risks to security or national interests, in general,

has increased substantially in recent years. Fear of being dependent on foreign powers for important goods and services, a desire to keep domestic technology within the country, and preventing sabotage of essential services are different aspects of these national security concerns and reasons for screening (Ufimtseva et al., 2020). Another argument for a more restrictive view that has gained broader support in recent years is that a country should not grant access to its domestic market if the same access for its own firms is restricted in foreign markets. This is a discussion that has become important in discussions on Chinese FDI.

There is also a discussion in many countries on the potential danger of being too dependent on global value chains, as it could increase vulnerability to foreign shocks and turbulence. One example is the development in Germany and the EU, described by Czernich and Falck in this volume. Policies are discussed and sometimes introduced to increase the domestic share of value-added, which harms globalization and FDI.

FIGURE 1. GLOBAL FDI FLOWS 1970–2019 (CURRENT PRICES MILLION US DOLLARS)



Source: <https://unctadstat.unctad.org/wds>

The change in attitudes toward FDI is seen in Table 1. It shows the number of policy initiatives that are favorable or negative for FDI. The number of policy changes, including restrictions and promotions, was higher before than after the financial crisis but has increased in recent years. The nature of these FDI policies has changed from a large share with a liberalizing aim to increasingly more policies aimed at restricting FDI. More precisely, more than five times as many policies liberalized the FDI regime than restricted the same regime five years before the financial crisis. The ratio declined to an average of 3,4 in 2008–2019 and saw a large drop to 1,4 in 2020. The absolute number of policies restricting FDI went from approximately 20–30 between 2003 and 2019 to 50 in 2020. Restrictions on FDI are now claimed to be the highest in 20 years and include a range of different measures (UNCTAD, 2019).

For instance, and as previously mentioned, the screening of FDI has increased, not least in the EU, which imposed a new framework for screening FDI in 2020. There has been a particular increase in screening in areas such as health-related industries. Moreover, Hufbauer et al. (2013) found an increase in various local content requirements after the financial crisis, clearly negatively affecting FDI.

TABLE I. CHANGES IN NATIONAL INVESTMENT POLICIES, 2003–2020

	2003– 2007 (av.)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of countries that introduced changes	67	40	46	54	51	57	60	41	49	59	65	55	54	67
Number of regulatory changes	128	68	89	116	86	92	87	74	100	125	144	112	107	152
Liberalizations/Promotions	107	51	61	77	62	65	63	52	75	84	98	65	66	72
Restrictions/Regulations	20	15	24	33	21	21	21	12	14	22	23	31	21	50
Neutral/Indeterminate	1	2	4	6	3	6	3	10	11	19	23	16	20	30
Ratio Liberalizations/ Restrictions	5.4	3.4	2.5	2.3	3.0	3.1	3.0	4.3	5.4	3.8	4.3	2.1	3.1	1.4

Source: UNCTAD (2021), Table III.1., p. 109.

3. THE EFFECT OF INWARD FDI ON ECONOMIC GROWTH AND DEVELOPMENT

To summarize the previous section, global FDI has increased substantially in a longer perspective. However, this development has changed due to the stagnation after the financial crisis and experienced a sharp decline during the pandemic. One crucial question to ask is whether this decline has any economic consequences. This brings us to a discussion on the economic impacts of FDI.

A discussion on MNEs and FDI might start from the observation that it is difficult to open up affiliates in foreign countries. Firms need to spend substantial amounts of money and efforts to do so. For instance, the firm needs to collect information on foreign rules and regulations, survey the country for good production facilities and qualified workers, and understand local preferences and tastes if the purpose is to sell its products locally. The firm needs to bear all of these costs before establishing foreign affiliates and receiving extra revenue from this FDI. Moreover, firms establishing themselves abroad need to compete with local firms with superior knowledge of local conditions. The MNE, therefore, needs a firm-specific advantage to compete, such as a superior technology, management, distribution network, or brand name. It follows that only relatively efficient and profitable firms can afford to take on the costs associated with FDI (Helpman et al., 2004). Empirical studies confirm that firms engaged in outward FDI are larger, more productive, and more

profitable than firms that restrict their activities to the domestic market (Temouri et al., 2008; Bernard et al., 2018).

The selection of good firms makes FDI attractive to many countries. Foreign MNEs will bring with them their superior firm characteristics, which could positively affect the host economy. Most importantly, foreign firms will raise output and income. This is obvious if there are idle resources in the country (unemployment), but it will do so even when this is not the case through a transfer of workers from local firms with relatively low productivity to foreign MNEs with relatively high productivity. This positive effect of FDI on the host economy will also benefit workers through higher wages (Lipsey and Sjöholm, 2004; Heyman et al., 2007), and it might benefit governments through increased taxes. However, the latter aspect is more uncertain, as MNEs typically pay relatively low corporate taxes (Davies et al., 2018). A network of affiliates in different countries makes it possible for MNEs to use transfer pricing to show high profits in countries with low corporate taxes and low profits in countries with high corporate taxes.

There are several other effects of FDI on the host country. For instance, foreign MNEs might use and thereby increase the output of local suppliers. Moreover, some MNEs provide support to suppliers, which will have a positive effect on productivity. Hence, foreign MNEs could benefit firms by providing inputs and components, including manufacturing and service sector firms. Another indirect effect will occur if some of the business practices and technology in foreign MNEs leak out to local firms. This externality is often referred to as “spillovers” from FDI (Blomström and Kokko, 1998). One mechanism is if domestic firms become aware of technology and business practices when foreign MNEs establish themselves in the country and simply imitate the MNEs. Another mechanism could be if local business partners in joint ventures use the technology in other projects. The existing empirical literature is somewhat inconclusive but tends to find spillovers from FDI (Keller, 2021). Despite increased competition, it is unclear whether such spillovers benefit only local firms in up- and downstream industries or firms within the same industry as foreign MNEs (Görg and Greenaway, 2004).

Hence, FDI can be an important contribution to economic growth and development. However, it is difficult to say exactly how important and identify the exact mechanisms based on empirical studies. One reason is that the relationship between economic growth and FDI is complex. Causality is likely to run in both directions; FDI increases growth in host countries, but high economic growth attracts more FDI. The effect of FDI on economic growth also seems to vary between countries that differ in different institutional and socioeconomic contexts. For instance, a high level of human capital seems to increase the growth effect of FDI, perhaps by facilitating technology transfers and externalities (Su and Liu, 2016). Moreover, it seems likely that different types of FDI differ in their impact on the host country and

that countries at different stages of development benefit from different types of FDI. For instance, labor-intensive manufacturing has been of significant importance in many countries in earlier stages of development, whereas technology-intensive FDI might be of relatively large importance in high-income countries.

Moreover, one often distinguishes between three motives for FDI: market-, resource-, and efficiency-seeking FDI. The first is FDI, pursued to be close to a market where the firm wants to sell its products, and the second is done to gain access to natural resources. Efficiency-seeking implies that firms divide the production chain into different parts and place these parts in countries where it is most cost-efficient. Another distinction is between horizontal and vertical FDI, where the former replicates the home country operation in a foreign country while the second divides the production chain into different parts. As discussed below, different types of FDI can and do have different effects on the home country.

4. ENCOURAGING INFLOWS OF FDI

4.1 Restrictions and hurdles

The above discussion shows that there are positive host country effects of FDI. It follows that countries will benefit from implementing policies that are viewed favorably by MNEs. The first step is to allow MNEs to enter and abolish different types of restrictions. As previously discussed, many countries have restrictions on FDI, and restrictions have increased in the last decade. However, avoiding restrictions is a necessary but insufficient measure for attracting more substantial amounts of FDI inflows. The second step is to make it easier to invest in the country. Bureaucracy, red tape, and various forms of legislation can be major hurdles for FDI. Cumbersome business licensing and permit procedures negatively affect FDI (De la Medina Soto and Ghossein, 2013; Hufbauer et al., 2013). Examples of entry barriers include restrictions on hiring foreign personnel, discriminatory licensing requirements, approval by multiple government agencies, and requirements to provide detailed forward-looking information on various aspects of the operation (World Bank Group, 2017, pp. 22). The procedures and efforts required to establish a company vary substantially between countries (World Bank Group, 2017), and they negatively impact FDI inflows (Hufbauer et al., 2013). Hence, simplifying these procedures is an important way to improve the country's attractiveness for FDI.

One way to reduce barriers to FDI is to make bilateral or multilateral investment agreements (IIAs). Such agreements are based on the judgment that investments are good and that various policies can increase them. Areas and issues that are included in IIAs include the admission, protection, and treatment of FDI. A dispute settlement procedure is often included. A large part of IIAs is the attempt to increase transparency on rules and regulations and thereby reduce uncertainty for firms

interested in pursuing cross-border investments. However, the empirical literature does not provide strong evidence of a positive effect of IIAs on FDI volume (e.g., Yackee, 2009). One reason could be that IIAs are negotiated between countries that are well integrated in terms of cross-border investments; causality goes from integration to IIAs rather than the other way around. Another reason could be that cross-country studies fail to find any effect since there is significant heterogeneity between industries, countries, and types of IIA, a hypothesis that receives some support in the literature (Colen et al., 2014; Berger et al., 2013; Haftel et al., 2010).

It should be noted that many IIAs include problematic aspects. According to some observers, IIAs do not give sufficient rights to host countries and responsibilities to foreign investors (Sauvant, 2021). In particular, there are arguments that the restrictions on what economic and social policies host country governments can implement without compensating foreign investors are too severe. Therefore, some countries are renegotiating bilateral investment agreements, a development in which the EU has been particularly engaged (UNCTAD, 2021, pp. 108). How agreements can be designed to increase FDI and account for aspects such as corporate social responsibilities is now negotiated and discussed in several forums and international organizations (Sauvant, 2021).

4.2 Country characteristics and FDI

In addition to the legal framework, there are obvious country characteristics that foreign MNEs favor and an equally obvious variety of country characteristics that discourage FDI. Guidance on important country characteristics can be found in the existing literature on FDI determinants. However, one should bear in mind that there are two serious shortcomings with most of the empirical literature, which make strong policy recommendations difficult. The first problem is that the studies differ substantially in scientific quality. For instance, most papers measure correlations between FDI and host country characteristics rather than causal relationships. Few studies have used common tools for measuring causalities, such as instrumental variables, regression discontinuity, and natural experiments.

The second methodological problem concerns data on FDI. Most studies on FDI suffer from a problem with measurement errors. There are a few studies using industry- or firm-level data on output to measure determinants of FDI; however, most use financial flows from the balance of payments data, which are affected by various factors and only have a weak link regarding actual production by MNEs (Lipseý and Sjöholm, 2011). FDI flows in balance of payments data often do not originate from the countries to which they are attributed, do not enter the countries that are their supposed destinations, and, if they do enter the declared destinations, do not remain in those destinations. They often represent bookkeeping entries in corporate accounts but no economic activity, such as employment, the production of goods

and services, or the installation of capital assets. For instance, many tax havens are among the largest receivers of FDI, although no actual production in MNEs occurs in these countries.

From the discussion above, it is clear that there is room for more research on FDI determinants, research that will attempt to estimate causal effects using appropriate methodologies and data. Because of the caveats above, the variables included in Table 2 are a somewhat subjective literature assessment.

Some country characteristics can be seen as exogenous to the country, outside the control of governments and policy-makers, and others as endogenous or affected by economic policies. The distinction is a simplification in the sense that it might be possible to change some exogenous variables. For instance, market size is one of the most robust factors affecting FDI inflows. Whereas the size of a country is difficult to change, better infrastructure will make the domestic market more integrated and larger, and regional integration might make foreign firms treat the country as part of a larger market.

Other exogenous characteristics include a strong geographic aspect; FDI flows are relatively high between countries located nearby. This has meant that some countries and regions benefit from being located close to large home countries of MNEs. For instance, Southeast Asia has received large amounts of FDI from Japan, Mexico from the U.S., and East Europe from the EU. Accordingly, the neighboring Nordic countries are large home countries of FDI to Sweden. There are different reasons for a strong geographic component in FDI. A short geographic distance typically means large similarities in preferences, culture, and other factors, positively impacting FDI. Moreover, MNEs prefer to have foreign affiliates within the same time zone and close enough to make traveling and visits easy. Finally, short distances reduce transport costs, which is another positive determinant of FDI, especially for efficiency-seeking FDI.

TABLE 2. HOST COUNTRY DETERMINANTS TO INFLOWS OF FDI.

Type	Variable/Host-Country Characteristics	Effect
Exogenous	Geography	Relatively large FDI inflows from nearby countries
	Market Size	Large countries receive large FDI inflows
Endogenous	Taxes	Low taxes increase FDI inflows
	Labor Costs/Productivity	Low wages and high labor productivity increase FDI inflows
	Human Capital	High human capital endowments increase FDI inflows
	Stability	High economic and political stability increase FDI inflows
	Infrastructure	Good infrastructure increases FDI inflows
	Openness to Trade	Openness increases FDI inflows

From a policy perspective, it is more interesting to look at the endogenous variables. Several such country characteristics are seen in Table 2.

Low taxes increase FDI. The effect of low taxes is perhaps surprising in light of our previous discussion on the ability of MNEs to avoid taxes through transfer pricing. Taxes seem to matter most for location decisions among countries that are similar in other respects, and low taxes cannot compensate for a poor and unattractive investment climate (Echandi et al., 2015, pp. 14–15). One example is that FDI to the U.S. declined substantially between 2017 and 2019, although corporate taxes were cut from 35 percent to 21 percent (Djankov and Zhang, 2020). The cut in tax rates could not balance other aspects that were seen as negative by foreign MNEs, such as increased tariffs and nontariff barriers.

The estimated elasticities, or how much FDI declines when taxes increase, vary between studies. It seems that the effect is larger in Europe than in most other places. For instance, in a slightly dated study, Desai et al. (2002) found that a ten percent higher tax rate in Europe is associated with a 7,7 percent decline in FDI inflows. Not only do corporate taxes matter for FDI, but in fact, some other taxes might be more important since MNEs are good at moving profits to countries where corporate taxes are low. Other taxes are more difficult to avoid and therefore relatively important for location choices. This could, for instance, include environmental taxes. Moreover, empirical studies have found effective average tax rates, effective marginal tax rates, and statutory tax rates to impact FDI (Echandi et al., 2015, pp. 14). Finally, different types of FDI are more or less sensitive to taxes. Empirical studies tend to suggest that efficiency-seeking FDI tends to respond most to taxes (Azémar and Desbordes, 2010).

Labor costs are important for FDI. However, the cost and wages should be shown in relation to the productivity of the labor force. Hence, it is the per-unit cost of production that matters for FDI rather than the wages themselves. Moreover, the importance differs between different types of FDI. Compared to MNEs that open foreign affiliates to sell on the domestic market, efficiency-seeking FDI is more sensitive to labor costs.

Labor productivity is affected by a range of factors, including human capital, which is found to have a positive effect on FDI; foreign MNEs are attracted to countries with well-educated populations. However, the discussion in the literature on the roles of human capital and education is rather vague. For instance, what does a skilled labor force mean? Is it a pool of experienced and well-trained workers, a highly

educated population, or something else? There seems to be a need for more research on how skills affect FDI since the literature provides little guidance on these issues.²

Infrastructure is found in many studies to positively affect FDI. However, infrastructure is another vague concept that includes different aspects. Different types of infrastructure are presumably important for different types of FDI. Some firms might be concerned about ports and airports connecting the host country to the rest of the world, whereas others are more interested in the domestic transport system. Others yet might look at some detail on the cost and reliability of electricity supply.

Openness to international trade is important for FDI in most empirical studies (e.g., Görg and Labonte, 2012), even though the theoretical effect of increased openness is unclear. More precisely, FDIs and exports can sometimes be substitutes rather than complements; firms might choose between serving a foreign market through exports or a foreign affiliate. High tariffs will make exports more expensive, and the firm will then choose FDI. However, a more important and dominating factor is that MNEs are trade intensive: they export more of their output and import more of their inputs than local firms (e.g., Bernard et al., 2018). This is, of course, most pronounced in MNEs that have divided up the value chain and produce inputs and components in different countries; however, it is also the case for other types of FDI. Hence, trade barriers will make the operation of MNE networks more difficult and expensive, which will discourage them from investing in the country.

Conflicts and turmoil are typically found to be negative for FDI. This is the case regarding economic turbulence but also concerning political and social turbulence. Economic instability includes high and volatile inflation and deep recessions. Political instability includes dramatic changes in political power or the policies favored by different parties. Exactly how important stability is for FDI is difficult to judge from the literature, but surveys by the World Bank found that investors regard political risk as one of the main negative aspects they consider (MIGA, 2014). It seems reasonable that the importance of stability differs between different types of FDI. Moreover, it is also reasonable to assume that stability is more of an issue for FDI in developing rather than developed countries.

The discussed policies are not discriminatory; they will benefit foreign and domestic firms alike. Hence, a key conclusion is that the most important policies to attract FDI are the same policies that encourage domestic firms and domestic entrepreneurship. A good business environment will bring strong domestic and foreign firms alike in the many different dimensions described above. However, one difference between local firms and MNEs is that MNEs have more location choices than domestic

2. Many studies use the share of the population with university education as a way to measure skills, and this variable has a positive effect on FDI.

firms, at least in comparison to small domestic firms. More specifically, MNEs are relatively good at locating where the conditions are best, whereas domestic firms face larger hurdles and are more constrained in location decisions. Hence, a poor business environment will presumably have a larger negative impact on FDI inflows than domestic business activities.

Moreover, some policies will impact the inflows of FDI but not necessarily on domestic firms. The provision of information is one such aspect. Foreign firms know less about a country than domestic firms. Host country governments can provide information and help foreign MNEs on various practicalities for investments to overcome this hurdle for FDI. Most countries have such agencies, and some countries have spent large amounts of money providing help to foreign firms. It seems reasonable to assume that such activities positively affect FDI, but the magnitude of the effect is unclear.

A related policy measure is subsidies for MNEs located in the country. Such support is common and has been in place for a long time in, for instance, the EU, the US, and many other developed countries (Echandi et al., 2015, pp. 15). The reason behind subsidies is a belief that the social value of investments is larger than the private value. In other words, society is to gain more from FDI than what is captured by production by the firm. Studies on such financial incentives suggest that the effect on FDI is, at best, very limited. For instance, Wren and Jones (2011) examine a large program in the UK that provided grants to FDI located in some specific areas. The estimated effect was positive but very small.

The discussion above is based on results from econometric studies. An alternative approach is to distribute surveys among firms and ask about important factors behind investment decisions. Such surveys have the advantage that they can capture more subtle aspects that are difficult to measure in econometric studies. One example of a survey-based paper is Ohmic and Stephenson (2019), who survey firms and IPAs. They find that aspects such as transparency and predictability of investment measures, streamlined and fast administrative procedures, and requirements, and arrangements to enhance coordination and cooperation are viewed as important determinants of the location of FDI.

5. MAXIMIZING THE BENEFITS OF FDI

5.1. Choosing the type of FDI

The discussion above describes some important determinants of FDI. A host country government might also be interested in attracting specific FDI types that are seen as being particularly valuable. Approximately 70 percent of all countries target specific industries (Charlton et al., 2004). Moreover, policy-makers are interested in

attracting FDI and maximizing the host country's benefits by affecting the MNE's behavior. Hence, there is room for policies that improve upon conditions crucial for some types of (valuable) FDI and policies that affect the behavior of entering MNEs. The latter could, for instance, include collaboration with local firms, technology transfer, and industrial upgrading. Again, this is important if the economic effects differ between different types of FDI. Previous studies suggest that this is the case; the growth effect of FDI depends on aspects such as, for instance, the MNE's skill intensity, suggesting that targeting might be appropriate (Alfaro and Charlton, 2013). It should also be noted that the perceived value of FDI might not be restricted to economic aspects but could include, for instance, social aspects. FDI that has a broader positive impact on the host country is sometimes referred to as "sustainable FDI" (Sauvant and Gabor, 2021) or "quality FDI" (OECD, 2019).

Two different factors are typically taken into account when the value of a particular FDI is being discussed. The first is the degree of possible externalities. High-tech MNEs tend to be viewed as valuable because of presumed technological spillovers. Host governments hope that technology-intensive FDI will spur the development of a domestic high-tech industry. Whether technology-intensive FDI is truly more valuable than other FDIs is questionable and seems to depend on the context: the host country must have the right conditions for utilizing and benefitting from technology-intensive FDI, for instance, through a sufficiently skilled workforce and sufficiently developed domestic firms.

Job creation from FDI is another aspect that is often looked upon. MNEs create many jobs in comparison to local firms (Lipsey et al., 2013), and MNEs contribute to a substantial share of total employment in most countries; for instance, 22 percent of total private industry employment in the U.S. and 6,4 percent of total urban employment in China (Qiang et al., 2020).

Job creation is often an argument used by policy-makers in favor of subsidies to FDI. However, subsidies to FDI can sometimes amount to huge sums for every new job. Delevic (2020) reported that Nissan received subsidies amounting to 11 000 USD per new job when it established an automotive factory in the U.S., and Subaru received 50 000 USD per job for a similar establishment. Moreover, India gave subsidies to Ford amounting to over \$200 000 per job created in a new factory (Thomas, 2010). These huge sums could be justified only if there is a crowding-in of jobs (i.e., if the new factory increases employment in many other firms). It is unclear whether such crowding-in typically occurs, at least to the magnitude that would make cost-benefit analysis justify the subsidies. Delevic (2020) found no effect on employment in Serbia beyond subsidized jobs (i.e., there is no additional job creation).

Hence, externalities from high-tech industries or job creation are two aspects that are often important in shaping the FDI policies of a country. One difficulty with an

overly strong focus on, for instance, externalities is that it might make governments target firms in industries where the country has no clear competitive edge and where the externalities, therefore, never materialize. An alternative approach is to favor FDI in industries where the country already has a strong base. In other words, the host country tries to strengthen already established clusters by encouraging FDI within the same industry or in industries with backward and forward linkages to the industry.

The work in attracting FDI is often organized by investment promotion agencies (IPAs). According to the World Bank Group (2017, pp. 18), more than 200 national IPAs and approximately 2 000 local IPAs are part of subnational governments. IPAs are typically organized around targeted industries with specialized staff working in these different units. Many IPAs offer investment incentives and investor facilitation to firms in targeted industries (Alfaro and Charlton, 2013).

5.2. Affecting the behaviors of MNEs

The benefits of FDI increase if the foreign MNE becomes rooted in the local economy, for instance, by using local suppliers. Linkages will increase output and employment in local firms and involve flows of tangible and intangible assets (UNCTAD, 2001). Alfaro-Urena et al. (2020) examine the effect of linkages with MNEs in Costa Rica. The positive effect on local firms is relatively large; they grow in size, increase productivity, and start selling their products to other new buyers. The positive effect is caused by MNEs demanding that local suppliers improve management, change sourcing strategies, and hire more skilled workers.

Most MNEs seem to have relatively few direct linkages of this sort with the local economy, even in developed countries. This is particularly true for relatively new FDI, whereas linkages might materialize and expand over time under the right conditions. For instance, Scott-Kennel (2007) examines linkages between MNEs and local firms in New Zealand. Only around 14 percent of MNEs are classified as having a broad set of linkages with the local economy. The number of linkages was positively related to the age of MNEs and affected by the line of businesses.

Moreover, different types of FDI are associated with different amounts of linkages. Market-seeking FDI tends to develop more forward and backward linkages with local firms than a resource- or efficiency-seeking FDI (Farole and Winkler, 2012; Sánchez-Martín et al., 2015). Efficiency-seeking FDI is often viewed as particularly valuable for host countries since it enhances participation in global value chains. However, high-quality suppliers are typically required for efficiency-seeking FDI to materialize since that is necessary for MNEs to compete globally.

There is a role for governments to play in developing linkages, mainly because of market failures, such as asymmetric information. MNEs highlight good information

about local suppliers as important for locating their foreign operations (Omic and Stephenson, 2019). Accordingly, local firms might need help to gather information on the presence of MNEs and what their demand for inputs looks like. It is costly and cumbersome for individual firms to collect such information. IPAs can play an important role simply by providing information on potential suppliers to MNEs and information on potential customers to local firms, for instance, through an accessible database. In addition, more active work to match MNEs with local suppliers can be pursued. Some countries have successfully invested significant effort into such activities. For instance, the development of Singapore's strong electronics industry was enhanced by a government program that matched local suppliers and foreign MNEs, hoping that such meetings would develop into a mutually beneficial collaboration (Brown, 1998).

Some governments instead try to force through linkages between MNEs and local firms. The local content requirement is often used in developing countries, although they tend to be prohibited by the WTO (Echandi et al., 2015, pp. 27). The intention is that local content requirements should accelerate the integration of foreign MNEs with the local economy. However, its benefits are highly questionable since it tends to make more competitive MNEs shy away and invest in other countries. This is the case for efficiency-seeking FDI in particular, where any policy that runs the risk of increasing the cost of production will discourage MNEs. Hufbauer et al. (2013) examined the effect of 117 local content requirements worldwide and found that it negatively affects FDI, trade, and employment.

Instead of policies trying to force MNEs to engage with local firms, local firms need to upgrade their operations and compete internationally to become of interest as suppliers to MNEs. There are several advantages for MNEs using local suppliers. For instance, it might reduce trade costs, and locally produced input goods might help adapt products for the local market. Hence, MNEs will use local suppliers if they can. However, MNEs often indicate that lack of direct linkages with domestic suppliers is caused by the poor quality of inputs, poor cost-competitiveness of suppliers, or poor reliability of supply (Jordaan et al., 2020, pp. 7). This is particularly the case with FDI in developing countries, but similar issues are also considered when firms decide between investments in different developed countries. MNEs perform a simple cost-benefit analysis when they decide on their sourcing strategies, and the poor quality of suppliers or even uncertainties regarding the quality make it less likely that sourcing will be local. Governments might reduce uncertainties by providing quality and certification schemes for local producers. Moreover, government organizations can complement efforts by MNEs and local suppliers and together strive for a broad and competitive supply base. It seems that such programs rely on the active engagement of all three parties to be successful: the host country government, local suppliers, and foreign MNEs (UNCTAD, 2001). In particular, cost-sharing increases the commitments of participating firms.

Erchandi et al. (2015, pp. 25) argue that host countries can improve upon linkages by paying attention to aspects such as the “learning and innovation infrastructure, trade policy business and investment climate, access to finance, and labor market regulations”. Regarding the mentioned Singapore case, government-supported local firms’ quality upgrading programs occur in various ways (Brown, 1998). Moreover, MNEs had managers working full time in conjunction with the supplier to improve quality, which benefitted both suppliers and MNEs.

Finally, it is desirable with FDI that strive to upgrade production over time to increase productivity and avoid industrial stagnation. Such upgrading will depend on the context and takes place if there is, for instance, a sufficient skill base in the host country. The host country’s government has an important policy role in providing an environment prone to quality upgrading.

Some studies also suggest that tax incentives to MNEs that upgrade their production, for instance, by introducing new products and direct R&D support, might have positive impacts (Brown, 1998), but the issue needs to be addressed in more general cost-benefit frameworks.

Again, the choice of activity taking place in a country by MNEs will rest on simple comparisons of costs and benefits. Hence, technology upgrading will take place if it is profitable. MNEs will avoid bringing in new technology if it is less suitable for the local conditions or risk losing it to domestic competitors. This highlights the importance of domestic institutional factors for how MNEs behave. The protection of intellectual property rights and good juridical systems increases the likelihood for MNEs to upgrade production over time.

Finally, the above discussion focuses on linkages between MNEs and local backstream suppliers. It can also be beneficial for countries to attract MNEs in support industries. Such MNEs will make downstream firms, local and foreign, more competitive. It will also contribute to the network of firms and create dynamic clusters. Clusters are important for attracting other MNEs to the country.

6. CONCLUDING REMARKS

FDI has the potential to spur growth and development in the host country. MNEs are larger and more productive than local firms, pay higher wages, and are integrated into global value chains. Policy-makers should, therefore, think carefully about how they can attract MNEs to the country. The context matters for FDI policies: policies suitable for developed countries differ from those suitable to attract a different type of FDI in developing countries. Our discussion offers some suggestions on what policies are important for a country such as Sweden.

The first conclusion from the literature review on FDI determinants is that any improvements in the general business climate will positively affect the inflows of FDI. Hence, good economic policies will benefit both domestic firms and attract inflows of FDI. Such policies include improvements in education, not substantially higher taxes than neighboring countries, good infrastructure, stable macroeconomic policies, and an open trade regime. The quality of education in Sweden has deteriorated in recent decades, and the debate on how to change this development is very active. Poor education will first and foremost be negative for wages and living standards. Our survey shows that it will also harm the inflows of FDI. Taxes in Sweden are high, although they have declined in recent decades. In particular, income taxes remain higher than in most other countries. This will have a negative impact on FDI, partly because it makes it more difficult to transfer foreign personnel to Swedish affiliates. Infrastructure is an area where large investments will be necessary for the years to come, not least concerning roads, railroads, and electricity systems. Moreover, Sweden has had large economic and political stability since the economic crisis in the early 1990s. Public debt and inflation are low, and economic growth has been comparably high. Finally, trade policy is decided at the level of the EU. Sweden has traditionally been an advocate for a liberal trade regime. Unfortunately, it is plausible that this view has lost strength with the exit of Great Britain, another free-trade champion. New alliances have been formed, but it is quite likely that the EU will be less open in the future.

Other factors affect MNEs more than domestic firms. For instance, good FDI policies would focus on abolishing various regulations and red tape that can be cumbersome and cause MNEs to invest in other countries. Finally, it can be difficult for MNEs to gather good information, which means that government agencies (IPAs) have a role to play. This is probably more important in developing countries than in more developed countries such as Sweden. Nevertheless, IPAs such as Business Sweden have a role to play and can be particularly important for investment from small- and medium-sized foreign firms, which may lack resources to collect the necessary information.

Attracting FDI can be seen as a first step, ideally followed by policies aimed at maximizing the benefits of having foreign MNEs located in the country. Such policies should aim to make MNEs develop linkages with the local economy and continuously upgrade their activities in the country. The first requirement is the right conditions for such linkages to develop. This means FDI in industries where Sweden has good conditions for production and growth. It is unlikely that more substantial linkages will develop if a good supply base does not already exist. The government can play an important role in implementing policies that foster competitive suppliers. These are similar to the general good business climate discussed above. Finally, there might also be a matchmaking role for the government; the

likelihood for linkages will increase if foreign MNEs and local suppliers are aware of each other's existence.

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CHAPTER 8

TOWARD A GEOECONOMIC ORDER

RISKS AND CHALLENGES FOR A SMALL COUNTRY

ENRICO DEIACO AND CHRISTER LJUNGWALL

1. BACKGROUND

Industrial policy can take many different shapes. On October 20, 2020, the Swedish Post and Telecom Authority (PTS) announced that Hi3G Access (Tre), Net4Mobility (Tele2 and Telenor), Telia Sverige, and Teracom had been invited to bid for Sweden's 5G network. The announcement also declared that Sweden's 5G network did not include any products from Chinese suppliers Huawei and ZTE after recommendations from the Swedish Security Services (SÄPO) and PTS. Huawei responded by declaring that they would take the PTS decision to court. Huawei appealed PTS's right to proceed with the auction but was turned down in court on January 19, 2021. Since then, PTS has held its 5G network auction, effectively excluding Huawei from a future role in Sweden's 5G and 6G infrastructure development.

Restrictions on Huawei's international activities were also implemented in the U.S. and UK (Rodrik, 2021). These restrictive decisions and Chinese industrial policies to curb activities from competitors have sparked a discussion and fear of how it may induce unfair competition in world tech markets. One response in the West has been to discuss whether there is a need for more industrial and regulatory policies (European Commission, 2020).¹ Recently, an editorial in Sweden's largest business paper even raised the question of disputing majority foreign ownership in sectors considered strategic for industrial development.² Thus, we are witnessing

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1. The fear of China's large strategic industrial investments led the EU and Germany (Chapter 1) to propose a more activist industrial policy, among other things by nurturing national champions (European Commission, 2020).
 2. <https://www.di.se/ledare/volvo-maste-hem/>.

a significant and structural reshaping of the international business order, partly governed by China's geopolitical and geoeconomic strategies.

We, therefore, raise questions on how to address the challenge from China and how well Sweden and Swedish companies are prepared and equipped to meet the next stage of the global research and innovation game. We argue, in this chapter, that response and reciprocity must be taken to unfair industrial practices in general, but the major issue is how not to underestimate China's rapid technological development and the formation of new competencies. In addition, an emerging geoeconomic game plan should focus on open markets rather than implementing protectionist policies. It should also be met by a more forward-looking strategic intelligence by companies and government following the development of an increasing geoeconomic world order.

The exclusion of the major Chinese suppliers came as a surprise given that Sweden has nonnegligible export and R&D cooperation with China.³ This led to a series of events that affected diplomatic relationships between the two countries. However, it also illustrates the main theme of the chapter, that strategic industrial policy may now be a central battlefield in the race for technological, military and economic supremacy. The precondition for what we refer to as the postwar and Cold War geopolitical competition for the control of territories and natural resources has undergone major changes (Harding and Harding, 2019). Behind this is a rapid, and in many cases, disruptive technological development in digital infrastructure where 5G (and 6G), artificial intelligence and big data are seen as keys to both economic and political influence. Today, companies and countries in the digital space collaborate and compete in partially unknown patterns where old approaches are replaced by new arrangements. This evolving geoeconomic structure has many dimensions, ranging from widespread abuse of IP rights, barriers to trade and the exercise of power, as well as mutual and global research collaboration between what are perceived as close allies.

With influence over the technological space, new opportunities are created to change the economic and political order. In this way, the contours of a nascent geopolitical and geoeconomic confrontation emerge (Blackwill and Harris, 2016). In a world of rapid technological development and major societal changes, these two concepts are increasingly intertwined. The former is based on an abundance of geographical and natural resources; the latter is grounded on the spatial, temporal and political aspects of a country and its technological resources and

3. Swedish export to China reached SEK 78 billion (USD 9 billion) in 2020.

competence.⁴ This geoeconomic order has grown in recent years, where countries are increasingly using a strong economy as a basis for sanctions and threats, rather than military force, to achieve direct or indirect control over a territory as well as tangible and intangible resources.

Power measurements between different regions are not new from a historical perspective. Competition for technological domination took place when Germany challenged Britain for industrial leadership in late 19th century Europe (Brunnermeier et al., 2018). However, competition is now different due to three large changes in the international business order (Petricevic and Teece, 2019). First, there is an emerging erosion of global rule-of-law governance. Competition is no longer rule-based, as in the Washington Consensus era, but contains features of a nonrule-of-law system. Second, this amplifies today's international business environment, making it more volatile, uncertain, complex, and ambiguous for international investments and trade. Third, geoeconomic strategies have been used before. The difference today lies in the magnitude and nature of digital innovations, which require large and geographically diverse markets to recoup investment but are difficult to retrieve in a business environment with large market distortions created by government policies eroding rule-of-law governance. What follow is a reshaped global economic order and the emergence of a new playing field for international business.

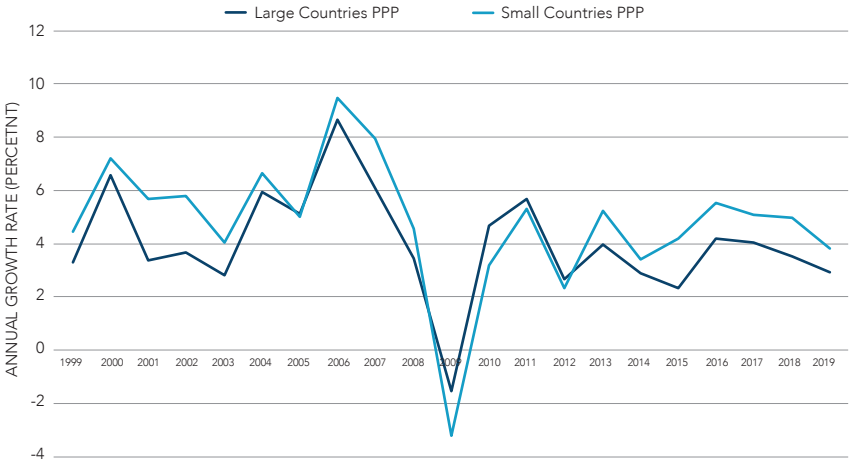
In the midst of this upheaval are the opportunities and limitations of the small country. In the 1980s, there was a similar discussion and fear that small open economies would not keep up with technological and industrial competition from emergent countries, such as South Korea and Japan, as well as from large and developed economies. It was framed in the literature as the risk of "a small country squeeze" and was used to describe and analyze the geopolitical and geoeconomic tensions in the 1980s (Levinsen, 1983). Despite the perceived risks, small countries generally fared well and blossomed in the era of globalization and deregulation, as was the case in Sweden (Heyman et al., 2019 and Figure 1.1).

However, the question we explore in this chapter is whether there is again a risk of a "small-country-squeeze" in an era of paradigmatic economic power struggle compared to the era of free trade that has prevailed during the Washington Consensus. The dominant playing field, or order, has been a free trade-friendly geoeconomic equilibrium point that has benefitted small countries. The international conditions in the last two decades and the global mobility of various input factors have favored small open economies that have taken advantage of

4. The definition used here is, "The use of economic instruments to promote and defend national interest, and to produce beneficial geopolitical results; and the effects of other nation's economic actions on a country's geopolitical goals" (Blackwill and Harris, 2016).

specialization opportunities that opened in the wake of global value chains. This is indicated in Figure 1 and shows the difference in GDP growth rates between large and small open economies.

FIGURE 1. PERFORMANCE OF SMALL VS. LARGE AND ADVANCED ECONOMIES, GDP GROWTH % (1998–2018)



Source: Swedish Entrepreneurship Forum.

The old geoeconomic and geopolitical order allowed small nations to bloom. However, there are good reasons to raise questions regarding how the golden age of small states such as Sweden will be challenged in a new geoeconomic order. How will the new order look like? How will it impact small countries? What industrial policy strategies are important for Sweden to handle changes toward an increasing geoeconomics game plan? We argue that Sweden, which to a large extent bases its prosperity on the free flow of goods, capital, and services, has special challenges in adjusting to the logic of increased geoeconomic conflict.

The aim of the chapter is to improve policy understanding of the significance, forms and likely impact for small and export-dependent countries facing an emergent geoeconomic order. Thus, the chapter is forward-looking. Section 2 will review current and major trends, elements and instruments used in the emergent order. In section 3, the likely economic impact of increased power struggles on large and small countries will be reviewed. China's current and planned industrial policies are used as an example to showcase the impact of geoeconomic power on a small, advanced country such as Sweden. The final section 4 summarizes and concludes.

2. THE EMERGING GEOECONOMIC ORDER

An international economic order is defined as predictable sets of behavior with interactions and outcomes within a particular social system (Roberts et al., 2019). Thus, a given order consists of certain regulations (rules, norms, institutions) and patterns of behavior (actions, reactions, outcomes) that reflect how various actors understand and apply those regulations.

The Washington Consensus has been just such a stable geopolitical and geoeconomic order, focused on maximizing economic gains in international trade and investment and with the aim of increasing efficiency within and across economies (Spence, 2021). The main institutional features of the order were to promote free markets, free trade, floating exchange rates, deregulated markets and macroeconomic stability; industrial policy was not a prominent part of the Consensus (op cit., 2021).

The pros and cons of the order have been discussed widely, but its effectiveness has also been challenged in the current period of rapid disruptive technological and geopolitical change.⁵ It was explicitly assumed that free trade would lead to a win-win situation where the size of economic gains could be claimed by each state through cooperation. Security concerns in the order were understood to increase economic interdependence, which would promote peace and cooperation by raising the cost of conflicts between states (Gartzke, 2007). However, as discussed below, the previous order has changed and international business relations are being disrupted and undergoing structural reshaping. The main rules, norms and institutions of the previous era have and are predicted to shift from an emphasis on cooperation to one of the blends of intense competition and state economic and security conflict (Roberts et al., 2019). As described below, the new order is already taking shape and growing in importance.

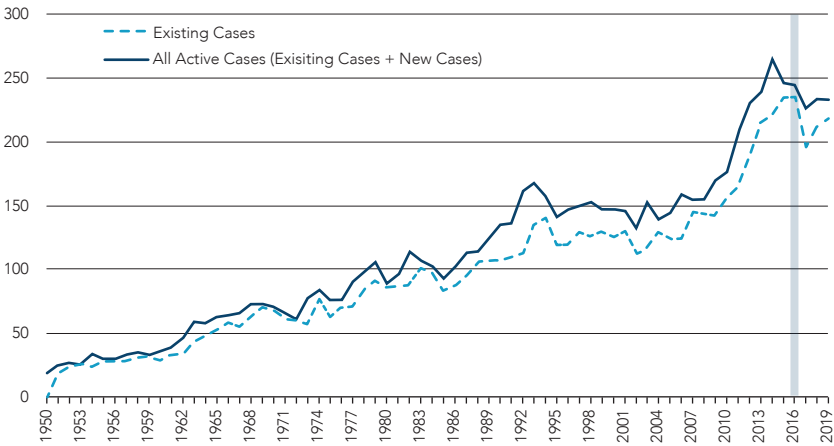
Even if strong tendencies of deglobalization are not yet prominent, protectionism is on the rise again.⁶ New tariffs have been introduced, and a more nationally oriented industrial policy has emerged in China and the United States (such as the America first policy) and is being planned for in Europe and heavily discussed in Germany (see Chapter 2). During the free trade era and rapid globalization of the Washington Consensus in the 1990s and the 2000s, the more recent past has seen interstate

5. In Spence (2021) the benefits and costs of the Washington Consensus for developing countries are discussed.

6. The discussion about the emergence of a new geoeconomic order has raised the question whether the new era will also be an end of globalization. The pace of globalization has slowed down relative to recent decades – a process that *The Economist* has referred to as “Slowbalisation”. There is little evidence indicating that the world economy has entered an era of deglobalization. Instead, it is suggested that the observed slowdown in globalization may be a natural sequel to the unsustainable increase in globalization experienced in the late 1980s, 1990s and early 2000s (Antràs, 2020).

political conflicts, political polarization, and extensive use of coercive sanctions intended to limit the international movement of goods, assets, and people. As an example, Figure 2 depicts the rapid increase in all identified sanctions between 1950 and 2019. In addition, the benefits of the existing liberal world order are being discussed and problematized, where an indicator of change is that bilateral agreements (research and trade agreements) rather than multilateral agreements have become increasingly common. Thus, a resurgence of techno-nationalism by nation-states is being called for (Petricevic and Teece, 2019).

FIGURE 2. EVOLUTION OF SANCTIONS, 1950–2019



Source: Felbermayr et al., 2021.

On the surface, it may seem as if the world is facing trade frictions between the U.S. and China. However, the underlying forces are not just competition for trade surpluses but, above all, competition for digital leadership, a struggle that is expressed as “a struggle away from physical space to digital data space” (Harding and Harding, 2019, pp. 171). The importance of the digital economy for gaining a competitive advantage for firms and nations can hardly be overestimated. Most things are now data-driven, such as market positions in platforms, sales of business services, development of innovation and business-driven ecosystems, smart products, the Internet of Things, AI and more. Thus, the production, use and diffusion of data has become a hard economic and military currency in the digital power struggle and is one of many aspects where the geoeconomic and geopolitical game plans coincide, such as in the example of Huawei.

Compared to the previous era, there is a shift from an economic mindset to a more security mindset in international economic relations and increased interdependencies

between nations where economic instruments are used to compete and conquer.⁷ For instance, there is a close connection between China's civilian and military sectors, which is amplified by the struggle of digital technology dominance. Most technological activity in China must thus be seen through a political techno-centric lens (Teece, 2019).

Other examples that may be used as illustrations of increasing geoeconomics strategies are China's and Russia's cooperation on formulating new 5G standards, China's work to develop an alternative to the current SWIFT system for financial transactions and China's dominance in the production of the powerful chips needed for 5G's large-scale implementation.⁸ In January 2020, the People's Bank of China began the implementation of an electronic currency that was eventually intended to be used in all transactions with foreign countries (PBoC, 2021).⁹ Thus, various nonmarket industrial policy instruments have been used to a much greater extent than in the previous era of the Washington Consensus. This includes sanctions, export and import controls, limited market access setting global standards for future competitive advantage, intellectual property theft, and regulatory pressures in favor of domestic companies (e.g., cyber security law in China), just to mention a few examples (Lou et al., 2020).

Increased foreign influence operates through multiple channels where a good portion is friendly but, increasingly, many are hostile. Some are based on mutual agreements (such as preferential treatment agreements, PTAs), others influence specific policies in the target country (e.g., actions toward Huawei in the U.S. and UK) or interventions where foreign powers seek to change the target country's institutions to obtain more influence on future policy outcomes such as beneficial market access or election results. Thus, the motivation behind influence and specific interventions, such as sanctions, tariffs, standard setting or influencing foreign elections, are, in economic jargon, an externality problem. In the present digital era, cross-national policy externalities exist where one country is directly affected by the choices made by other countries. Foreign interventions are used to internalize these externalities (Aidt et al., 2019).

Chinese geoeconomic policies have triggered various counteractions. Within the EU, there is great concern about functioning toward a future geoeconomic game plan. An industrial policy debate preceded by the European Commission not

7. The Chinese Communist Party, for example, believes that China has achieved "Geoeconomic Resilience". In this way, they can exercise power without fear of economic countermeasures from, for example, the EU (Ljungwall and Bohman, 2017; Ljungwall, 2020).

8. The Economist, January 23–29, 2021.

9. Central bank digital currency (CBDC).

approving a merger between German Siemens and French Alstom came up on the agenda with the motive that it would limit the market for high-speed signaling systems. The decision aroused criticism, as it was considered that the two companies were too small to be able to compete with primarily Chinese state-owned companies (Ekholm, 2020). In response, a debate arose calling for changes in industrial policy with extensive investment in innovation using the EU's common financial resources, opportunities to block other countries' direct investment, standard setting, developing their own data-sharing protocols, participation in public procurement and changes in the current competitive framework. This indicated a concern that the EU's competition policy is too focused on the internal market, non-geo-economic, and may lead to disadvantages when other countries use a game plan with their own rules.

2.1 Potential macro impact of technology decoupling

We do not suggest that one order has or will replace the other. However, current trends in international business relations indicate that major actors, particularly China and the U.S., have shifted from the main emphasis on cooperation to increased nonmarket competition and conflict. The geo-economic trends and elements outlined are not all about competition in the trade of physical goods but rather about who controls and leads an emerging digital technological game plan.

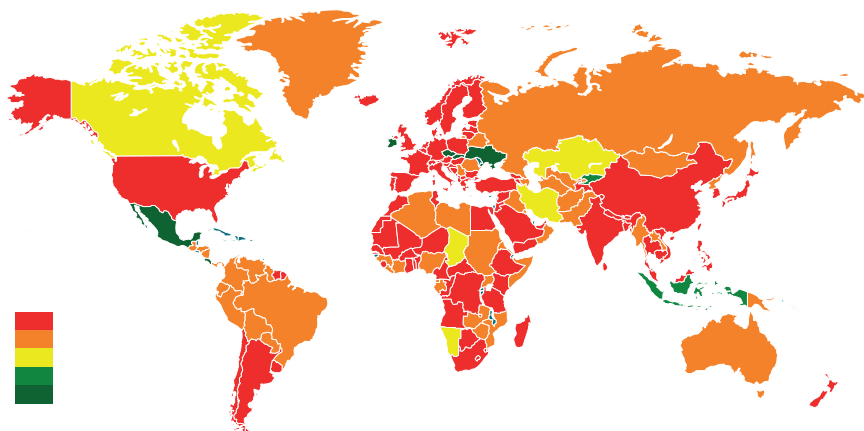
This rise of techno-nationalism in the form of renewed attention to strategic industrial policies heightens complexity and ambiguity in international economic relations and increases the risk for technology decoupling, defined as the undoing of cross-border trade in high-tech goods and services (Cerderio et al., 2021). The simulations in Figure 3 show that decoupling is costly for most countries, irrespective of whether they are large (U.S. and China) or “smaller” (Germany and other OECD countries). The cost is highest for China, followed by the U.S. and Germany. In all scenarios, small open economies (especially with a small GDP share in the global economy) experience large and negative gaps in output.¹⁰ Whether a smaller country loses depends on its relationship with large technology hubs in China or the U.S. For a small country, dependence on a single hub may be especially harmful.

Hence, the macroeconomic impact of a geo-economic game plan may be severe for small economies. In the next section, China's state-led industrial policies are used as an example to showcase the potential impact and squeeze of a large country's

10. Using a dynamic macroeconomic model, the authors describe the hypothetical economic impact of technological decoupling on growth in various countries. Different scenarios are simulated with either nonpreferential or preferential treatment, the latter being defined as a case where nonhub countries only trade with the hub for which their trade is highest and only with other countries in that bloc.

geoeconomic power on a small, advanced and export-dependent economy such as Sweden.

FIGURE 3. SIMULATIONS OF THE IMPACT OF TECHNOLOGY DECOUPLING BETWEEN CHINA AND THE U.S. ON THE LEVEL OF POTENTIAL OUTPUT IN VARIOUS COUNTRIES



NB: The colour code maps show effects on potential GDP. Red indicates negative values under scenario (no 6) with preferential attachment by nonhub countries. Green show most positive effects
Source: Cerdeiro et al., 2021.

3. FROM SMALL COUNTRY SQUEEZE TO A DOUBLE SQUEEZE

Burdened by weakened growth during the 1970s and early 1980s and with an uncertain and unstable economic environment, Sweden, like most small advanced economies (SAEs), was in a situation where the conditions for competing in the global market had changed significantly. In just over a decade, countries such as South Korea, Taiwan and Singapore had transformed from low-income to high-middle-income economies and were now considered newly industrialized economies (NIEs). However, despite the strained situation, most SAEs managed to handle the pressure from the outside world, develop their competitive edge and soon became major beneficiaries of the “next wave” of globalization. This is both noteworthy and impressive.

Nonetheless, the seemingly sustained competitiveness that has served small advanced economies (SAEs) so well for almost half a century has, to some degree, become challenged by rapidly emerging economies such as China. As shown in section 2, this is happening at a time of game-changing global restructuring and increasing polarity between the West and China. The present-day situation is thus different

from new dynamics at play with potentially negative impacts on multinational companies (MNCs) in SAEs.

The broad premise for the following analysis is a careful examination of these dynamics and what to expect next. Particular attention is given to the strategy of China, first because of its economic might and huge market, and second because of its seemingly provocative, nonrule-of law-based industrial policies. Two questions are necessarily raised to a high level. First, are SAEs equipped to meet the current alterations to the existing geoeconomic *modus operandi* of global trade and investment of the 21st century? Second, is there a risk that SAEs will be caught in the middle of two or more globally dominant economies while being overrun by old and new NIEs? Our conjecture to the first question—deliberately exaggerated to make a point—is “probably not, but the problem can be cured”. The second question “pleads for a yes”.

3.1 Small economy squeeze

A vast number of studies have documented the greater vulnerability of small economies compared with large economies, but the literature is blurred by its broad definition ranging from relatively well-off microeconomies to poor [small] developing economies (Bräutigam and Woolcock, 2001; Easterly and Kraay, 2000; Commonwealth Secretariat, 2000). In addition, SAEs are often equated with small industrialized economies (SIEs).¹¹ The difference between them may seem subtle but is, in fact, both clear and significant. Not the least does it imply that SAEs and SIEs face different types of vulnerability, and with them, different risks of ending up in a small country squeeze.

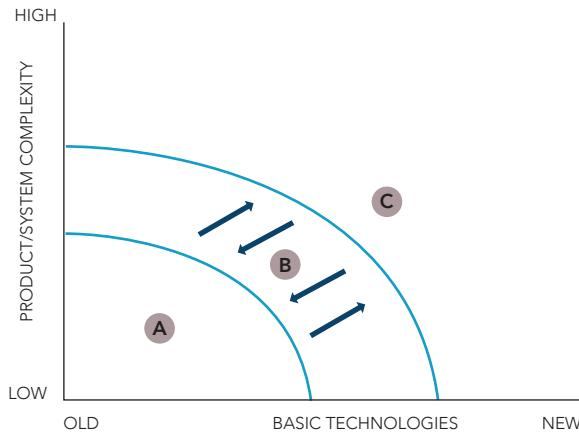
Figure 4 provides a simple framework to analyze how SIEs were squeezed throughout the 1980s. Small industrialized economies (SIEs) suffer from domestic markets that are too small to permit a competitive strategy based on scale economies and cost reductions similar to those of small advanced economies (SAEs), other than in highly selective niche sectors (Skilling, 2020).¹² Scholars such as Kotler et al. (1997) use Levinsen and Kristensens’ (1983) concept of “the small country squeeze” and explain in an illustrative way the strategic dilemma in which SIEs find themselves. Area B in Figure 4 denotes the situation where SIEs, such as Ireland, are being squeezed from two directions. First, they are subject to hard competition in simple products based on mature technologies from newly industrialized economies (NIEs), such as Malaysia, denoted by area A. At the same time, their indigenous manufacturing is effectively excluded from markets for complex products based on new technologies, where large advanced economies (LAEs) such as the U.S.

11. Denmark, Norway, and Sweden are examples of SAE. Ireland, Iceland, Czech Republic are examples of SIE.

12. For example, Ireland and other smaller EU-member states.

are dominant, denoted by area C. Area C is itself increasing as traditional sectors themselves adopt new technologies, thus pushing outward in the direction of area B. The natural domain of SInS is, therefore, being squeezed from two directions. Only when these economies can sustain world-class multinational companies are they able to sustain global competition, which has been a fortunate position for Sweden (Eliasson et al., 2021).

FIGURE 4. THE SMALL COUNTRY SQUEEZE



Source: Kotler et al., 1997

Perhaps one of the most important triggering factors for the dynamic environment that reflects the success of SAEs is that both business and politics realized early on that a sustainable competitive advantage is rare.¹³ The lesson learned was thus about the need for change, i.e., the necessity to move from one temporary competitive advantage to another where joining global value chains was an important strategy. This is what made it possible for SAEs to transition away from a potential small country squeeze in the 1980s, making them increasingly capable of sustaining and advancing global competition.

Its relevance is proven by a series of studies that gained momentum during the 1990s that show that sustainable competitive advantage is rare and, if it exists, declines in duration (D’Aveni, 1994; 2010; Ruefli and Wiggins, 2002; Wiggins and Ruefli, 2005). Much research effort has also been devoted to the idea that continuous strategy innovation and change are necessary in disruptive environments, especially in nascent, emerging, high-tech, or other high-velocity environments, where

13. Earlier studies were dedicated to defining and empirically demonstrating the existence of sustainable advantage. See for example Rumelt et al. (1994).

the structure and the rules of the game are unstable (D’Aveni, 1994; Christensen, 1997; Markides, 1999; Hamel, 2000). Adapting the ideas of continuous pursuit of strategic change became a mantra for success and helped SAEs and Swedish MNCs stay at the productivity frontier despite harsh competition from NIEs and LAEs.

A conclusion is, thus, that a combination of being dominated by domestically owned multinational companies and the ability to both anticipate and implement change made SAEs increasingly capable of sustaining and advancing global competition. This took place during a favorable international order with open rule-of-law-based trade, technology, and foreign direct investments (FDIs).¹⁴ The implication is that SAEs were able to avoid being caught in the ‘small country squeeze’. Instead, SAEs have been able to successfully compete in markets for complex products based on new technologies. In this way, a country such as Sweden, through constant innovation and change, essentially managed to handle the pressure from NIEs. That this has endured over the past forty years is noteworthy and impressive. Nevertheless, signs in recent years suggest that this situation is being slowly challenged by rapidly growing emerging economies such as China.

3.2 Double squeeze: A possibly contagious narrative

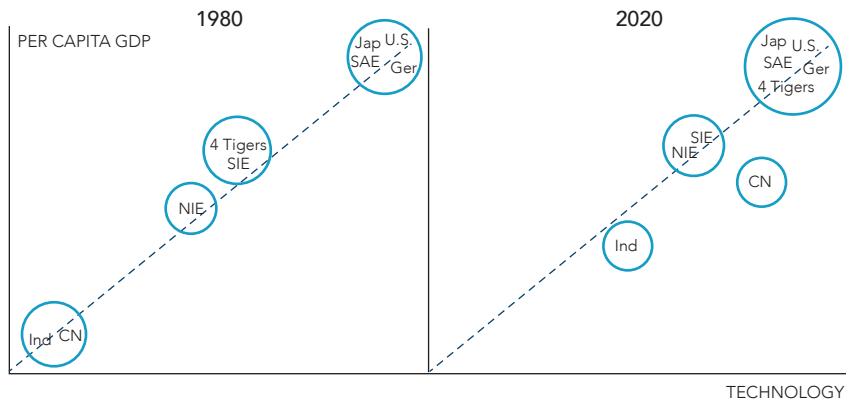
What does not appear from the analysis thus far is that despite all the favorable conditions mentioned, there is no consistent evidence in the literature that dynamic capabilities are sustainable over extended periods of time and in different contexts. There is both theoretical and empirical evidence that complacency and inertia may undermine the sustainability of dynamic capabilities (D’Aveni et al., 2010; Petrececic and Teece, 2019). With its origin in the disruptive environment literature – a segment of the business strategy literature – it is argued that companies can either become exhausted by continuous transformation and innovation or become complacent by success and turn out to be blinded and myopic to requisite environmental change (Audia et al., 2000; Anderson and Singleton, 2008; D’Aveni et al., 2010; Van Knippenberg, 2013; Schatz, 2019). If the perceived pressure for innovation and change diminishes over time, a company’s competitiveness can be quickly eroded. From this point of view, one can raise the question of whether there is a risk or not that SAEs, after almost half a century of success, are now starting to show signs of innovation exhaustion and complacency. Is it at all possible that China’s seemingly endless appetite for foreign investment and growing markets have obfuscated the rising capabilities of Chinese domestic companies?

Figure 5 illustrates the increasingly competitive environment over the past four decades. In this period, a country such as China moved from a largely agrarian society to an industrial powerhouse with advanced technology and a global presence.

14. See Chapter 2

Similarly, economies such as South Korea, Taiwan, and Singapore have successfully transformed themselves from middle-income to high-income economies and global leaders in innovation and technology, only to be shadowed by fast-growing economies such as Israel, Thailand, Mexico, South Africa, Brazil, and Turkey. India is making progress in the direction of a middle-income country with rapidly improving productivity levels and advancements in technology. The implication is that the concentration of global competitors in technologically advanced goods and services has increased rapidly between 1980 and 2020. Figure 6 highlights the intense and increasing technology competition by depicting private tech companies by valuation and country and where the increase in Chinese companies (and lagging EU) is notable.

FIGURE 5. CHANGES IN THE GLOBAL COMPETITIVE ENVIRONMENT, 1980–2020



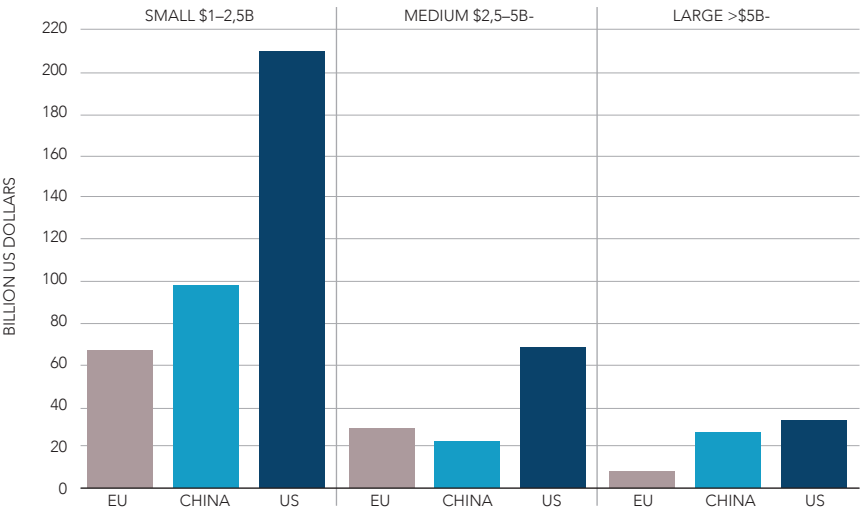
Source: Based on National Accounts in the Countries.

Note: Ind – India; CN – China; NIE – Newly industrialized economies; 4 Tigers – Asian Tigers (S Korea, Singapore, Taiwan, Hong Kong); SIE – Small industrialized economies; SAE – Small advanced economies; Jap – Japan; Ger – Germany; U.S. – United States. Country positions are for visualization purposes only and may not be exact.

With China’s seemingly endless appetite for advanced manufacturing and research-intensive industries, especially during the period after 2000, MNCs headquartered in small advanced economies (SAEs) began producing a wide variety of complementary goods to what could be readily manufactured by the domestic Chinese industry. A typical example would be the Swedish telecommunications company Ericsson and their digital exchanges and cellphones. Others are SKF and AB Volvo, which began manufacturing high-quality bearings and advanced trucks. That is, foreign companies manufactured products that were used together with domestically produced products of lower technological content and, hence, they were complementary, or elsewhere needed due to a lack of domestic alternatives. The picture that emerged during the late 1990s and well into the 2000s was that the vulnerable position in

which SAEs, including Sweden, found themselves at the beginning of the 1980s was now a distant memory.

FIGURE 6. VALUATION OF PRIVATE TECH COMPANIES IN DIFFERENT COUNTRIES



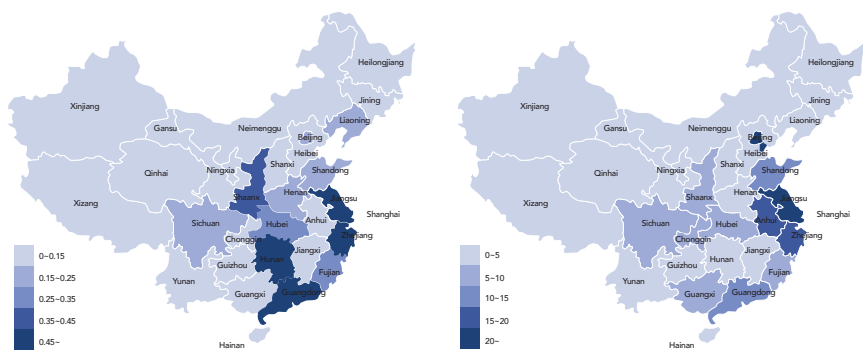
Source: Keyu Jin, 2021. Academic lecture: International technology competition. <https://www.bruegel.org/events/academic-lecture-international-technology-competition/>

However, a coin has two sides, and as foreign companies reached new sales records, introduced new products, and expanded into new sectors, a new kind of complacency slowly emerged, basically implying that China as a nation and Chinese domestic companies would never fully catch up. As a result, many observers misjudged China's rapidly growing domestic ability to produce technologically advanced, high-value content goods and services (Williamson and Zeng, 2004). Perhaps the most internationally acclaimed case is the telecommunication company Huawei. Founded in 1987, most analysts for more than a decade dismissed Huawei for having even the slightest possibility of producing high-quality technological products and compete on a global scale with existing multinational telecommunications companies. Today, Huawei's products and solutions are deployed in over 170 countries and serve more than one-third of the global population. For many observers, Huawei has seemingly come out of nowhere to become one of the world's most dominant technology brands. Although examples of similar magnitude as Huawei are limited, it was stressed in 2014 that China's technology sector is rapidly reaching a critical mass of expertise, talent and financial power that could realign the power structure of the global technology industry in the years ahead (Osawa and Mozur, 2014). Half a decade later, scholars such as Li (2018) and Chimits et al., (2021) concluded that the West still outperforms China in many areas of advanced technology, but it

should be recognized that it has much to learn about how it lost the lead in others (Chimits et al., 2021).

In fact, aggregate data shows that China’s innovation capacity has been increasing steadily, as is its rise up the value chain. For example, the total number of invention patent applications in China increased from 281 451 in 2010 to 949 623 in 2015 and to 1 495,034 in 2020.¹⁵ A recent empirical study by Ljungwall et al. (2021) shows that the fast increase in R&D inputs in China in recent years has been followed by a corresponding rise in high technology content innovation output. This result is especially noticeable in the more developed areas of China’s eastern region. Moreover, the results suggest that continuous strengthening of the intellectual property rights (IPR) regime is a crucial factor for the increase. Figure 7a, b shows that regions with a strong IPR regime exhibit a positive spillover toward neighbors in terms of innovation output.

FIGURE 7A. STRENGTH OF IPR REGIME FIGURE 7B. INNOVATION PATENTS (10 000's)



Source: Ljungwall et al., 2021

The seemingly slow awakening suggests that many foreign companies have moved from producing complements to increasingly producing substitutes, i.e., goods of similar or comparable quality and technology content as those produced by domestic

15. The number for 2020 is preliminary. See Jaffe and Palmer (1997); Ulku (2007), and Warner (2014) for an explanation and critique of invention patents and patenting in China.

manufacturers, with Huawei being the most renowned case.¹⁶ Another famous case is Haier Group Corporation, a Chinese multinational home appliances and consumer electronics company.¹⁷ Foreign MNCs may have cornered themselves into a position where they have lost, or are about to lose, their competitiveness, particularly so for those present in China, the world's second-largest economy. Whether this would lend to exhaustion, complacency or misjudgment – perhaps even a combination – the rapidly changing business environment and its resulting pressure for change may not translate fully into necessary change, i.e., innovation and the introduction of new technologically advanced products and services that complement those now being produced domestically.

The point being made is that the present-day rapidly increasing competition from Chinese companies in the domestic market is certainly partly a result of protectionist policies hitherto implemented by the Chinese government. The crux of the matter is that foreign companies may have misjudged the pressure of change, and as a result risks becoming outcompeted by Chinese companies. Foreign companies now compete with Chinese companies both inside and outside China to an extent beyond imagination a decade ago. Many Chinese companies in areas such as telecommunications today produce the same goods and services with equivalent or higher technology content and quality but at a lower cost. The market where foreign companies were once so successful is thus rapidly eroding in part or fully. Being in the midst of such disruptive environments once again highlights the necessity to pursue strategic change that became a mantra for success only a few decades ago.

Summarizing: Our analysis of how changes in the global trade and investment environment affect small advanced economies (SAEs) may, to some extent, seem both pointed and exaggerated. That may be! However, a clear trend is emerging where SAEs are moving at an ever-faster pace in a direction where there is a risk of being caught between primarily China and the United States on the one hand and newly industrialized economies (NIEs) on the other – “double-squeezed”, by simple expression and which will be described in the next two sections.

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16. The European Union Chamber of Commerce in China (EUCCC) in, for example, their recent position paper (2020/21), rightly paid attention to the growing list of concerns and sectors that either restricts foreign investment, or in which support is provided to China's national champions to the extent that it squeezes out any potential European competition. This is particularly apparent in industries like telecommunications, internet and high technology industries, along with other key sectors. The EUCCC further explain that China's indigenous companies catch up to and even surpass European firms in some areas, often propped up by extensive state support.
 17. According to data released by Euromonitor, Haier was the number one brand globally in major appliances for ten consecutive years from 2009 to 2018.

3.3 China's industry policy: Technologically more sophisticated than any predecessors

Thus far, we have described the difficult and sometimes precarious situation in which small advanced economies (SAEs) are already either in or risk ending up in. This is especially true in relation to the world's two largest economies, which are themselves preoccupied with an economics tug of war. At the same time, China is increasing its ambitions to become a leading global nation in advanced manufacturing and innovation with a competitive position in advanced technology. The goal is clear, and the policy to get there is defined. A discussion of the full impact of China's industrial policies today is beyond the scope of this chapter, but we can clearly extrapolate that China's policy has potentially large effects on SAEs such as Sweden. In the following, we point at the unprecedented size of China's industrial policy, discuss some of its potential impact on foreign companies, and point to a "critical point" that may arise insofar as foreign companies fail to recognize and adjust to the oncoming change.

China passed a major policy turning point in 2006, beginning a steadily increasing commitment to the use of government industrial policy. In that year, China presented the 2006 Medium to Long Term Program of Science and Technology (MLP).¹⁸ This strategy can be likened as preparatory work to the Made in China 2025 (MIC 2025) plan introduced in 2015–2016. The commitment set off by the MLP intensified in approximately 2009–2010, after the Global Financial Crisis. More recently, with a further shift in 2015–2016 by the introduction of MIC 2025 and in 2020–2021 by China 2035, the government launched a new and intensified round of industrial policy under its innovation-driven development strategy. In fact, the main features of MIC 2025/35/45 were presented in the autumn of 2014 but were not seriously examined by the foreign community at that time.¹⁹ The current rounds since 2015 are larger and more comprehensive than any previous Chinese industrial policy and, measured by any scale, unprecedented (Naughton, 2021). They are also more technologically and more economically sophisticated than any predecessors.

18. Unfortunately, the MLP soon fell into oblivion with most foreign observers.

19. PRC Premier Li Keqiang presented Made in China 2025 on September 15, 2014, in the Great Hall of the People. Dr. Zhou Ji, then President of China Academy of Engineering, presented the long-term development plans that are to follow after MIC 2025, expressed as MIC 2035, and MiC 2045. Dr. Christer Ljungwall (coauthor of this chapter) participated in the conference.

China's 14th Five Year Plan and long-term targets for 2035 were released and ratified by the National People's Congress on March 11, 2021.²⁰ The long-term development goals are ambitious²¹: By 2025: Lift manufacturing quality, innovation, and labor productivity; obtain an advanced level of technology integration; reduce energy and resource consumption; and develop globally competitive firms and industrial centers; By 2035: Reach parity with global industry at intermediate levels, improve innovation, make major breakthroughs, lead innovation in specific industries, and set global standards; and by 2045: Lead global manufacturing and innovation with a competitive position in advanced technology and industrial systems.²²

In this process, China's policies feature a heavy government role in directing and funding Chinese firms in areas where the West, including small advanced economies such as Sweden, have strong competitive advantages such as telecommunications, aerospace, microelectronics, pharmaceuticals, logistics, mining, etc. Other policies include tax preferences to incentivize foreign firms to shift production and research and development (R&D) to China. There are also government procurement policies and other market access terms that seek to transfer foreign know-how to Chinese entities and use Chinese suppliers for key components. If all goes as planned, this will expand China's economic competitiveness by advancing its position in the global manufacturing value chain, leapfrogging into emerging technologies, and reducing reliance on foreign firms.

In concert with the above policies, China is also increasing its efforts to define the standards for the 4th Industrial Revolution with a 15-year strategic development program: China Standards 2035. The plan lays out a roadmap for China's government and leading technology companies to set global standards for emerging technologies such as 5G and 6G, the Internet of Things (IoT), blockchain, quantum computing and artificial intelligence. It is thus clear that China has put forward ambitious plans for the country to reshape the global technology industry. As such, the China Standards 2035 project endorses and builds upon Made in China 2025 and the long-term plans for 2035 and 2045. The key issue with China's development plans is not so much that the Chinese government is willing to subsidize and support such specific industries but that the size and scope of such activities go far beyond

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20. In November 2020, the Communist Party of China Central Committee (CPCCC) published the CPCCC's Proposals for the Formulation of the 14th Five-Year Plan (2021–2025) for National Economic and Social Development and the Long-Range Objectives through the Year 2035.
 21. See Sutter (2020) and Aglietta et al. (2021) for an overview.
 22. This date is set only four years prior to the 100th anniversary of the founding of the People's Republic of China.

the classical conceptualizations of industry subsidies or protection (Zenglein and Holzmann, 2019; Naughton, 2021).²³

3.4 Visualizing the tentative impact of China's industrial policy

Plans are, of course, only plans, but given China's commitment to long-term perspectives, they must be taken seriously, and the potential impact must be discussed. Figure 8a–b is an attempt to conceptualize the tentative effect of China's industrial policy on small advanced economies in general and foreign multinational companies present in China specifically. What we want to show is the very high pressure for change that arises when China steps up the pace of development. At the time, somewhere in the mid-1980s, when several foreign MNCs were seriously establishing their operations in China, the Chinese need for new technology was huge, partly as a complement to domestic production and partly for technology development.²⁴ The difference in technology content made it possible to set a higher sales price, which in turn was accepted by the market. In this way, a situation arose where foreign and domestic companies existed side by side but with a clear difference in the goods and services produced.

As China's domestic research and development capacity has improved and domestic players increasingly manufacture highly processed goods and services, foreign companies have come under increasing pressure. Competition can be said to have increased dramatically, and Chinese firms are increasingly challenging foreign companies in sophisticated sectors (Mollet, 2021). To date, with a few exceptions, foreign companies have nevertheless managed to maintain their lead and thus are able to continue to manufacture complements.

Let us explain: We depart from a situation where domestic companies produce goods with lower technology content than foreign companies, which thus render a lower price to the market. The goal of China's industrial policy is, as described earlier, to become a world leader in global manufacturing and innovation while ensuring a high level of independence from abroad. This presupposes that China's dependence on foreign technology must be low or insignificant. To achieve this, domestic companies need to invest more resources in R&D and innovation (R&D+I), which leads to increased costs for labor, machinery and equipment, which are offset by an increase in the price of the product. Here, the Chinese state plays an important role

23. The Chinese government has until 2025 set aside more than \$500 billion in various funds to support indigenous R&D in technologies and products for which China currently depends on foreign companies. Not included in these amounts are subsidized loans and other assistance to bolster local champions (Black and Morrison, 2021).

24. The Swedish telecommunication company Ericsson opened its first China office in Beijing in 1987.

through various support measures, helping to ensure that the costs of (domestic) companies do not increase too quickly.

In the long run, this means that the technology content of the goods manufactured by domestic companies approaches the technology content of foreign companies but with slower cost development. In this way, foreign companies will be squeezed from two directions, i.e., through convergence in technology content and divergence in price. If this development continues, a critical point will eventually be reached where domestic and foreign companies manufacture the same type of goods but where domestic companies can offer a lower selling price. At this stage, i.e., at the critical point, foreign companies no longer produce complements to domestic production. Instead, substitutes are manufactured at a higher price with a lower demand as a result.

At first glance, the new situation that arises at the critical point can be perceived as a 180-degree shift compared to the end of the 1980s and the period thereafter. The big difference is that this time Chinese companies are equipped to seriously compete with their foreign rivals in global markets, something we already see in South America (Ljungwall and Roman, 2020), with equivalent or higher technology content, self-developed standards and lower prices.

This scenario, even if it is a theoretical description of a potential progression, indicates a difficult situation for foreign companies. To avoid ending up at the critical point, that is, ($T_D = T_F$ and $P_D < P_F$) illustrated by $(A_{I:D})$ and $(A_{I:F})$, in Figure 8, foreign companies must either maintain their technological lead or find new niches where they can specialize and thus continue to operate in Chinese and global markets. However, extremely ambitious investments in R&D+I will be required to maintain competitive positions in China.²⁵

Perhaps it is purely the irony of fate that the debate on China has taken the direction we are experiencing today. However, the course of events described in Figure 8a and 8b has been ongoing for a long time. In the early 2000s, several research reports warned of the risks of misjudging China's ability to quickly build its own expertise in R&D+I and transfer this to advanced manufacturing of goods and services.²⁶ Other reports conveyed the message that China was reaching a critical mass of knowledge and financial strength to reshuffle global research and knowledge-intensive sectors.²⁷

25. Another alternative is for companies to choose to hold back their R&D expenditure, slow down the pace of innovation and focus on the market for goods and services with lower technology and value content.

26. See for example Williamson and Zeng (2004).

27. See for example Osawa och Mozur (2014).

FIGURE 8A. CRITICAL POINT

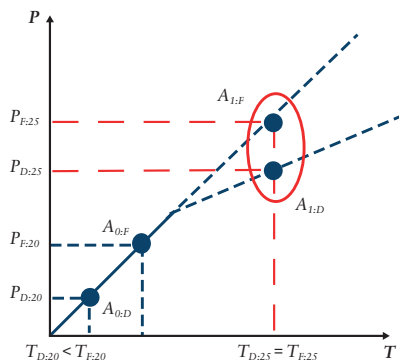
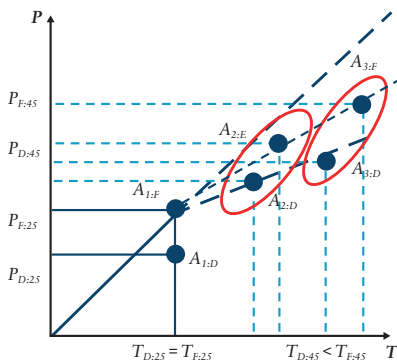


FIGURE 8B. OPPORTUNITIES



Source: The authors.

Note: Assumptions: Domestic (D) and foreign firms (F) operate in the same sector; sales price of a good (P_i) is equal to the marginal cost + mark-up, $P_i = MC + \mu$; price of a good (P_i) increase when the cost of R&D+I increase, which in turn leads to higher technology content (T_i); price and technology levels year 2020 is given by (P_{20}) and (T_{20}), at MIC 2025, by (P_{25}) och (T_{25}), and so forth; $y = x + b$; $y = m > 0$.

The point of departure is illustrated in Figure 8a by ($A_{0:D}$); ($A_{0:F}$). A higher level of technology content is illustrated by a rightward shift of ($A_{1:D}$), and a higher price by an upward shift in ($P_{1:D,F}$). The critical point is given by: $T_D = T_F$ and $P_D < P_F$ and is illustrated by ($A_{1:D}$) and ($A_{1:F}$). The points ($A_{2:D}$), ($A_{2:F}$), ($A_{3:D}$), ($A_{3:F}$) in Figure 8b illustrate the situation where foreign companies maintain their technological lead within existing sectors or, alternatively identify new niches.

Will China succeed? For many reasons, China's seemingly ostentatious and far-reaching industrial policy and accompanying development strategies lead to this question. The short answer would be, "we simply do not know". However, observing the Chinese economy today is not without serious challenges that could disrupt its smooth development. We highlight four of them. First, there is a plentiful supply of macroeconomic challenges: massive expenditure of public funds at a time when China's debt-to-GDP ratio is one of the highest in the world; its growth rate has significantly slowed, total factor productivity growth has fallen dramatically in the last decade, and financial risk is intensifying. On the other hand, the Chinese government has an incomparable ability to steer the financial system to mitigate shocks. Second, there could very well be long-term consequences of industrial policy if it hampers the economy's productivity growth, leading to a vicious cycle of ever-expanding government interventions (Jin, 2019). Third is the risk of less successful technology area investments. In this respect, being a pioneer exposes China to the risk of investing in second-best technologies that turn out to be expensive and quickly obsolete (Naughton, 2021). Fourth, reactions from the outside world arise from the reaction of other countries to China's industrial policies. Unmistakably, this risk has already surfaced by means of trade frictions and threats of decoupling between the

United States and China. These observations are by no means a complete account of all potential economic, political, and societal risks related to China's long-term development.²⁸ Importantly, however, the consequences, whether positive or negative, are not only confined to Chinese domestic issues but also have spillovers that would affect the global economy at large.

4. DISCUSSION AND CONCLUDING REMARKS

In a recent interview, the CEO of Ericsson Börje Ekholm conjectured, “If the tech world is fragmented in East and West then it is going to mean competition between two ecosystems. A Chinese ecosystem will be formidable competition for the West”.²⁹

We began the chapter by formulating three questions that have bearing on the quote. What will the new order look like? How will it impact small countries such as Sweden and where China was used as a case to reflect on a likely economic squeeze? What overall policy strategies are important to respond in an emerging geoeconomic game plan? The sweeping question we posed in the chapter is: Are the glory days for small and advanced countries over in a post-Washington era?

Great power competition is here once more. The global economic order is being reshaped. There is an emerging erosion of global rule-of-law governance. Competition is no longer rule-based, as in the era of the Washington Consensus, but contains significant features of a nonrule-of-law system. The past era had stable governance with the WTO rule of law; the new geoeconomic era, instead, is faced with increased uncertainty and volatility in international governance. This amplifies today's international business environment, making it more volatile, uncertain, complex, and ambiguous for international investments and trade.

The various geoeconomic trends outlined in section 2 demonstrate an economic and military struggle for who leads and controls the emerging digital game plan. This may have significant challenges for companies in small, advanced economies in maneuvering the geoeconomic landscape. In the 1980s, small countries managed the squeeze of that time by taking advantage of globalization, increasing R&D spending and engaging in extensive outsourcing and offshoring of goods and services. However, this will be more difficult as countries and regions revert to nonmarket geoeconomic measures to reassess their geopolitical power. The risk for a squeeze is more prevalent today than in the 1980s.

28. For that we refer to scholars like Itskhoki and Moll (2018); Jin (2019); and Naughton (2021), who collate much of the evidence on industrial policies practiced in China.

29. <https://www.lightreading.com/5g/ericsson-ceo-warns-china-will-be-formidable-if-5g-or-6g-splits/d/d-id/771650>.

The difference today lies in the magnitude and nature of digital innovations, which require large and geographically diverse markets to recoup investments and exploit reverse innovation but are difficult to retrieve in a business environment with large market distortions created by government policies that are eroding rule-of-law governance. What follows is a reshaped global economic order, technology decoupling and the emergence of a new playing field for international business.

In this process, China's policies feature a heavy government role in directing and funding Chinese firms in areas where the West, including small, advanced economies such as Sweden, has strong competitive advantages. The result is that small, advanced economies become exposed to pressure from several directions, i.e., they are double-squeezed in a bind where the following elements are rampant. First, there is a rapid convergence in technology; second, there is downward pressure in production costs; third, there is a new wave of highly competitive Chinese (and from other nations) firms entering the global market for advanced goods and services; and fourth, there is reduced diffusion of technology with the potential undoing of cross-border trade, by either export or import bans, in high-tech goods and services (so-called technological decoupling). In fact, the double-squeeze is more than about technology. It is also about increased economic and political pressures from changing models of national, regional, and global economic integration. In such a way, small economies are more exposed to international economics and politics than perhaps ever before.

4.1 How do we respond and at what cost if any?

The view of China in, for example, the United States and the European Union with its large and small Member States is based on broadly the same basic assumptions: On the one hand, it is about that the economic relationship with China is (critically) important for industry, jobs, and growth. On the other hand, it is also one of the most complex and challenging relationships because of the increasing fusing of political and economic interests on both sides, i.e., the emerging geopolitical (security) and geoeconomic changes at play. The differences are very much about how one chooses to proceed and which policy strategies are considered most effective. The United States has thus far opted for a much tougher stance against China compared to the European Union, but even in the case of the EU, there are signs of increased demands for a much tougher position. Here, we agree with Czernich and Falck in this volume (Chapter 2), that dealing with China should be based on coordination at the European level, with a focus on open markets rather than implementing China-inspired direct industrial policies, and avoiding tit-for-tat policies or increasing trade and investment barriers.

As mentioned in the beginning of the chapter, a discussion has begun in Sweden on the perceived risk of foreign ownership in certain high-tech areas and high-tech

companies that seem to be important for both industrial and security reasons. This discussion will continue in the geoeconomic setting we are facing. However, foreign ownership and takeovers are questionable only if Swedish and European companies are restricted to invest in China.

For Sweden being at the technology frontier, high spending on education and R&D will play an even more important role, particularly if the diffusion of foreign technology due to technology decoupling slows down in a geoeconomic setting. Thus, providing the best framework conditions for entrepreneurship, investments, and openness to foreign technology, high-skilled immigration and excellent universities are even more essential in the geoeconomic era. However, domestic policies, while necessary, will not be sufficient. A larger question arises if the technology ecosystem in the West is large enough. The discussion on formulating a European industrial policy can be seen as an attempt to formulate an alternative to China's and U.S. (huge) industrial policy efforts (European Commission, 2020), although discussions are intense about the pro and cons of the proposed policies (see also chapter 2 in the volume).

Cooperation and competitiveness will be key in the emerging geoeconomic order, particularly for small economies. The absence of large markets means that the attractiveness of small countries depends to a greater extent on strategic considerations. However, as bilateral and regional agreements increasingly replace multilateral deals, geopolitical considerations will determine the nature of the agreements that can be achieved by small countries. Though, cooperation and coordination are easy to say, what is at stake is compromise and sacrifice in the near term to gain or survive in the long term. That's politically difficult in Beijing, Washington, Brussels, and Stockholm. The challenge is also that the major powers need to compromise among themselves for the global and long-term good. Should norms, rules, IP rights and standards be universal? Or should we accept variations while setting and maintaining certain standards in our own regions? Whatever the choice, it is neither a painless policy to sell nor an easy one to implement.

The point is that the global economic and business environment is about to change in ways that follow previously unknown patterns. For any economy, small or large, and companies of different sizes, it will be critical to understand this development and the resulting pressure of change. The new order needs exchange between politics, business and society on priorities and how state and nonstate actors could benefit from a transition from traditional external monitoring, where executives and government policy-makers look in the rear-view mirror for answers, to a more forward-looking and question-controlled, strategically applied technology and business intelligence. What are the key issues? How should the EU, and Sweden alone, relate to these developments and what measures should be taken to become an attractive partner in the future?

Lastly, are the glory days for small countries such as the Sweden over in the emerging geoeconomic era? We formulated two questions: Are small advanced economies equipped to meet the current geoeconomic *modus operandi* of global trade and investment? Is there a risk that they will be caught in the middle between two or more globally dominant economies? Our answer to the first question – deliberately exaggerated to make a point – is “probably not”, but the problem is self-inflicted and can be cured. The main point being made is that there is a risk that small advanced economies, including multinational companies, misjudge the immense pressure for change arising from increasing political and economic polarization and initiatives such as China’s powerful industrial policy.

The second question “pleads for a yes”. Small advanced economies are likely to end up in a situation where they are exposed to both pressure and difficult choices from the world’s two largest economies – \pm China and the United States. Simultaneously, the struggle to become a technology leader increases as new industrial economies enter the market, while some become small, advanced economies. In this situation, it is difficult or perhaps impossible for existing small, advanced economies to sit still in the boat and wait for the storm to end; because it will not end.

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In the thirteenth edition of Swedish Economic Forum Report the renewed interest in and advocacy for the use of industrial policy to promote economic development is examined. In recent years, geopolitical and geoeconomics considerations have actualized the use of industrial policy, which played an important role in economic policy over the twentieth century. Yet, there is disagreement among politicians as well as academics as to what industrial policy comprises and how effective it is.

The authors of *Swedish Perspectives on Industrial Policy, the Washington Consensus and Beyond* address industrial policy from Swedish and international perspectives and the various chapters in the report describes experiences and impacts of conducting industrial policies in Sweden, UK, Germany, and China using different theoretical and empirical perspectives.

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