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Edited by Ana Fernandes, Nadia Rocha and Michele Ruta

## **Beyond Trade**

How Deep Trade Agreements  
Shape Non-Trade Outcomes

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**CEPR**

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Edited by Ana Fernandes, Nadia Rocha  
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We are extremely grateful to the authors who dedicated their time and intellect to this project. We would also like to express our gratitude to colleagues inside and outside the World Bank who graciously gave their time to provide inputs at various stages of this project or acted as discussants: Vanessa Alviarez, Paulo Bastos, Sebastien Dessus, Alvaro Espitia, Deon Filmer, Hiau Looi-Kee, Mauricio Moreira, Gaurav Nayyar, Bob Rijkers, Sandra Rozo, and Daria Taglioni.

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More information about the project is available at: <https://datatopics.worldbank.org/dta/index.html>

Ana Margarida Fernandes, Nadia Rocha and Michele Ruta  
Washington, DC, April 2023

# Foreword

Climate change. COVID-19. The war in Ukraine. In an increasingly turbulent and fragmented world, preferential trade agreements (PTAs) are emerging as potential anchors of stability and a means to tackle emerging social and environmental challenges. Half a century ago, the objective was to improve market access. Since then, PTAs have evolved to embrace investment, competition policy, and product regulations. Today, goals include protecting labour rights and cutting greenhouse gas emissions. Developing nations can reap substantial benefits by using PTAs to cement domestic reforms to attract foreign investors seeking to diversify supply chains. They can also use PTAs to expand trade at a time of declining confidence in the multilateral trading system. Have PTAs delivered on their promise?

This CEPR-World Bank eBook brings together leading experts in international trade from academia and policy institutions to provide the first empirical assessment of the effectiveness of non-trade disciplines in PTAs. The research uses the World Bank's comprehensive Deep Trade Agreements Database and builds on the 2021 CEPR eBook by Fernandes, Rocha and Ruta on *The Economics of Deep Trade Agreements*.

The book traces the evolution of non-trade disciplines in PTAs, from their emergence in the 1950s primarily focusing on reducing tariffs, to forging deeper economic relationships and harmonising national policies to accommodate the rise of global value chains. The authors discuss the intended and unintended consequences of non-trade provisions, as well as their gradual change in scope and breadth. The research highlights the importance of the design and complexity of trade agreements in shaping outcomes beyond trade, as well as the important role of trade policy complementarities. Readers will learn that PTAs have different outcomes for developed and developing economies and that their effects among developing countries also vary widely.

Overall, the research presented in this eBook provides an important first empirical assessment of the effectiveness of non-trade disciplines in PTAs to better inform policymakers. We hope that this eBook will provoke new questions and inspire new research in this area.

CEPR, which takes no institutional positions on economic policy matters, and the World Bank Group are delighted to provide a platform for an exchange of views on this important topic.

Tessa Ogden  
Chief Executive Officer  
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Global Director  
Trade Investment and Competitiveness  
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June 2023





# INTRODUCTION

## How deep trade agreements shape non-trade outcomes

Ana Fernandes,<sup>a</sup> Nadia Rocha<sup>a</sup> and Michele Ruta<sup>b</sup>

<sup>a</sup>World Bank; <sup>b</sup>IMF

Preferential trade agreements (PTAs) have been a key policy tool in shaping trade in the past three decades. Their number has increased, from fewer than 50 in 1990 to 350 today. The scope of PTAs has also evolved over time, reflecting changes in the global trade landscape, with many agreements becoming ‘deep’ as they cover more policy areas and require more stringent commitments (Mattoo et al. 2020). The first wave of PTAs emerged in the 1950s and 1960s focusing on reducing tariffs and border barriers among member countries. The proliferation of global value chains (GVCs) and the need for countries to deepen their economic relationships and create larger markets highlighted the need to harmonise certain national policies to make international production-sharing activities more secure and efficient (Baldwin 2011, Lawrence 1996, Antras and Staiger 2012). This led to a second wave of PTAs going beyond market access and covering disciplines such as investment, competition policy and the standardisation and harmonisation of product regulations, amongst others.

Current trends such as the reorganisation of GVCs and increased awareness regarding climate change and labour rights have increased the role of preferential trade agreements in addressing non-trade outcomes. For instance, the inclusion of labour market disciplines and environmental provisions in many modern PTAs reflects growing concerns about the impact of trade on social and environmental outcomes and the need to promote sustainable trade practices. Additionally, in an increasingly fragmented world, deep PTAs can play an important role in pragmatically advancing integration and creating a more stable and predictable trade environment, which can encourage investment, innovation, and economic growth (Ayar et al. 2023). They can also serve as a valuable instrument for developing nations, facilitating domestic reforms and preventing policy reversals that may diminish their appeal to investors seeking fresh opportunities to diversify supply chains and enhance production resilience.

Since the classic work by Baier and Bergstrand (2007), a vast body of empirical literature has analysed the impact of PTAs on trade with members and non-members (see Freund and Ornelas 2010 and Limao 2016 for reviews). More recent work has focused on the distinctive role of ‘deep’ trade agreements in promoting trade and on how these effects result from specific provisions in PTAs (see Fernandes et al. 2021 for a recent collection of studies).

This CEPR and World Bank eBook brings together new research on the impact of non-trade disciplines included in PTAs on a broad range of outcomes that go beyond trade. These include diverse areas such as foreign direct investment (FDI), innovation, policy stability, labour standards, environmental quality and political rights. Of course, the increase in trade brought about by trade agreements has an impact per se, positive or negative, on non-trade outcomes. For instance, having access to larger markets can help promote a surge in FDI in member countries. More open trade, in the absence of appropriate domestic policies, can lead to faster depletion of natural resources such as forests. But do non-trade policy areas in PTAs directly influence non-trade outcomes?

The chapters in this eBook build on the detailed information of the World Bank's Deep Trade Agreements Database introduced by Mattoo et al. (2020) to analyse if and how non-trade disciplines in PTAs affect non-trade outcomes. Indeed, the inclusion of provisions that deal with non-trade objectives is increasingly a salient characteristic of PTAs, especially of those signed by advanced economies such as the European Union and the United States with developing countries. Underlying this transformation in the content of trade agreements are multiple reasons, ranging from the changing nature of trade, with the growing importance of global value chains, to the changing politics of trade, with issues like the protection of labour rights and the environment increasingly seen as central in the ratification process of PTAs. Whatever the reasons for non-trade disciplines in PTAs, there is little understanding about their effects – i.e. whether these non-trade provisions actually achieve the intended goals.<sup>1</sup> The research in this eBook helps filling this important gap. In this introduction, we present the highlights of this analysis.

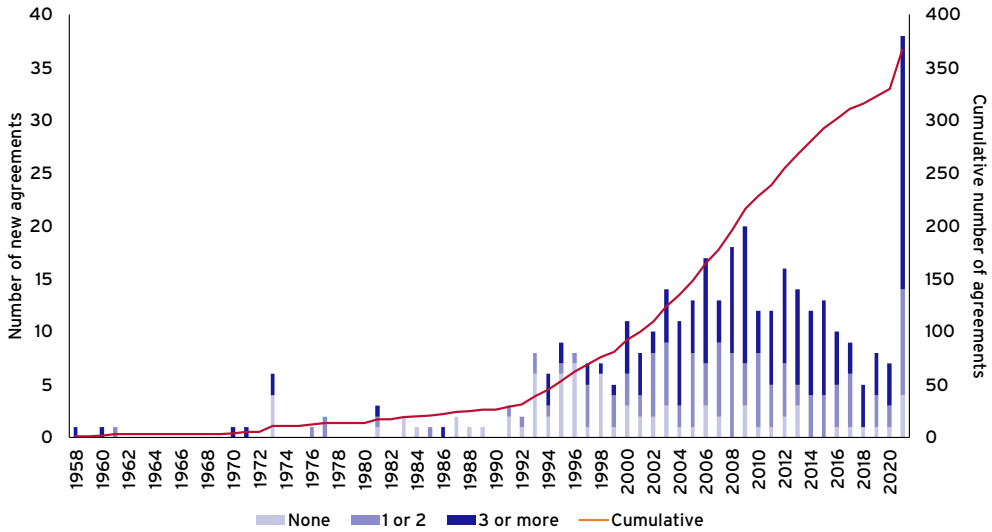
## THE EVOLUTION OF NON-TRADE DISCIPLINES IN PTAS

Preferential trade agreements increasingly include different types of non-trade provisions. First, PTAs pursue economic integration, that is, free (or freer) movement of goods, services, capital, ideas and people. As such, PTAs cover policy areas such as investment, intellectual property rights protection, and visa and asylum that aim at regulating respectively FDI, technology diffusion and migration flows. Second, policy areas such as labour and environmental regulation aim at improving social welfare or protecting rights that could be impacted by market integration by regulating the behaviour of exporters. In 2022, around 60% of global exports were covered by PTAs including at least one discipline regulating non-trade outcomes. For illustrative purposes, Figure 1 shows how the coverage of these five policy areas in PTAs has evolved – pointing to a large increase over time.<sup>2</sup>

1 Of course, a first-order question is the economic rationale (or lack thereof) for including non-trade policy disciplines in PTAs; the arguments in favour and against are revisited in one of the chapters in this eBook.

2 The surge in the number of agreements since 2020 is mainly driven by the PTAs signed by the United Kingdom after Brexit to replace its trade agreements with third countries signed as a member of the European Union.

**FIGURE 1 EVOLUTION OF NON-TRADE DISCIPLINES OVER TIME**

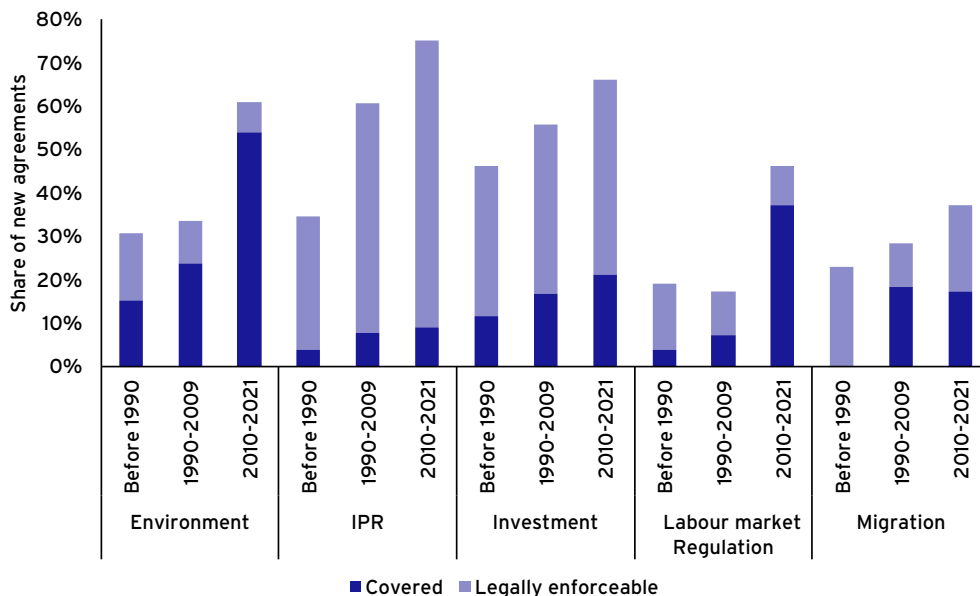


Note: the figure shows the number of new PTAs that include different numbers of provisions (none, 1-2, 3 or more) in the five policy areas: environment, intellectual property rights, investment, labour market regulation, and migration.  
 Source: Authors' calculations based on Hofman et al. (2017).

Figure 2 illustrates the wide heterogeneity in the coverage of non-trade policy areas in PTAs and their enforceability. Disciplines on intellectual property rights, investment and the environment tend to be largely more frequent than disciplines regulating labour market conditions and migration. For example, in the period 2010–2021, 66% of PTAs included investment disciplines compared to 37% covering migration. Interestingly, the most dynamic areas are environment and labour market regulation: PTAs including disciplines in these areas more than doubled between the period before the 1990s and the period 2010–2021. More than 60% of new agreements that entered into force in the latter period included these disciplines. Finally, there is also heterogeneity in terms of the legal enforceability<sup>3</sup> of the policy areas regulating non-trade outcomes. While 66% and 45% of new agreements covering intellectual property rights and investment, respectively, are also enforceable, less than 10% of agreements covering environment and labour market regulations are legally enforceable.

3 A policy area is considered legally enforceable if the language is sufficiently precise from a legal point of view and if the agreement foresees a dispute settlement mechanism to resolve disagreement.

**FIGURE 2** EVOLUTION OVER TIME IN COVERAGE AND LEGAL ENFORCEABILITY OF NON-TRADE DISCIPLINES IN PTAS



Source: Authors' calculations based on Hofman et al. (2017).

We turn next to the effects on non-trade outcomes of non-trade disciplines in PTAs. The analysis leads to four main findings.

### INTENDED AND UNINTENDED CONSEQUENCES

Non-trade provisions in trade agreements promote integration beyond trade. Through decreases in trade and migration costs, PTAs promote movement of capital and people across members, along with trade flows. Indeed, sizeable benefits for FDI flows from trade agreements arise when investment provisions are included. At a more granular level, PTAs – namely, those including investment, movement of capital, intellectual property rights and competition policy provisions – foster cross-border firm ownership linkages (especially vertical) across countries. And the inclusion of visa provisions in PTAs stimulates bilateral migration stocks, especially of low-skilled immigrants. Intellectual property rights (IPR) provisions in PTAs tend to improve and harmonise IPR standards, reduce patent application costs and strengthen protection for patent holders, thus encouraging higher cross-border patenting activity among members.

Non-trade provisions in PTAs in areas that aim to enhance welfare by regulating the behaviour of exporters can also be effective. In particular, environmental disciplines are found to help shape environmental outcomes. The inclusion of binding environmental provisions in PTAs limits their nefarious impact on deforestation. Signing a PTA generally supports the aims of international environment agreements like the Montreal

Protocol, which limits trade in ozone-depleting substance (ODS) goods with non-member countries, by increasing the likelihood of member countries ratifying its amendments. But the effects are shown to be much stronger if the trade agreement includes ODS-related provisions. The rationale for such impacts is the introduction of enforcement measures for non-compliance in PTAs with ODS-related provisions.

But non-trade provisions in PTAs in areas of labour and civil or political rights are not always effective and can have unintended consequences on outcomes such as labour protection or child labour. Non-trade provisions in PTAs in areas of labour and civil or political rights do not significantly improve indicators on labour rights, workers' protection, democracy and political rights in member countries.<sup>4</sup> Binding labour provisions included in EU PTAs actually result in a deterioration of worker protection, which is measured by a set of labour standards including occupational safety and health, hours of work, and minimum age for employment of children. A study of the impact of child labour standards included in PTAs similarly finds that simple bans have a perverse effect on child labour outcomes. PTAs without child labour provisions reduce child employment and increase child school enrolment, but paradoxically trade agreements with child labour provisions do the opposite. The rationale for this result is that child labour bans can lead to a decline in child wages and a decline in the income of poorer households, requiring them to actually increase the supply of child labour.

## DESIGN MATTERS FOR NON-TRADE OUTCOMES

The design of non-trade provisions matters for non-trade outcomes. First, in some cases there is a minimum set, or core, of disciplines that are needed for the realisation of underlying non-trade policy objectives. For instance, not all PTAs with IPR provisions encourage more technology transfer through patent flows among members. PTAs that involve only some legally enforceable IPR provisions and thus ensure a weaker protection to patent applicants do not stimulate further bilateral patenting among members. The PTAs that are most effective in promoting patent flows are those that include a 'strong' protection that goes beyond the standards established by the WTO TRIPS agreement.

Second, and related to the above point, there are trade-offs in the complexity of non-trade disciplines. Overly complex provisions can have adverse consequences. For example, an increase in investment provisions related to transparency and regulations is shown to actually decrease FDI given the large compliance costs they impose. But in other cases, it is the simplicity of the provisions that can be problematic. The child labour bans discussed above are a case in point. The rule is simple, direct and easily understood by relevant constituents in advanced economies. But it does not account for the incentives that are faced by the poor households in developing countries that are affected by the

4 Note that that the European Union and the United States do not include enforceable non-trade provisions dealing with civil and human rights in their PTAs, so this greatly reduces the strength of the potential impacts of such provisions.

measure. Rather than simple bans, labour clauses in PTAs should encourage active education policies that favour the poor, such as direct payments to households for school attendance.

A third element is the legal enforceability of non-trade disciplines. A key element of the effects of PTAs is that they change current and expected policies. The reduction in policy uncertainty brought about by legally binding disciplines is critical to understand the impact of PTAs on trade and non-trade outcomes. For example, whether environmental provisions are subject to formal dispute settlement mechanisms or non-enforceable matters for environmental outcomes. PTAs with non-binding environmental provisions lead to a significant deterioration in several indicators of environmental quality: CO<sub>2</sub> emissions, ozone exposure, protected biological diversity and sustainable nitrogen management in agricultural production. These adverse effects point to the pressure put on the environment by the increase in production and trade associated with the signing of a PTA and suggest that non-binding environmental provisions in PTAs fail to ameliorate those pressures.

### **HETEROGENOUS EFFECTS**

The effects of non-trade provisions in PTAs can be heterogeneous, depending on the countries involved and the power relations among members. PTAs affect FDI very asymmetrically across countries, with China and the United States benefitting most in terms of their outward FDI and East Asian and Latin American countries with a large number of PTAs (such as Chile, Peru, Singapore and Thailand) benefitting most in terms of inward FDI. The impact of non-trade provisions on migration flows are influenced by the composition of the political parties of a country. When origin and destination countries belong to different income groups, PTAs with visa provisions are effective in fostering bilateral migration, but these effects are weaker when destination countries have a large share of votes for parties at the extreme right of the political spectrum. PTAs including strongly enforceable IPR provisions encourage patent applications from non-members to developing country members, suggesting the stronger IPR standards in the PTAs make these countries more attractive locations to protect and deploy new products. These results suggest that, when properly designed, non-trade disciplines in PTA can help fill a gap in national legislations. Their success in achieving this might however depend on factors such as the political economy conditions in the signatory countries.

### **THE ROLE OF COMPLEMENTARITIES**

The effects of PTAs with non-trade provisions on non-trade outcomes depend on the overall content of the PTA as well as on other policies in place in member countries. There are complementarities between investment provisions and provisions on labour

markets, exports, taxes, public procurement and state-owned enterprises in fostering significantly FDI between PTA members. There is also a complementarity between IPR provisions and provisions on investment in PTAs in stimulating cross-border patenting.

Complementary policy instruments may play a role in making PTAs with non-binding non-trade provisions more effective in improving non-trade outcomes. One such instrument, official development assistance, may influence whether non-trade provisions are implemented. High-income PTA members – the major proponents of non-trade provisions – allocate more aid to countries that agree to soft (non-binding) provisions in the area of environment and human and civil rights. Non-binding non-trade provisions may thus act as focal points for cooperation among countries on an issue area.

## **ORGANISATION OF THE EBOOK**

The eBook is divided into five sections covering different aspects of the economics of deep trade agreements and a concluding chapter. The first section examines the trade-offs in the design of trade agreements with non-trade objectives. The chapter by Winters questions whether trade agreements help or hinder the achievement of non-trade objectives.

The second section focuses on non-trade outcomes in the areas of FDI, the organisation of value chains and innovation. The chapter by Larch and Yotov quantifies the impacts of trade agreements on FDI. The chapter by Egger and Masllorens-Fuentes takes a micro perspective on those impacts on foreign ownership along global value chains. Finally, the chapter by Howard, Maskus and Ridley assesses how cross-border patenting and innovation change when new trade agreements are signed.

The third section examines the role of trade agreements for trade policy and its uncertainty. The chapter by Felbermayr and Teti provides a fresh perspective on the impacts of deep trade agreements on trade with an emphasis on non-discriminatory impacts. The chapter by Limão examines how and when trade agreements affect policy uncertainty.

The fourth section considers non-trade outcomes in the areas of labour and migration. The chapter by Abman, Lundberg, McLaren and Ruta assesses how provisions on child labour in trade agreements affect labour market outcomes. The chapter by Levelu, Mayda and Orefice considers the role of migration provisions in trade agreements for migration flows.

The fifth section concentrates on non-trade outcomes in the areas of civil rights and environmental protection. The chapter by Hoekman, Francois, Lechner, Manchin and Santi examines the impact of binding and non-binding provisions on civil and political rights, environmental protection and labour standards on related non-trade outcomes. The chapter by Abman, Lundberg and Szmurlo studies the role of trade agreements with environment provisions in supporting the goals of environmental treaties.



The final chapter by Blanchard reflects on the future of non-trade objectives in trade agreements and lays out new frontiers for research in this area in a context of a post-pandemic fragmenting world, where prospects to leverage trade for development and to address climate change may increase demand for deeper and more complex agreements.

## CONCLUSIONS

Trade agreements increasingly include disciplines aimed at achieving non-trade objectives: promoting FDI, technology transfers, workers' movements, but also improving labour conditions, environmental quality and achieving other broader social goals. Do these provisions actually achieve their intended goals? The research presented in this eBook provides a first empirical assessment of the effectiveness of non-trade disciplines in PTAs. The evidence points to some successes, such as in the area of FDI, technology transfers and the environment, but also to the limits of regulating non-trade policy areas in trade agreements, as in the case of the perverse effects of child labour bans on children's employment and school enrolment. As governments' trade policy agendas in the world post-Covid and post-Ukraine war expand to consider new and wider non-trade objectives, from supply chain resilience to national security, the early work presented in this eBook will hopefully provide a solid ground to ask new questions and build new research in this area.

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## **SECTION 1**

# **TRADE-OFFS IN THE DESIGN OF DEEP TRADE AGREEMENTS WITH NON-TRADE OBJECTIVES**



# CHAPTER 1

## Trade agreements and non-trade objectives: A cautionary note

**L Alan Winters**

University of Sussex and CEPR

*The fundamental aim of trade agreements is to increase trade, boost competition, and raise economic welfare. Alongside this, trade agreements are often supplemented with clauses that aim to improve various non-trade objectives (NTOs), such as labour standards, civil, human, and political rights. This chapter argues that the empirical evidence on the effects of trade agreements on NTOs is mixed, and the results depend on the countries studied as well as the specific NTOs analysed. In general, it is not correct to suggest trade agreements have positive spillovers on NTOs or to promote trade agreements as a route to achieving non-trade objectives. While more research is welcome, there will often be more effective ways of fostering NTOs without jeopardising the gains from trade.*

No-one disputes the desirability of people living in good environments and having satisfactory labour, civil, human and political rights. In the context of this eBook, the relevant questions are whether trade agreements help or hinder the achievement of such objectives (which I will term non-trade objectives, or NTOs, hereafter), whether agreements may be designed to help achieve them and, if so, what the trade-offs are in terms of other objectives. The last of these questions leads naturally to the further question of whether there are other means to achieve NTOs that may have more benign trade-offs.

In this chapter I argue that economists should continue to research how trade agreements affect NTOs, and I welcome the current research programme as a major step forward in what remains a very fluid subject. However, I also note that, on the evidence up to now, it is not correct to suggest that trade agreements generally have positive spillovers on NTOs and still less to promote trade agreements as a route to NTOs in general. In many cases, there are better approaches to achieving NTOs (Hoekman 2021). Associating them too tightly with trade agreements poses the joint dangers of overloading the trade negotiating agenda and of losing the other benefits that trade (and trade agreements) can bring if these are sold as significant steps towards NTOs and then disappoint in that regard. Trade agreements are about enhancing trade, and, through that, increasing competition and raising economic welfare. We need to be sensitive to their spillover effects on other areas of concern, but it is important not to lose sight of their fundamental objective.

## TRADE AND NTOs

The purpose of (nearly all) trade agreements is to increase trade and through that, incomes, usually via increased output, and ultimately to improve welfare. It is widely believed that as countries' incomes increase, they pay more attention to environmental quality and maybe also to other NTOs such as political and labour rights. However, it is easy to find counter-examples and even encouraging cases are complex (e.g. McCaig et al. 2022). Moreover, where, *ceteris paribus*, increasing output implies increasing harm, such as with emissions or air pollution, there is widespread concern that trade agreements exacerbate the problems (e.g. Nemati et al. 2019, Tian et al. 2022).

Hence, a sort of trickle-down argument – just rely on the income effects of trade to eventually advance NTOs – is not credible, and this has led to interest in whether trade agreements might be designed to foster NTOs, or at least to mitigate their adverse effects on NTOs.

## CARROTS AND STICKS

Deep trade agreements that cover both trade policy *per se* and NTOs are examples of issue linkage – the tying together of two basically separate issues into one package. Maggi (2016) offers an interesting and sophisticated discussion of issue linkage in general, but for the purposes of this chapter, a simpler structure suffices.

The overt purpose of including NTOs in trade agreements is to persuade partner governments to change their policies and/or partner firms to change their practices. Setting aside the worries that such moves may represent an attempt to hobble competition from the partner (and hence make the trade agreement more palatable domestically) or the propriety of one government seeking to 'guide' another's policy, two questions arise. First, how easily and effectively can carrots and sticks be applied? And second, is one approach likely to have more success than the other?

In essence, carrots are *ex ante* approaches (which Maggi refers to as 'negotiation linkage') that withhold benefits such as accession to an agreement until certain commitments are made or conditions met; sticks, on the other hand, are *ex post* whereby existing privileges are removed/suspended in the event of a breach of the conditions – a form of Maggi's 'enforcement linkage'. In terms of enforcement, Borchert et al. (2021) argue that preferential trade agreements are not an ideal way to pursue NTOs, because once reciprocal liberalisation has been implemented – by eliminating tariffs and other restrictions on commerce on 'substantially all trade', as required by GATT Article XXIV – it is not strictly permissible to withdraw them piecemeal and there are, besides, no more carrots to offer. In agreements with the EU, clauses requiring the maintenance of the 'essential elements' of the agreement, which include human and political rights,

permit the suspension of the whole agreement, but this route has rarely been used and has never resulted in suspension. It is basically too large a stick and possibly too costly in terms of lost EU exports to wield.

Borchert et al. (2021) argue, however, that the enhanced but conditional arm of the Generalised System of Preferences, the so-called GSP+ which is unilateral in nature, is much easier to use in a graduated fashion. Even so, they note that punishment has only rarely been implemented by the EU and then typically on smaller partners.

In its post-Brexit replacement of the GSP, the Developing Countries Trading Scheme, the UK breaks from the EU practice of making its enhanced arm conditional on partners applying 27 international conventions, but instead retains the right to “*suspend a country’s preferences for serious and systematic violations of human rights and labour rights based on international conventions, ... [or for violations] of conventions on anti-corruption, climate change and the environment*” (UK Government 2022). The problem with this is that it replaces a notionally clear conditionality with something much vaguer, which, to date, has no defined thresholds or procedures for identifying violations. This matters, because as Borchert and Di Ubaldo (2020) show, uncertainty about whether preferences will apply in future materially reduces the trading benefits of the GSP. This, indeed, is a potential problem with all *ex post* enforcement mechanisms: they create uncertainty and hence reduce the willingness to invest in exploiting the trading opportunities that arise from a trade agreement.

Carrots – *ex ante* conditionality – may be more effective in fostering NTOs, but the NTO policies need to be either irreversible or supported by an *ex post* enforcement mechanism to prevent backsliding. The most obvious example of *ex ante* persuasion is the EU’s Association Agreements and even more strongly its accession process. Here, however, conditionality is supported by technical, and possibly financial, assistance.

## **DESIGNING TRADE AGREEMENTS TO FOSTER NTOs**

Most of the empirical research in economics on trade and NTOs has been directed at identifying whether the inclusion of non-trade provisions (NTPs) in trade agreements affects outcomes. One conclusion is that the results of such studies are highly heterogeneous, varying over countries in the agreement and different types of NTPs in ways that make generalisation very difficult.

Moreover, identified changes are not necessarily mediated by changes in trade. For example, Robertson (2021) argues that labour provisions in agreements tend to improve working conditions but that they tend to reduce levels of trade, especially those provisions that pertain to discrimination. Harrison (2019), on the other hand, argues that even the pay-off in terms of improved labour rights is weak. Abman and Lundberg (2019) find that



preferential trade agreements appear to lead to significant increases in deforestation, but that, at least in the first three years, there is no relation to changes in timber trade. They argue that, consequently, the agreements need to include NTPs to limit such harm.

Abman and Lundberg's argument is supported by Abman et al. (2021), who examine whether the inclusion of clauses specifically aimed at limiting deforestation following the signature of a trade agreement do actually limit it. An important aspect of their analysis is that they allow for the probability that such clauses are endogenous, and in so doing seek to establish a causal relationship. In summary, Abman et al. find statistically and environmentally significant net increases in annual forest loss where trade agreements do not include relevant environmental provisions, and that the inclusion of such provisions eliminates such increases. Further analysis shows that environmental provisions limit agricultural land expansion that otherwise occurs following a trade agreement and partially mitigate the corresponding increase in agricultural output and exports. These latter results suggest that, even with limiting environmental provisions, there are commercial benefits to signing trade agreements. That is, signing agreements with relevant environmental clauses is not 'good for the environment' but allows an increase in output without worsening it.

A comprehensive study of trade, trade agreements and NTOs undertaken by a consortium of European universities<sup>1</sup> found little evidence that trade agreements fostered NTOs. The study focused mostly on the EU agreements, but an extension to a global sample by Francois et al. (2022) reinforces this view. The authors conclude that there is next to no evidence that NTPs on labour and civil rights affect outcomes and only patchy evidence (varying by objectives) that those on environmental issues do so. Their study may not fully cope with the inevitable selectivity in the signature of trade agreements: if an agreement is likely to impose too strong a constraint on policies in non-trade areas, a government will not sign. Thus, for those that do sign, we should expect that signature is positively correlated with progress towards the identified NTOs. Arguably, this makes the general absence of such positive associations in the empirical literature even more telling.

The literature is not universally discouraging about the effects of NTPs on NTOs, but the preponderance of evidence is that including NTPs on labour and civil rights in trade agreements is ineffective. For example, in their contribution to this eBook, Joseph Francois, Bernard Hoekman, Miriam Manchin and Filippo Santi present an empirical investigation which finds little effect of non-trade provisions on civil and human rights performance indicators. Moreover, while including NTPs on environmental issues may affect outcomes, at least so far as mitigating adverse effects that might otherwise happen, this is not guaranteed (see the contribution by Clark Lundberg, Daniel Szmurlo and Ryan Abman for further evidence of the effects of environmental provisions in PTAs).

1 "Realising Europe's soft power in external cooperation and trade" (RESPECT; see <https://respect.eui.eu/>).

## CONCLUSIONS

In conclusion, this chapter highlights the complex relationship between achieving trade and non-trade objectives in the context of trade agreements. The recent literature and the rest of this eBook show that the effects of including non-trade provisions in trade agreements are complex and depend in subtle ways on many contextual factors. If including them is to have benefits, the NTPs and the circumstances in which they apply require careful design and monitoring. This mandates proceeding slowly and cautiously, and above all, avoiding a headlong rush into supplementing trade agreements with NTPs of doubtful effectiveness. Indeed, as noted in the introduction, there will often be more effective ways of fostering non-trade objectives which do not run the risk of jeopardising the gains from trade.

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## **SECTION 2**

# **FDI, ORGANISATION OF VALUE CHAINS AND INNOVATION**



# CHAPTER 2

## Deep trade agreements and foreign direct investment

**Mario Larch and Yoto V. Yotov**

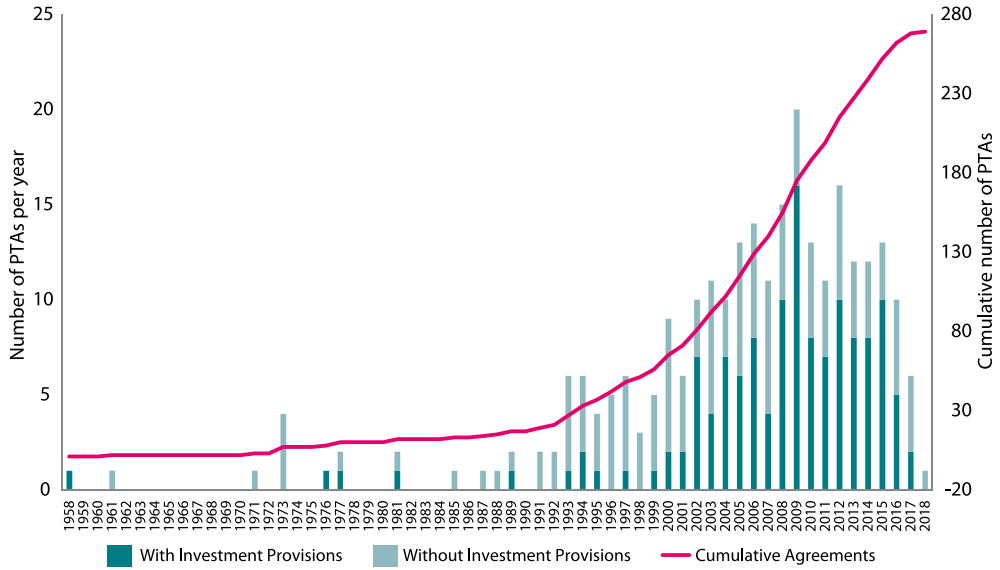
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*Investment provisions are an increasingly common component of preferential trade agreements (PTAs). By 2017, around 2,500 country-pairs had a PTA with such a provision, up from fewer than 500 in 1997. However, the little evidence there is on the effectiveness of such provisions on foreign direct investment (FDI) flows is mixed. This chapter uses a large cross-country dataset covering over 90% of world GDP and FDI to study the partial and general equilibrium effects of deep trade agreements (DTAs) on FDI. It finds sizable, positive, and statistically significant estimates of the effects of DTAs on both trade and FDI. The effects on FDI are particularly strong in trade agreements with investment provisions. Furthermore, a counterfactual analysis suggests that, in combination with direct and indirect channels, DTAs have contributed to a large but asymmetric increase in outward relative to inward FDI.*

Most modern preferential trade agreements (PTAs) include a variety of investment provisions. As pointed out by Crawford and Kotschwar (2020), “[f]ollowing the entry into force of NAFTA and the GATS, trade negotiators increasingly began to incorporate into PTAs a broad set of investment provisions that liberalise, protect, and regulate investments” (p. 145). The increase, both in absolute and in relative terms, in the number of PTAs with investment provisions is depicted in Figure 2.1.

Using the World Bank Deep Trade Agreements database (Mattoo et al. 2020), we complement Figure 2.1 by plotting the number of country pairs that have signed trade agreements including investment provisions. Figure 2.2 corroborates the evidence from Figure 2.1 by depicting a remarkable increase in the number of country pairs that have negotiated investment together with trade, especially since the early 1990s, and consistent with the opening quote from Crawford and Kotschwar (2020).

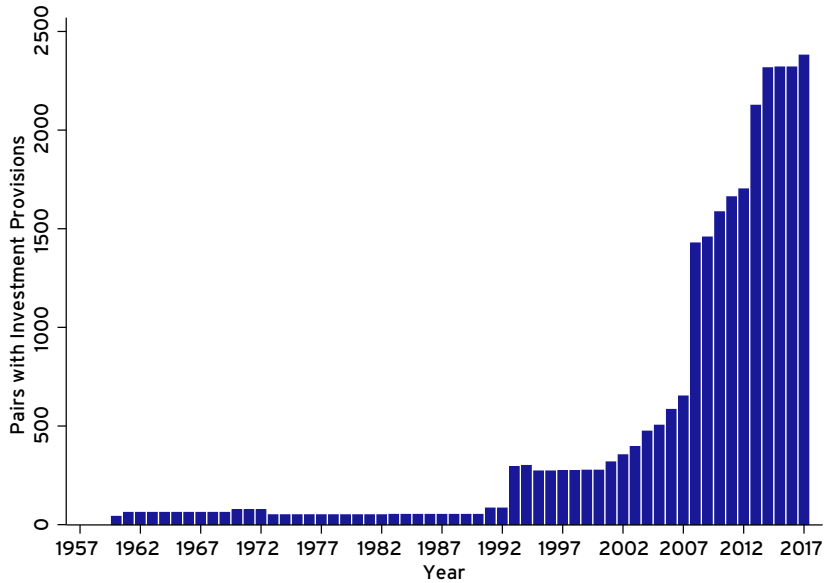
**FIGURE 2.1 NUMBER OF PTAs THAT INCLUDE INVESTMENT PROVISIONS, 1958-2018**



Notes: This figure plots the number of PTAs with and without investment provisions.

Source: Crawford and Kotschwar (2020).

**FIGURE 2.2 COUNTRY PAIRS THAT HAVE PTAs WITH INVESTMENT PROVISIONS, 1958-2017**



Notes: This figure plots the number of country pairs that have signed trade agreements that include investment provisions.

Source: Authors' calculations using World Bank Database on the Content of Regional Trade Agreements data.

Despite the increase in the number and importance of investment provisions in the negotiations and implementation of PTAs, there is relatively little (and mixed) evidence on the effectiveness of such provisions in promoting foreign direct investment (FDI). For example, the authoritative surveys of Eicher et al. (2012) and Blonigen and Piger (2014) on the determinants of FDI do not account for such provisions.<sup>1</sup> Relatively few papers have studied the impact of deep trade agreements (DTAs) and various PTA provisions (disciplines) on FDI, offering mixed evidence on the impact of investment provisions. For example, Leshner and Miroudot (2006) obtain positive effects of investment provisions on FDI, while, more recently, Kox and Rojas-Romagosa (2020) and Laget et al. (2021) do not find that investment provisions have a significant impact on FDI. Moreover, we are not aware of existing work that quantifies the full/general equilibrium impact of DTAs and their investment provisions on FDI.

## CONTRIBUTION TO THE LITERATURE

Against this backdrop, we make three contributions to the existing literature on the links between DTAs and FDI. First, we contribute to the debate on whether DTAs with investment provisions stimulate FDI by estimating the direct/partial equilibrium effects of DTAs and DTAs with investment provisions on FDI. Second, we use our partial equilibrium estimates to obtain general equilibrium estimates of the effects of DTAs on FDI. Third, within the same structural framework, we obtain estimates of the effects of DTAs on trade flows, and we translate those effects into general equilibrium effects of DTAs on FDI through trade liberalisation.

Guided by the theoretical model of Anderson et al. (2019), we specify two estimating gravity equations – one for trade and one for FDI – which (i) are consistent with and representative of a large number of studies that quantify the impact of various determinants on FDI (e.g. Eicher et al. 2012, Blonigen and Piger 2014, Kox and Rojas-Romagosa 2020, Laget et al. 2021); and (ii) capitalise on the latest developments in the trade gravity literature (e.g. Yotov et al. 2016). Specifically, we rely on the Poisson pseudo-maximum likelihood estimator to account for potential heteroskedasticity in the bilateral trade and FDI data and to take advantage of the information in the zero trade and FDI flows (Santos Silva and Tenreyro 2006, 2011). In addition, we employ a very rich set of fixed effects (including origin-time, destination-time and directional country-pair fixed effects), which control for and absorb all possible country-specific and time-invariant bilateral determinants of trade and FDI. In addition to PTAs and DTAs, we control for other policy variables such as WTO membership, economic sanctions and bilateral investment treaties.

1 Other examples of studies on determinants of FDI, including papers on the impact of trade liberalisation and deep trade agreements on FDI, include Baltagi et al. (2008), Medvedev (2012), Osnago et al. (2019) and Di Ubaldo and Gasiorek (2022).



To perform the empirical analysis, we build a balanced panel data set for 89 countries covering more than 96% of world GDP and more than 94% of FDI throughout the sample period of 1990–2011. Our dataset covers FDI, trade agreements, trade flows, GDP, employment, physical capital, bilateral investment treaties, sanctions and WTO membership. An important feature of the dataset is that we capitalise on the richness of the World Bank Database on the Content of Regional Trade Agreements (DCRTA; Hofmann et al. 2019, Mattoo et al. 2020). Specifically, the DCRTA enables us to distinguish between several indicators and continuous PTA variables, including a standard dummy variable for PTAs, an indicator variable for DTAs, an indicator for DTAs that include investment provisions, and two continuous variables for the overall depth of DTAs and the depth of the DTAs with investment provisions.

## KEY FINDINGS

Three main findings stand out from our estimates of the effects of DTAs on international trade. First, the average impact of PTAs in our sample is not statistically significant. Second, however, we obtain a positive and statistically significant estimate of the effects of deep trade agreements. Specifically, our estimate suggests that the DTAs in our sample have led to about a 16% increase in bilateral trade among member countries. Third, deeper trade agreements (as measured by the number of provisions) lead to larger increases in the trade flows among DTA members. Depending on the number of provisions that they include, the DTAs in our sample have led to trade increases of between 0.6% and 23%. Overall, our estimates of the DTA effects on trade are consistent with findings from recent studies that have utilised the DCRTA and reinforce the view that ‘depth’ matters for the effectiveness of PTAs.<sup>2</sup>

Similar to our results for trade, the estimates of the effects of DTAs on FDI are also heterogeneous. Specifically, we do not obtain significant estimates of the effects of PTAs and DTAs on FDI. However, when we zoom in on the effects of DTAs that include investment provisions, we obtain a positive, sizable and statistically significant estimate. This result suggests that, on average, the PTAs with investment provisions in our sample have led to about a 34% increase in FDI between their members. We also obtain positive estimates of the effects on FDI of several other DTA provisions including ‘labor market regulations’, ‘export taxes’, ‘public procurement’, and ‘state-owned enterprises’, pointing to some interesting directions for further research and policy analysis. Finally, our estimates do not reveal a significant impact of the increase in the depth (number of provisions) on FDI. We find that some investment provisions (e.g. related to ‘transparency’ and ‘regulations’) may even decrease FDI. Our explanation for this result is that such provisions may lead to increased complexity of the agreement or may impose larger compliance costs.

2 See Fernandes et al. (2021) on various aspects of the determinants of DTAs and on the DTA effects on trade and other economic outcomes.

In sum, our econometric analysis confirms the significant impact of deep trade agreements on international trade and demonstrates that DTAs with investment provisions have led to a significant increase in foreign direct investment too.

## APPLYING FINDINGS TO A GENERAL EQUILIBRIUM SETTING

To translate our estimates of the impact of DTAs on trade and FDI into general equilibrium (GE) effects, we rely on the structural model of Anderson et al. (2019), which simultaneously offers theoretical foundations for, and is consistent with, both our trade and FDI econometric specifications. The main conclusion from our analysis is that DTAs have had large but strongly asymmetric effects on FDI. The DTAs that were in force in 2011 have contributed to about 3% of inward FDI in the world and about 70% of outward FDI.

The big average effect of outward FDI is driven by some large outward FDI countries (such as the United States and China), where any change in the technology stock of these countries – for example, following the formation of a DTA – has a multiplying effect due to the usage in many other countries, resulting in a large boost in the outward FDI stock of these countries. This finding is consistent with the non-rival technology capital models of Markusen (2002), McGrattan and Prescott (2009, 2010), and Anderson et al. (2019). We also find that changes in trade costs due to DTAs have led to additional boosts in FDI through the GE links between trade and FDI. Specifically, through their impact on trade costs, the DTAs in our model, which were in place in 2011, have increased inward FDI by an additional one percentage point and outward FDI by ten additional percentage points. By demonstrating that the impact of DTAs on FDI through trade is significant, we complement some recent work on the GE links between DTAs and trade outcomes (Fontagné et al. 2021), and also, from a broader perspective, papers that have studied the GE links between trade liberalisation and FDI (Baltagi et al. 2008, Tintelnot 2017, Anderson et al. 2019).

A caveat with our GE analysis is that the underlying theory is based on the assumption of non-rival technology FDI, while our data include all/aggregate FDI flows. While this gap, of course, has implications for the quantitative results, our conclusion about the disproportionately large impact on outward FDI will remain qualitatively the same if applied to appropriate data on technology FDI.

## CONCLUSIONS

In this chapter, we construct a new dataset covering 96% of world GDP and 94% of FDI flows to study the impact of deep trade agreements on trade and FDI. We show that DTAs have a significant positive impact on bilateral trade, and DTAs with specific investment provisions increase FDI flows between members. Using a structural model based on Anderson et al. (2019) suggests that DTAs have had a strong but asymmetric impact on outward FDI compared with inward FDI. Overall, we view our results as novel and potentially important from a policy perspective, both for the negotiations of trade and investment agreements and for properly quantifying their implications. Moreover, we see significant potential in developing and utilising datasets on global technology transfers that would generate more precise partial estimates and more informative general equilibrium analysis of the links between trade liberalisation and FDI and lead to clearer policy recommendations. In addition to the theory on the intensive margin that we utilise here, we expect significant payoffs from developing a theory that captures the links between trade liberalisation and the extensive margins (both domestic and international) of technology capital and its diffusion in the global economy.

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# CHAPTER 3

## Deep trade agreements and firm ownership in global value chains

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*Since the mid-1990s, preferential trade agreements (PTAs) have grown to cover multiple objectives beyond abolishing tariffs and boosting trade. For example, the effect of trade agreements on cross-border investment is of particular importance. The chapter creates a new dataset of ownership links at the country-sector level to study the effects of PTAs and their depth on firm ownership along global value chains. It finds that entering a PTA, and increasing the depth of an agreement (proxied by the number of distinct areas covered by the PTA), boosts the number of ownership links. Furthermore, this increase is mainly driven by vertical integration, both backward and forward along the value chain.*

When hearing the term ‘preferential trade agreements’, which trade economists use (almost) synonymously with ‘regional trade agreements’, one would think that such agreements are about trade. Tariffs are an important instrument that politicians and policymakers have at hand to deter (by raising tariffs) or stimulate (by lowering tariffs) trade, so one might think that PTAs are mainly about preferential tariff setting. Indeed, this is how PTAs were initially designed – they were signed and enforced to completely abolish tariffs on specific or all goods traded between selected sets of two or more countries. Free trade areas and customs unions are the two most prominent examples of PTAs. The former allow member countries to charge tariffs independently, while the latter charge common tariffs on goods from outside for all members. This difference is a major issue in the dispute about the treatment of Northern Ireland and the Republic of Ireland, an EU member, emphasising the role of rules of origin.

### **MODERN TRADE AGREEMENTS GO BEYOND TARIFFS**

However, today’s PTAs are not only about tariffs – and not even mainly about tariffs. In fact, PTAs have become complex sets of rules regulating issues from goods trade to services trade (on which there are no tariffs whatsoever), investment, the treatment of labour and workers, the environment, and competition among the players in a market. This change in the scope and content of PTAs mainly happened around the mid-1990s, when the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) was concluded and the World Trade Organization was founded.

While modern PTAs are about many issues beyond trade, they affect primarily one other outcome, namely, investment, including cross-border investment and the activity of multinational enterprises (MNEs). As shown in the chapter by Mario Larch and Yoto Yotov in this eBook, PTAs with investment provisions can have significant positive effects on FDI flows. Yet, empirical work on the content-related effects of PTAs, often measured by their depth, still mainly focuses on trade (Egger and Nigai 2015, Maggi and Ossa 2021). Work on the linkages between deep PTAs and cross-border investment and MNEs outcomes is much more scarce (for exceptions, see Orefice and Rocha 2014 and Kox and Rojas-Romagosa 2020).

Focusing on the investment and inter-firm linkages resulting from PTAs is interesting for three reasons. First, it can reveal the relative importance of horizontal MNEs, which duplicate production plants in different locations with the main objective of optimising trade and market entry costs, versus vertical MNEs that set different stages of production in different location with the aim of obtaining inputs and lower production costs. Second, it can shed light on the relevance of firm integration in global value chains (GVCs). And third, and it can highlight a channel of the consequences of a greater depth of PTAs for trade through value chain changes and vertical versus horizontal MNE activity.

What predictions does economic theory offer regarding the broadening scope and depth of PTAs on cross-border investment? First, a combination of trade- and investment-facilitating measures should reduce horizontal MNE activity (i.e. investments from shareholders in the same sector as an affiliate), as tariff-jumping is less profitable with low than with high tariffs. Second, it should incentivise firms to invest vertically either backwards (shareholders purchasing affiliates as upstream input suppliers) or forwards (shareholders purchasing affiliates as downstream producers), because cross-border value chain linkages are cheaper to sustain with lower trade and investment barriers.

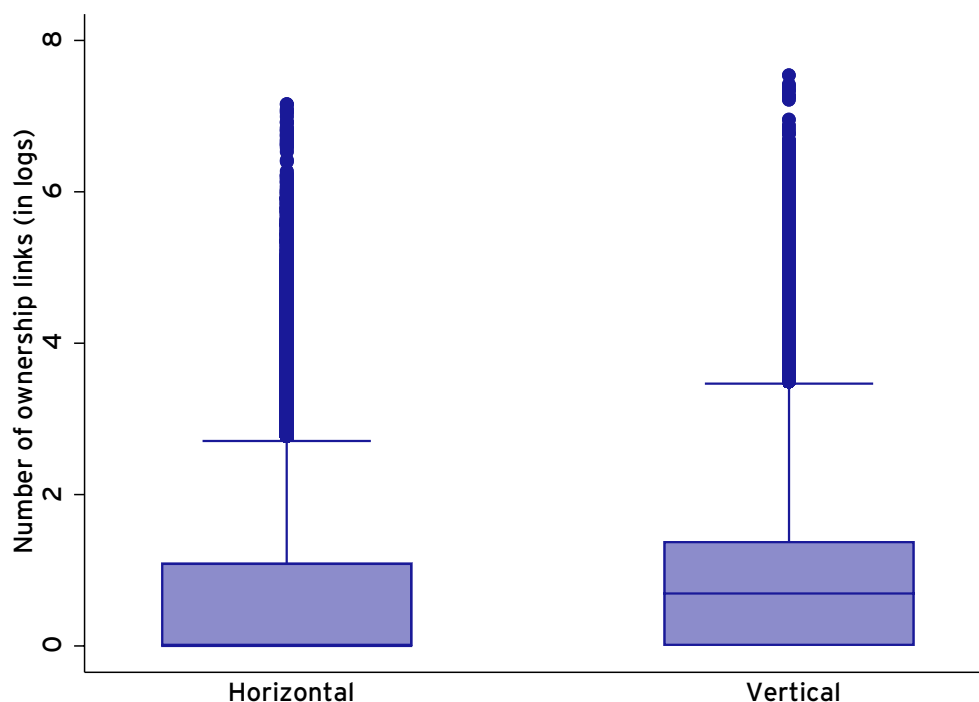
### **A DATA-DRIVEN APPROACH TO THE IMPACT ON CROSS-BORDER INVESTMENT**

Up to now, however, the main difficulty in corroborating such predictions was rooted in the lack of sectoral disaggregation in cross-border investment data. Using the Orbis Database published by Bureau van Dijk, we count the number of ownership links between country pairs (across all 209 economies) and sector pairs (across 38 sectors) building a panel from 2007 to 2015. The data not only allow us to count ownership links in those country-and-sector-pair cells but also to discern intra-sectoral links (pertaining to horizontal relations) and inter-sectoral links (pertaining to vertical relations). Moreover, (global) input-output tables allow vertical forward links (where the shareholder is upstream from an affiliate) to be distinguished from backward ones (where the shareholder is downstream). We use these data to shed light on the impact of PTA membership of firm ownership along GVCs. More concretely, we focus on two dimensions of firm ownership: the propensity (the probability of changing from no link

at all to at least one link) and the frequency (the count) of positive cross-border ownership links. To explain changes in these variables, we first use a PTA membership indicator variable that measures PTAs as such, and we additionally use a PTA depth variable that takes into consideration the intrinsic heterogeneity between different PTAs.

In Figure 3.1, we define vertical integration as a firm-to-firm shareholder-affiliate ownership link where the affiliate is either among the top five supplying (backwards integration) or the top five purchasing (forwards integration) two-digit ISIC sectors of the shareholder, and we define other integration links as horizontal. The figure shows the log number of links by type of integration when a PTA is in force through box plots. Here, we do not yet differentiate between PTAs by content or depth. The figure suggests that the number of links per (sector- and country-pair) cell is small on average. Moreover, it is larger for vertical links than for horizontal ones at the median. Finally, the counts at the higher end of ownership-link counts are also larger for vertical than for horizontal relationships between sectors, as can be seen by the top end dots reaching higher values for vertically integrated ownership links. Overall, this suggests that vertical ownership links occur more frequently among country pairs within PTAs for vertical than for horizontal relationships between shareholders and affiliates.

**FIGURE 3.1 NUMBER OF OWNERSHIP LINKS (IN LOGS) BY TYPE OF INTEGRATION IF A PTA IS IN FORCE**



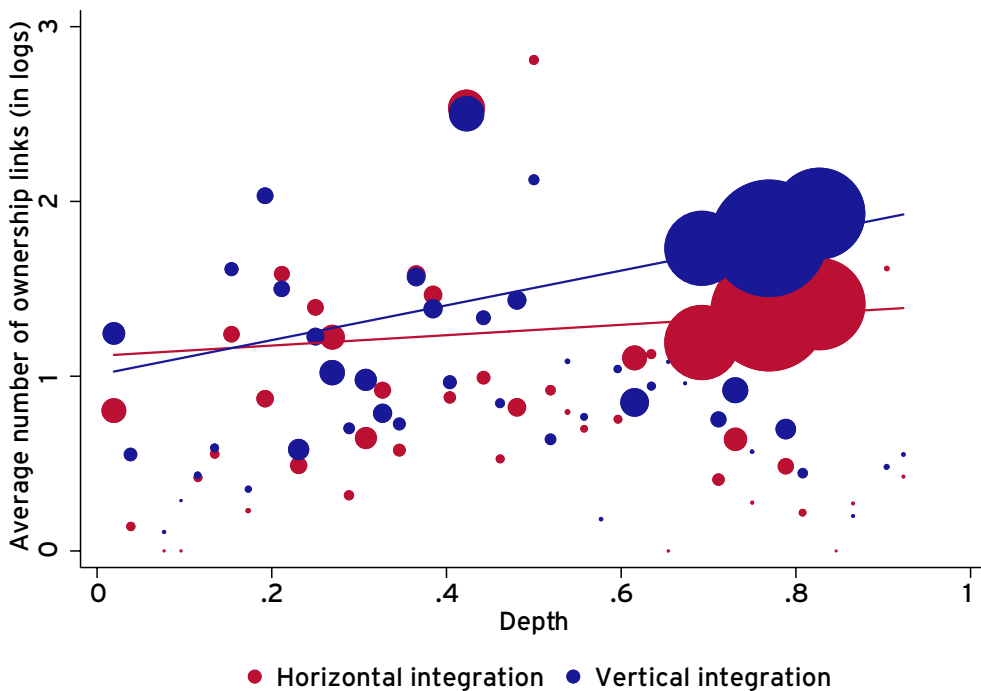
Notes: This box plot compares the distribution of ownership-link numbers in logs between horizontally integrated links and vertically integrated links when a PTA is in force.



We proceed to considering the relationship between PTA depth and ownership links. For this, note that deeper PTAs cover areas such as investment protection. Accordingly, one would expect that deeper PTAs promote the propensity and the frequency of cross-border ownership links of any kind. To shed light on this hypothesis, we construct a measure of the depth of PTAs where we count how many (out of 52) areas a PTA covers.

Figure 3.2 shows the relationship between the average number of ownership links and the depth of PTAs by type of integration (horizontal versus vertical) when a PTA is in force. We do so by way of a binned scatter plot, where the size of points is drawn proportionately to the number of ownership-link numbers at each level of PTA depth. Figure 3.2 suggests two conclusions. First, the number of observed ownership links is considerably larger at the high than at the low end of the distribution of PTA depth during the period between 2007 and 2015. Second, the relationship between PTA depth and the number of ownership links is generally positive, as can be seen from the upward-sloping lines which are fitted by least squares through the data clouds. Hence, deeper PTAs clearly induce more cross-border investment in general. Finally, the effect of any – and particularly of deeper – PTAs mainly materialises for vertical integration, which are represented by the blue scatter points and blue fitted line.

**FIGURE 3.2 AVERAGE NUMBER OF OWNERSHIP LINKS (IN LOGS) BY TYPE OF INTEGRATION AND PTA DEPTH**



Notes: Size of the points is proportional to the number of observations used to compute the average.

In an accompanying paper (Egger and Masllorens 2023), we present a more extensive econometric analysis of the question. More precisely, we make use of high-dimensional fixed-effects regressions to assess the role of changing PTA membership and of PTA depth on ownership links. The results are clear and robust to different specifications: entering PTAs in general, and increasing their depth in particular, boosts integration, and principally vertical integration.

## CONCLUSION

In this chapter, we analyse the effects of entering into deep preferential trade agreements on the frequency of shareholder-affiliate links using a unique dataset covering all pairs of 209 economies and 38 sectors over nine years between 2007 and 2015. Overall, we find evidence that points to a stimulus of deep PTAs for ownership links, and particularly vertical ones, in line with the hypotheses put forward by eminent researchers in international economics. Moreover, our results suggest that modern developments in the design and content of PTAs, making them deeper and more comprehensive, has exacerbated the tariff-related stimulus and triggered additional vertical cross-border investments along global value chains.

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## ABOUT THE AUTHORS

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# CHAPTER 4

## Intellectual property-related PTAs and patenting

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*Intellectual property rights protections have become an important component in modern preferential trade agreements (PTAs). However, the effects of intellectual property-related PTAs (or IPAs) on cross-border patenting and innovation remain understudied. This chapter uses data from the World Bank Deep Trade Agreements database as well as patent data from PATSTAT to study the effects of IPAs on patenting behaviour. It finds that agreements with strong intellectual property rights requirements (so-called ‘core TRIPS-plus requirements’) boost patent flows between members as well as inward patent flows from non-member countries. These effects are present across almost all sectors, but especially in biopharmaceuticals, medical devices, and information technologies. Early results on new patenting (a proxy for innovation) also suggest positive effects of TRIPS-plus IPAs in biopharmaceuticals, chemicals, and medical devices.*

In recent decades, preferential trade agreements (PTAs) have evolved from exercises in tariff cutting to deeper and broader commitments to set minimum standards in a variety of regulatory areas. Intellectual property rights (IPRs) play a central role in this regulatory convergence. Increasingly, PTAs embody extensive chapters covering detailed requirements in all areas of IPRs, including their enforcement. Such agreements, which we call intellectual property-related PTAs, or IPAs, build on rules required in the TRIPS Agreement at the World Trade Organization. However, the primary countries seeking stronger global protection – the United States and the European Union – have demanded even stronger standards, in the form of so-called TRIPS-plus requirements, in the PTAs they negotiate. For example, several US-partnered PTAs contain substantively tighter standards of patent protection for pharmaceuticals, new regulations for copyrights in digital goods, and expanded penalties for infringing IPRs. The Comprehensive Economic and Trade Agreement between Canada and the European Union contains an extensive chapter on intellectual property with elevated standards.

That such *demandeur* countries want strong protection in trade agreements reflects the global business orientation of most IPR-intensive industries, such as pharmaceuticals, medical devices, advanced machinery, software, and electronic devices. In principle, elevated and more harmonised standards should improve the international economic environment for high-technology trade and multinational production – a prediction supported by considerable empirical evidence. However, that situation should also

enhance incentives for firms to register more patents within the member countries of IPAs and, in principle, to develop more patentable innovations aimed at selling new goods and technologies in such markets. These latter ideas – that the formation of strongly protective IPAs should encourage more cross-border patenting and more innovation – have not been studied systematically in the literature.

This chapter summarises the results of a project studying these issues (Howard et al. 2023) undertaken using the World Bank Deep Trade Agreements database (Mattoo et al. 2020), which covers extensively regulatory provisions in comprehensive PTAs.

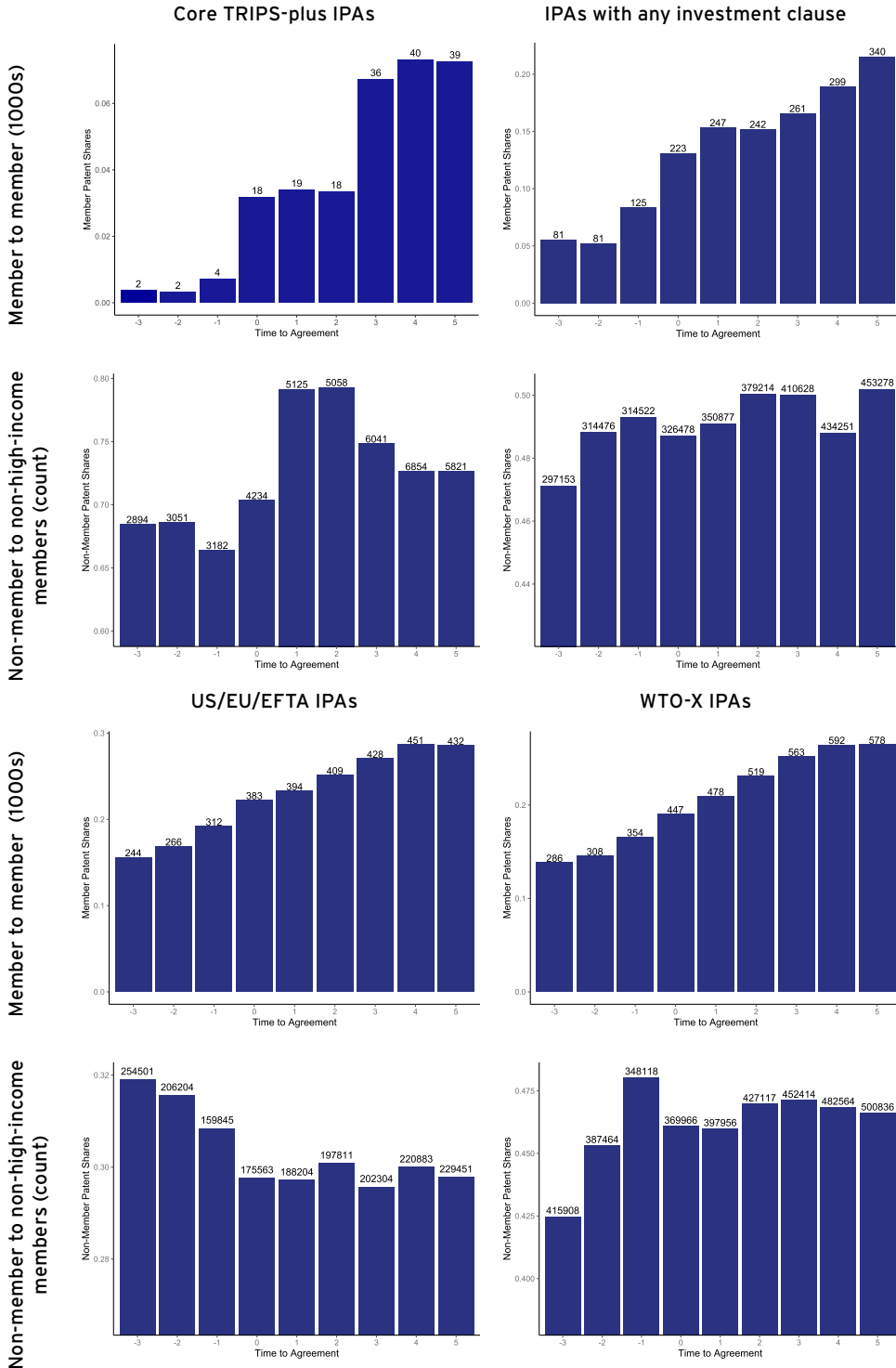
## PTAS AND TRENDS IN CROSS-BORDER PATENT APPLICATIONS

Figure 4.1 depicts changes in average patent shares and volumes in the years before and after the entry into force of three types of IPAs and another simple form of policy protection. Our definition of which trade agreements constitute IPAs is as follows. First, does an agreement include at least three of what we call ‘core TRIPS-Plus requirements’ (denoted as “core TRIPS-plus IPAs” in the figure), which are key elements of IPR protection that go beyond TRIPS standards? Second, is one of the parties the United States, the European Union or the European Free Trade Association (EFTA), which demand high standards (“US/EU/EFTA IPAs”)? Third, a weaker definition includes other PTAs that incorporate some IPR provisions that the World Bank considers legally enforceable under WTO rules (“WTO-X IPAs”, following the terminology in the Deep Trade Agreements database). Finally, for comparison purposes we include patent trends in PTAs that have at least one clause protecting ownership of investment assets (“IPAs with any investment provision”), regardless of whether they are IPAs.

All four agreement types demonstrate that cross-border patenting among member nations (‘member to member’) rose prior to agreement implementation (year 0) and continued to rise sharply after (as seen in the first and third rows). This was true also, however, of PTAs with investment protection, suggesting the need to control for that. In contrast, patent applications from non-members to members who are not high-income countries,<sup>1</sup> where IPAs typically require the largest policy changes, rose in absolute terms (the second and fourth rows). However, in spite of the rise in patenting volumes, and except for a small rise immediately after IPA implementation, there are no obvious changes in the share of patents originating from countries outside of the IPA to non-high-income member countries in the wake of agreement formation.

1 We categorise countries by income groupings according to the World Bank’s classification.

**FIGURE 4.1 CHANGES IN AVERAGE PATENT SHARES AND NUMBERS WITH ENTRY INTO FORCE OF FOUR TYPES OF IPAS**



## DATA AND RESULTS FOR INTERNATIONAL PATENT APPLICATIONS

Our patent data come from the PATSTAT database, which lists for each application the origin<sup>2</sup> and destination nations in which protection is sought. These data consist of annual bilateral patent applications for the years 1995–2015, a period in which both the scope and number of existing IPAs expanded considerably. We include each destination listed in a patent family as a separate application. For patents filed through the Patent Cooperation Treaty or the European Patent Office, we include only those that reached an ultimate national authority. In addition to international patent applications between countries, we also include strictly domestic patent applications (applications for which the source and destination countries are the same) in our gravity estimations described below. PATSTAT is also the source for new patent applications in each country, an additional outcome that we investigate. We also categorise patents by their primary high-technology industrial cluster – including biopharmaceuticals, medical devices, information and communication technologies, and other sectors – to see if specific types of advanced inventions are affected differently than others by the formation of IPAs.

To estimate the impacts of IPAs on bilateral patent applications, we adopt a structural gravity approach, commonly used in international trade studies.<sup>3</sup> Countries are designated as high-income (HI) or not high-income (NHI). For every pair of source ( $i$ ) and destination ( $j$ ) countries, application flows are regressed on indicators of whether both are members of a particular IPA, whether non-members patent in NHI members, and whether NHI members of an IPA patent in non-member countries.<sup>4</sup> We estimate similar regressions distinguishing countries by higher and lower research and development (R&D) capacities. We include variables capturing whether an IPA has IPR provisions that are not considered enforceable, whether countries  $i$  and  $j$  have a bilateral investment agreement, and a full set of fixed effects that account for time-varying factors specific to each origin or destination country, as well as time-invariant features of bilateral patenting relationships.

Our findings may be summarised as follows. First, there is a sharp distinction between types of IPAs. On one hand, neither the basic WTO-enforceable IPAs nor the US/EU/EFTA-partnered IPAs stimulate more patenting among members. However, the broader set of IPAs focused on core TRIPS-plus requirements strongly encourage more intra-agreement patenting. This suggests that such elevated and enforceable standards adopted in IPAs beyond those negotiated by the United States and the European Union attract technology transfer through patent flows. Second, IPAs encourage inward patent

2 We define a patent's origin using the nationality of its applicants and an algorithm based on applicant types (a corporate applicant receives priority over an individual applicant, for example) and the structure of patent families, similar to Coleman (2022), to assign a unique origin to each patent within a patent family.

3 The gravity approach allows estimation of the impacts of IPA membership on bilateral patenting volumes while controlling for other relevant bilateral and multilateral factors, such as innovative capacity or market size.

4 For technical reasons in the gravity equation, it is necessary to include this HI/NHI breakdown to identify directional impacts on flows with non-members, similar to Beverelli et al. (2018).

flows into NHI countries from non-members, suggesting that such nations become more attractive places to protect and deploy new products. They also encourage outward patents from lower R&D nations to non-members. Third, the existence of bilateral investment agreements is highly significant in stimulating cross-border patent flows in basic WTO-enforceable agreements. This suggests a potentially important complementarity between TRIPS-level protection and investment guarantees in stimulating cross-border patenting.

Turning next to the high-technology industry clusters, our gravity regressions reinforce the findings for total patents. The core TRIPS-plus IPAs strongly encourage higher patenting among member countries in virtually all sectors, which did not happen in the other cases. The core TRIPS-plus IPAs also stimulate flows from non-members to NHI agreement partners in these high-IP clusters. All three agreement types stimulate both internal and external patent flows in biopharmaceuticals, medical devices, and sometimes information technologies. Again, the existence of a bilateral investment agreement between country pairs is a strongly positive determinant of international patenting in WTO-enforceable and US/EU/EFTA agreements.

## RESULTS FOR NEW PATENTS

Our database also has information on new patent applications in many countries, permitting the study of how IPAs may influence innovation (defined as patents registered after agreements go into effect). Our approach is to estimate straightforward regressions, in which new patent applications are related to the ten-year cumulative patent stock in the registration country, whether that country is in an IPA, interactions of IPA status with high-technology industry clusters, and a full set of fixed effects (country-industry, industry-year, and country-year). This specification identifies innovation impacts strictly through IPA membership and cluster.

Our results are preliminary and require more fine-tuning. At this point, however, we have essentially negative conclusions. That is, membership of a country of registration in any of our IPA types has no detectable impacts on new patenting, whether from domestic or foreign sources, even permitting for one- and two-year time lags. However, within the core TRIPS-plus IPAs there are significantly positive effects on innovation in biopharmaceuticals, chemicals, and medical devices – the most patent-sensitive sectors. In this regard, the emphasis of TRIPS-plus standards on strongly protecting new inventions in these industries seems to bear fruit.

## CONCLUSIONS

The previous chapters in this section have examined the effects of trade agreements on foreign direct investment (Chapter 2) and firm ownership patterns along value chains (Chapter 3). In this chapter, we analyse the effects of PTAs with intellectual property-



related provisions on patenting and innovation. Using a demanding econometric specification with a battery of controls and fixed effects, we find that bilateral investment agreements matter considerably for encouraging cross-border patenting. The types of IPAs vary in whether they stimulate internal patenting among members or external patenting to or from non-members. Patenting in NHI countries from outside such agreements is sensitive to IPA membership, suggesting that joining them makes NHI markets more attractive for technology transfer protected by stronger IPR rules. Finally, both cross-border patenting and new innovation in pharmaceuticals, chemicals, and medical devices are stimulated by those IPAs featuring core TRIPS-plus requirements. We hope these findings motivate additional research into the relationships among IPAs, investment protection, and patenting.

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## **SECTION 3**

# **NON-TARIFF MEASURES AND UNCERTAINTY**



# CHAPTER 5

## What can we expect from preferential trade agreements?

45

**Nuno Limão**

Georgetown University

*Preferential trade agreements (PTAs) can affect economic outcomes via their effects both on current policies and expectations about future policies. The standard empirical approach is to estimate the impact of negotiated policies when the PTA enters into force. It is important to augment this approach in three fundamental ways. First, to examine whether the negotiated policies are applied de facto. Second, to measure how PTAs affect expectations, by using surveys, investor calls and prediction markets. Third, to systematically incorporate policy expectations to estimate the impacts of PTAs over their full lifecycle: from negotiation to ratification to implementation and eventual renegotiation. These changes are essential in evaluating if and how PTAs affect trade and non-trade outcomes as shown in recent research.*

Preferential trade agreements (PTAs) have been the major source of international trade reforms in the last 25 years. We now understand that certain PTAs increase goods trade, and increasingly when and how they do so (Limão 2016). The typical modern PTA goes far beyond regulating tariffs in goods. Figure 5.1 shows that countries negotiate non-tariff barriers and behind-the-border policies that enhance and secure market access. Their scope has also broadened – a majority of PTAs now include clauses on trade in services, intellectual property and investment.<sup>1</sup> The standard empirical approach is to examine if trade (or another outcome) changes after a PTA enters into force. I argue it is important to systematically examine an intermediate step, namely, how PTAs change current and expected policies. I refer to this as the policy pass-through of the agreement, and argue that it is central to explaining what we can expect from PTAs.

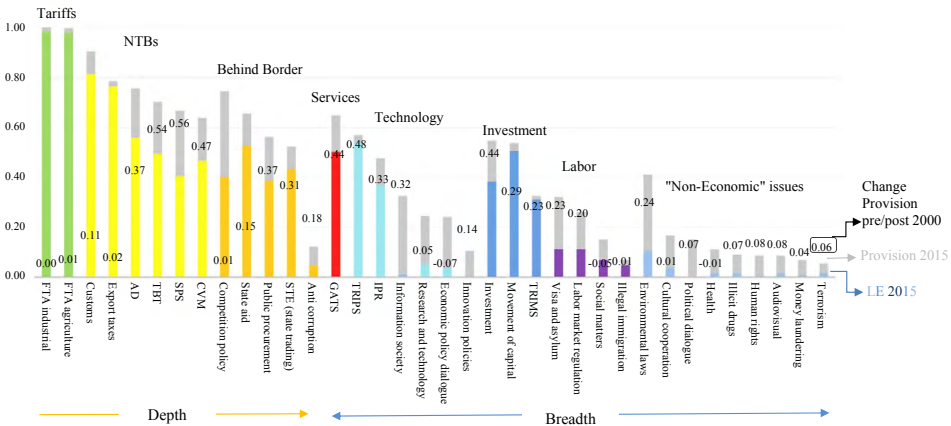
The chapter is organised as follows. First, I define the standard approach, the questions it raises and how policy pass-through can address them. Second, I specify a conceptual pass-through measure for an agreement addressing only current tariffs and discuss its applicability to other policies and how it complements the standard approach. Third, I review evidence of how and when PTAs affect trade policy uncertainty (TPU). An

<sup>1</sup> Mattoo et al. (forthcoming) provide details on the evolution of PTAs. The other research summarised in this eBook contributes to the growing literature estimating the impact of PTAs on non-trade outcomes. These include the environment (see the chapter by Ryan Abman, Clark Lundberg, John McLaren and Michele Ruta), labour rights (see the chapter by Joseph Francois, Bernard Hoekman, Miriam Manchin and Filippo Santi), migration (see the chapter by Anthonin Levelu, Anna Maria Mayda and Gianluca Orefice) and FDI (see the chapter by Mario Larch and Yoto Yotov).

important implication is that if PTAs change expectations, then we must consider the impacts over their lifecycle, which requires us to go beyond the standard before/after approach.

Fourth, I discuss how the TPU research tackles the challenges of measuring shocks to expectations, and the applicability of this research to select PTA policies that affect forward looking decisions.

**FIGURE 5.1 SHARE OF PROVISIONS AND LEGAL ENFORCEABILITY IN PTAs**



Notes: Omits the 16 "other policies" classified in Limão (2016). On average only 0.16 of agreements had them and 0.04 were legally enforceable.

Source: Author's calculation based on the 279 PTAs in the World Bank Deep Trade Agreements database (Mattoo et al. 2020).

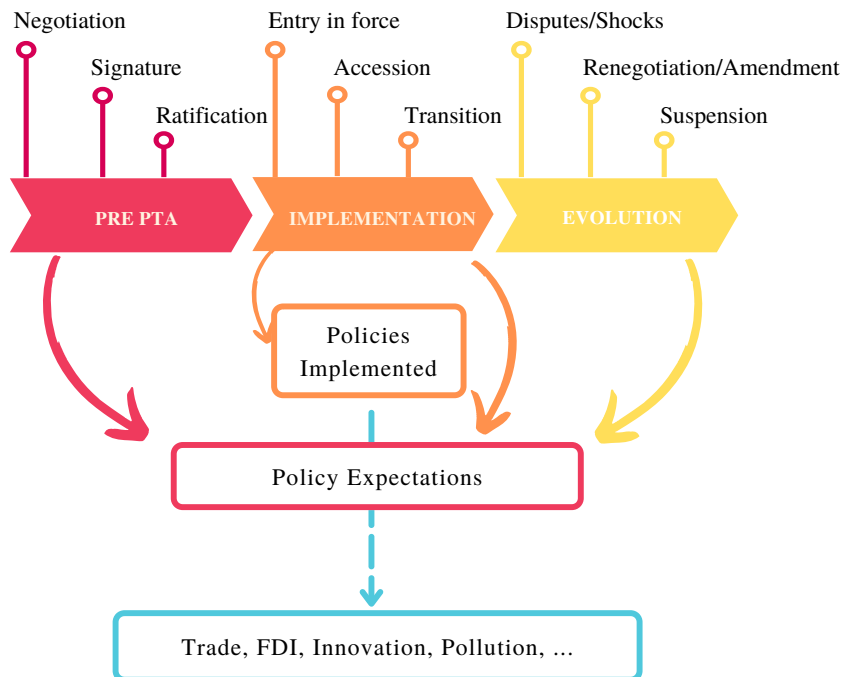
## POLICY PASS-THROUGH OF AGREEMENTS

What are the causal effects of PTAs? The standard approach is to examine if an outcome changes after the PTA enters into force. This approach is applied to the whole agreement or to specific provisions (see examples in Fernandes et al. 2021), and has a causal interpretation if we construct a valid counterfactual for the outcome (one without the agreement or provision). The standard approach is useful but has some limitations. First, it focuses attention around one event (entry into force), but several others can be relevant both before and after, as described in Figure 5.2. Second, suppose we find no impact of a provision on an outcome, then the question is why. Was the provision not implemented? Was it implemented but not binding? Was it binding initially but expected to be reversed? Did the impact occur in anticipation of the agreement, or will it occur only later? The answer to these questions hinges on how the agreement affects incentives via current and expected policies.<sup>2</sup>

<sup>2</sup> Some of the timing issues could be addressed by extending the standard approach over more periods if the data are available. However, doing so increases the potential for confounding effects. Even if the approach identifies a divergence between short-run and long-run effects, it cannot explain why.

Agreements can only affect outcomes if they change the incentives of governments, firms, consumers or other agents. Such a change requires the content of an agreement to be passed through to policies. An example is a negotiated tariff schedule, which passes through to applied tariffs if implemented. The agreement can also affect incentives if a negotiated issue does not pass through to current policy. In this case, we require the agreement to change expectations about future policies. To capture this idea, I define the policy pass-through of an agreement as a measure of how it *changes* applied and/or expected policies over its lifecycle, which we depict in Figure 5.2 and describe below.

**FIGURE 5.2 LIFECYCLE OF A TRADE AGREEMENT AND ITS POLICY CHANNELS**



Source: Author's elaboration.

## CURRENT POLICIES

The importance of the pass-through of an agreement to current policies may be obvious, but a simple example can help clarify the concept and its usefulness. Consider a hypothetical world where (i) PTAs only address tariffs, (ii) governments surprise agents by announcing a new tariff schedule to enter in force at time  $T$ , and (iii) agents believe the announcement, have no uncertainty about tariffs, and make no forward-looking decisions based on those tariffs. What effect can we expect this PTA to have on trade between its members? It depends on whether the negotiated tariffs are implemented and differ from the existing ones, i.e. on the pass-through.



Measuring pass-through in this case is simple. If at  $T$  the applied tariff equals the negotiated one and differs from the pre-agreement, then there was full pass-through. Negotiated and implemented tariff data exist, at least in some format. It would be useful to compile it systematically and include in PTA databases to compute this pass-through measure.

An imperfect alternative to measure pass-through is to bypass the negotiation data and focus on changes in applied tariffs. Hayakawa and Kimura (2014) employ the standard 'before and after' PTA approach to applied bilateral tariffs between members and estimate they fall on average 2 percentage points. Limão (2016) finds the same average in 1990-2010 but with heterogeneity across types of agreements (for example, 4 percentage points for customs unions and common markets, but only 1 percentage point for non-reciprocal agreements).<sup>3</sup> Why are these changes small and heterogeneous?<sup>4</sup> Partially due to incomplete pass-through – either from lack of implementation, or because tariffs were already zero, so there is no change. There is also evidence that non-reciprocal preferences are uncertain and not fully utilised.

Focusing on the pass-through to current policies has important implications for the interpretation and timing of PTA impacts. Consider a scenario where the standard approach yields an average increase in trade after the PTA enters into force. If the effect remains after controlling for changes in current policies (say, tariffs), then we should consider alternative explanations. Moreover, there are two implications in this scenario in terms of timing. First, it is clear that the relevant estimation period is before and after pass-through, rather than entry into force. A slow pass-through may then partially explain why estimated trade effects of PTAs using the standard approach double after five years and triple after ten (Baier and Bergstrand 2007). Second, PTAs evolve, as shown in Figure 5.2. They can be renegotiated, amended and deepened over time (for example, EC 1958 versus EU 1993), but this is typically ignored by the standard approach. Thus, it is important to update (and backdate) PTA databases to reflect major changes after entry into force.

The pass-through concept applies to other issues in Figure 5.1, but it can be harder to implement.

The first challenge is to code negotiated provisions such as technical barriers to trade, competition policy, services commitments, and so on. Recent data overcome this challenge for a broad number of PTAs, as described in Mattoo et al. (2020). These data can be the starting point to address the second challenge: to determine if the provisions in those

3 A common characterisation of PTA effects on preferential tariffs is to compute their difference relative to the current MFN tariff. This preference margin can be useful for economic analysis but does not address the pass-through question since the MFN tariff changes over time and may increase as a consequence of PTAs (Limão 2006).

4 They are small relative to the maximum possible reduction, the MFN value, which averaged around 8 - 10 percentage points in that period.

agreements were implemented and binding.<sup>5</sup> One could start with important and easily observable negotiated items – for example, creation of regional or national institutions such as a competition authority. Moreover, when national legislation is required, it may be possible to leverage recent tools to measure textual similarity between the agreement and changes in that legislation.<sup>6</sup>

In sum, we require additional data and studies of whether negotiated provisions are passed through after a PTA enters into force. Determining if pass-through is immediate or slow, full or incomplete, for alternative policies will help explain the broader effects of PTAs. It is also a factor that can shape the policy expectations of agents.<sup>7</sup>

### (UN)EXPECTED POLICIES

Policy is uncertain, and agreements can play a key role in shaping expectations. Trade policy uncertainty (TPU) has increased considerably since 2016 – the year when the UK voted for Brexit and the US elected a 45th president who renegotiated and withdrew from PTAs and initiated an international trade war. This was followed in 2020 by border and export restrictions, lockdowns and varied fiscal responses to the Covid-19 pandemic.

TPU is not a new phenomenon. In fact, predictability has long been a core objective of agreements. Research in the last decade shows that trade agreements reduce TPU and this is an important source of trade integration (Handley and Limão 2022). This empirical research mostly examines the impacts of tariff uncertainty on specific economic outcomes via goods trade. What lessons does this research have and which apply to other policies and non-trade outcomes relevant for modern PTAs?

In order to understand pass-through in the context of expected and uncertain policies, we extend our earlier example. PTAs address only tariffs and governments announce a negotiated schedule, as before. But now agents make forward-looking decisions based on current tariffs and their beliefs about future tariffs. The PTA has a pass-through to expected policies if it changes those beliefs.

When PTAs alter expectations, they can have impacts at any point in their lifecycle shown in Figure 5.2, which has implications for estimation. The negotiation can reveal the content and enforcement mechanism; the signature and ratification increase the probability the new policy regime will be implemented. If there are anticipatory effects over the several years before entry into force then they should not be used as the base period, contrary to what the standard approach does. This argument also applies to renegotiations and suspension of an agreement. The relevance of this point is evident

5 Detailed monitoring of implementation and compliance is done by some PTAs (for example, the DG for the Internal Market in the EU), but not by all and not in a standardised form.

6 This data is available for agreements (see <https://unctad.org/topic/trade-analysis/text-as-data>) and used to study their similarity by Alschner et al. (2017).

7 Hakobyan and McLaren (2016) is a rare example of the importance of using applied tariff changes and capturing anticipatory effects of announced tariffs yet to be implemented of NAFTA on US local labour markets.

from the reduction in trade between the UK and the EU, which started when the Brexit referendum was proposed (Graziano et al. 2021) – this was five years prior to any actual policy changes due to Brexit.

## MEASUREMENT

Measuring pass-through in policy expectations is challenging, but possible in specific cases. We need two basic elements. First, a relevant event or agreement provision that can potentially change expectations. Second, a measure of whether any change occurred, obtained either directly or via inference.

What are potential ways in which agreements can affect policy expectations? Suppose agents believe the tariffs are volatile – so in any year they may change with some probability, and if they change then the new tariff value is drawn from some distribution,  $H$ . In this case, an agreement reduces TPU if it lowers policy volatility and/or the riskiness of  $H$ . Sources of volatility include non-compliance, exceptions and poor enforcement. PTAs can lower the risk of non-compliance by binding tariffs at zero; they can reduce the risk by restricting policy substitutes such as anti-dumping or other non-tariff barriers. Moreover, monitoring and enforcing commitments on tariffs and complex issues may be easier for smaller groups of countries with similar preferences.

We can capture some of these expectation features of an agreement in systematic ways. Using the World Bank Deep Trade Agreement database, we can identify features that generate higher persistence in negotiated policies. These include legal enforceability, which varies across issues as seen in Figure 5.1; linkage and compatibility with previous agreements; and surveillance.<sup>8</sup> We can also identify provisions that are more focused on future conditions.<sup>9</sup> Specific agreements may explicitly remove a source of uncertainty. A prominent example is China's WTO accession, which led the United States to grant it permanent most-favoured nation (MFN) status and eliminate the yearly threat to increase tariffs by 30%.<sup>10</sup>

How can we then measure any actual changes in policy expectations that the agreements may have had? In the context of tariffs, we can measure if, after agreements, ex-post tariff volatility falls – as Limão and Maggi (2015) find for the United States – or tariff increases are less likely – as Groppo and Piermartini (2014) find for products with WTO bound tariffs. Changes in expectations related to agreements and disagreements, such as Brexit, can also be measured more directly by careful surveys of firm managers (Bloom et al. 2019), textual based data from either the news or company investor calls (Hassan et al. 2020), or prediction market probabilities (Graziano et al. 2021).

8 They may also include complementary policies such as technical assistance and funding (see the contribution by Francois et al. in this eBook).

9 Procurement provisions do not allocate current government procurement contracts but prescribe rules for future ones.

10 This TPU reduction alone accounts for about a third of Chinese export growth to the United States in 2000-2005, and had multiple other impacts reviewed in Handley and Limão (2022).

Even if none of the measures above is available, there are alternative ways to infer if agreements affect TPU. A good example is the Portuguese accession to the European Communities (EC) in 1986. Portuguese industrial goods already faced a zero tariff in the EC before 1986, but these preferences were not GATT-legal and if revoked the Portuguese exporters would have faced the EC MFN tariff. That threat was much lower after 1986, and this led to substantial export entry from 1985 to 1987 in products previously threatened with the highest EC MFN tariffs (Handley and Limão 2015).

## APPLICATION BEYOND TARIFFS AND TRADE

Extensive research finds significant effects of reduced TPU via agreements on various outcomes. These include TPU effects on trade measures, such as value, prices, firm entry and exit. There are three basic data ingredients for this type of study. First is the realisation of an event that can change beliefs about policy change (or a direct probability measure).

Second is a measure of the threat policy – for example, heterogeneous EC common tariffs across products or a trade war tariff. Third is an outcome that resulted from some prior investment – for example, a sunk cost to start exporting, as found in Handley and Limão (2017).

Tariffs remain an important source of uncertainty. We can apply the TPU approach to analyse the tariff war and eventual border carbon adjustments. We can build on that approach to examine non-tariff policies and outcomes other than goods trade. Doing so is feasible when we have the basic ingredients mentioned above. Here are some potential candidates:

- **Non-tariff barriers** (listed in Figure 5.1) such as anti-dumping, technical barriers and sanitary standards. These barriers are uncertain and often subject to exceptions. They can also be prohibitive and thus pose a high risk to investment in new export products to that market. In some cases, the impact of NTBs on trade is measurable via a tariff equivalent; Ahmad et al. (forthcoming) do so and find lower services trade between the EU and UK in sectors where Brexit threatened higher non-tariff barriers.
- **Competition policy.** This is an interesting area since several provisions regulate future firm behaviour, so they can directly impact investments such as firm entry. Moreover, there is uncertainty about the implementation, impact and enforcement of multifaceted policies. Future analysis can explore available data varying across PTAs (for example, in terms of predictability, transparency, and expected enforcement), and also within PTAs if it varies across sectors.

- **Intellectual property right provisions.** These directly affect the incentives to research and innovate, which require sunk investments. Implementation and enforcement of rules related to IPR, technological transfer, and so on are a source of disputes and uncertainty. Data on the degree of protection and legal enforceability are available within PTAs and can vary by the sectors' IP intensity.
- Other candidates include **labour, investment, government procurement and environmental provisions.**

## CONCLUSIONS

Data and research are catching up with the depth and breadth that characterises modern preferential trade agreements. It is important to understand both if *and how* these agreements affect trade and other outcomes. Doing so requires us to go beyond standard estimation approaches and to estimate the pass-through of agreements. Agreements seek to affect current and expected policies, so the default must be to measure and evaluate both, even if this is challenging. This richer approach has been successful in explaining the timing, magnitude and channels of PTAs on trade and related outcomes at different points in their lifecycle, and it has the potential to be just as valuable for non-trade outcomes.

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## CHAPTER 6

# Deep trade agreements: Not a tool for strategic trade policy?

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**Gabriel J. Felbermayr and Feodora A. Teti**

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*Preferential trade agreements (PTAs) have grown in recent decades to cover multiple objectives and provisions. In addition, the use of both tariff and non-tariff measures has become increasingly common; to understand if and how PTAs affect trade outcomes, it is important to disentangle between the two. To understand if and how PTAs affect trade outcomes, it is important for empirical analysis to disentangle the effects of these different provisions. This chapter uses a large dataset of international and domestic trade flows, trade agreements, and a new database of tariffs to study the effects of tariff and non-tariff provisions on trade flows. It highlights that existing data on tariffs are often mis-measured and can lead to misleading results. Using new tariff data, it shows that tariff reductions have a robust positive effect on trade creation. Meanwhile, the effects of non-tariff provisions in deep PTAs are positive but likely to impact both member and non-member countries in a non-discriminatory way. From a geopolitical perspective, the evidence suggests tariffs remain the more potent and targeted tool for influencing trade flows.*

In their 2007 paper, Scott Baier and Jeff Bergstrand asked: “Do free trade agreements actually increase members’ international trade?”. This is an irritating question, as policymakers usually assume that the answer is a clear and unequivocal “yes!”. Indeed, the authors find evidence in favour of this position, but only after showing that the right econometric gravity framework needs to be employed. In their survey, Head and Mayer (2014) conclude that, on average, preferential trade agreements (PTAs) increase bilateral trade in structural gravity models by some 32%. Recently, the debate has moved towards a more granular view: showing that different PTAs can have very different effects (Baier et al. 2019) and that some of these differences can be explained by the scope and depth of their legal provisions, many of which go much beyond the simple reduction or elimination of tariffs. Importantly, some of the deep provisions in modern PTAs have a multilateral (i.e. non-discriminatory) effect that may mitigate concerns about trade diversion (Mattoo et al. 2022).



## NOT ALL PROVISIONS IN PTAS ARE MEANT TO CREATE TRADE

Understanding the trade effects of PTAs is important, not only because trade creation and diversion shape economic welfare effects. In the present times of increased geostrategic rivalry, the active promotion of bilateral trade activities also has the purpose of securing and diversifying supply bases or of promoting international cooperation in non-trade areas, from defence to climate policy.<sup>1</sup> However, some provisions in trade agreements do not actually end up delivering freer trade, despite appearances. This may be either intended by powerful stakeholders (Rodrik 2018) or it may be a side-product. An example of the latter is the case of strict rules of origin (Haaland and Wooton 2022). Moreover, some provisions do not even pretend to promote trade (or free trade) but they target other objectives (Borchert et al. 2021). Such provisions could still increase bilateral trade, but this would rather be the result of a welcome side effect.

## DISENTANGLING TARIFF AND NON-TARIFF PROVISIONS

Interestingly, much of the empirical literature (as surveyed in Head and Mayer 2014, for example) uses dummy variables to identify whether two countries share the same trade agreement, but does not control for tariffs. Then, the estimates identify the total trade creating effect of a PTA (such as NAFTA or the EU) or the average over PTAs or types of PTAs (deep versus shallow) between the members of the agreement as compared to non-members. When controlling for tariffs, by definition, the dummy variables capture the non-tariff component of the total effect. Studies usually show both – statistically significant tariff elasticities (negatively signed) and dummy effects (positively signed) – providing evidence in favour of the trade-creating power of non-tariff provisions.

## ABOUT MEASUREMENT ERROR IN TARIFFS DATA

In recent work, one of us shows that the tariff variables usually employed in aggregate trade flow modelling are often severely mismeasured. Teti (2020) presents a new global tariff database that covers tariffs at the six-digit product level for 197 importing countries and their trading partners for 30 years (from 1988 to 2017). She documents two major issues: missing data and misreporting. Most strikingly, the common data sources sometimes confound preferential and most-favoured nation (MFN) tariffs. Her new database solves these problems by almost doubling the number of tariffs at the six-digit product level (to 5.7 billion) and fixing erroneous coding. Aggregation to the sectoral level occurs by taking simple means across products at the importer-exporter-sector-year level.

1 See the collected volume Bilal and Hoekman (2019) for discussion in the context of the European Union.

We use the International Trade and Production Database for Estimation (ITPDE) put together by Borchert et al. (2020). This is the largest data set that contains not just international trade flows but also domestic ones; this is important to identify multilateral trade policy effects, as they do not vary between foreign trade partners but between domestic and foreign partners. The drawback is that those data are available at a rather high level of aggregation only.

Information on trade agreements comes from various sources, mostly from the World Trade Organization. We distinguish between reciprocal preferential trade agreements notified under Art. XXIV of GATT and non-reciprocal ones under the Enabling Clause of GATT. Moreover, we draw on the World Bank Deep Trade Agreement database (Mattoo et al. 2020) to determine which Article XXIV agreements are deep agreements. The dataset on the content of RTAs maps 52 provisions in 279 PTAs notified to the WTO and signed between 1958 and 2015. We define agreements as deep when they cover more than 20 provisions and shallow otherwise. We also define a count variable ‘MFN Openness’, which counts the cumulated number of provisions in deep trade agreements of each country (exporter or importer) that are classified as MFN by Hofmann et al. (2019).

## **BEST PRACTICE GRAVITY ESTIMATION**

We run gravity equations, pooled over sectors, for manufacturing and agricultural trade. We have also worked with a larger sample that includes services, too. Our findings are broadly robust. In this chapter, we present the results based on the longest panel that is available to us.

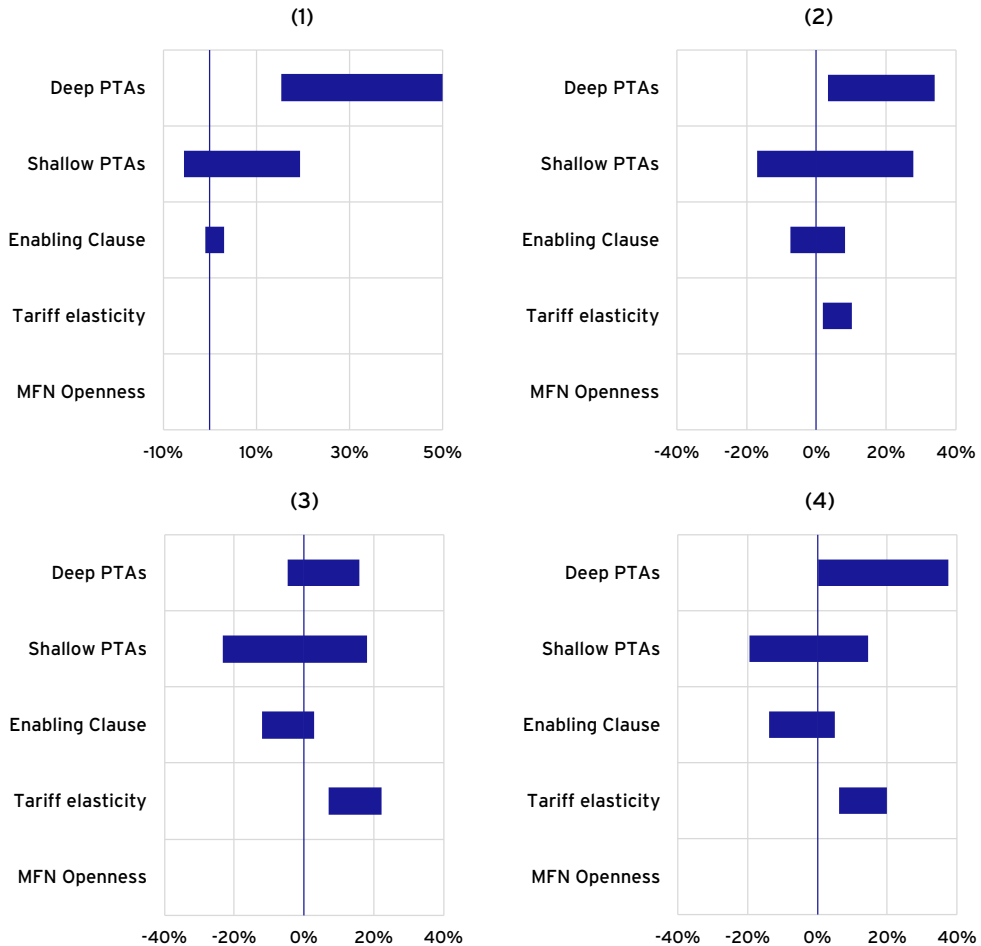
In line with current best practice (Yotov et al. 2016), we estimate the gravity model using the pseudo-Poisson maximum likelihood estimator. We include the largest possible set of fixed effects to control for all determinants of trade that do not vary at the sector-pair (directed) -year margin. All standard errors are three-way-clustered (importer, exporter and time). The right-hand side of the model contains a host of dummy variables (deep trade agreements, shallow agreements, and Enabling Clause) that take the value of unity of a country pair and displays the respective agreement. It also features the log of the tariff factor  $1 + \tau$ , and the count variable MFN Openness defined above.

## **DISCRIMINATORY TARIFF CUTS MATTER, NON-TARIFF PROVISIONS MAY BE NON-DISCRIMINATORY**

Figures 6.1 and 6.2 present the results in graphical form. The effects of dummy variables are expressed as the trade growth in percent attributable to enacting a trade agreement. Panel (1) of Figure 6.1 shows that the 95% confidence interval for the effect of deep PTAs is [15%, 58%], with the mean at 35%. The size of the effect is very standard in the literature. In contrast, we find no evidence that shallow PTAs create any trade between the participating countries; nor does the Enabling Clause. The size of the sample used

to obtain these results is large ( $N = 683,290$  sector-pair combinations). If one accounts for ad valorem tariffs from the standard WITS data set in the specification, the sample shrinks to  $N = 392,839$  observations, as there are many missing values. Hence, models (1) and (2) are not directly comparable. Rather, specification (2) needs to be compared to (3), which draws on exactly the same sample but instead of tariffs from WITS uses tariff data from the cleaned new GTD.

**FIGURE 6.1 95% CONFIDENCE INTERVALS OF ESTIMATED TRADE EFFECTS (MANUFACTURING AND AGRICULTURE), 1989-2015**



Notes: All specifications use importer-sector-year, exporter-sector-year, and pair-sector fixed effects. Specification (2) uses WITS and specifications (3) and (4) use the new global tariff database as a source for tariff data.  $N=638,290$  in specification (1) and (4);  $N=392,839$  in specifications (2) to (3). Confidence intervals are based on standard errors that are clustered three ways for importer, exporter, and year. Deep PTAs, shallow PTAs, and Enabling Clause are binary variables; MFN Openness counts multilateral provisions in all trade agreements of the importer or exporter.

Source: Own estimations.

Specification (2) suggests that deep PTAs continue to remain statistically significant determinants of bilateral trade. The estimated 95% confidence interval ranges from 3% to 31%, with a mean trade-creating effect of 16%. Shallow PTAs and the Enabling Clause still do not appear to matter in a statistically significant fashion. The estimated (absolute value of the) tariff elasticity is 1.65, different from zero at the 1%-level of significance. To make the effect easier to understand, we translate it into the trade-creating effect of a tariff reduction of 3 percentage points – a very standard magnitude across sectors and trade agreements. The associated 95%-confidence interval is [2%, 8%]. Hence, a tariff reduction by 3 percentage points adds between 2% and 8% to trade. Model (2), therefore, seems to suggest that both the tariff reduction (across all types of agreements) and the non-tariff provisions in deep agreements create trade between countries, but the non-tariff provisions matter more.

Specification (3) keeps the sample size constant but replaces the noisy tariff measure from the World Bank's World Integrated Trade Solution (WITS) with one obtained from the new global tariff database. The tariff elasticity is estimated much more precisely (the t-value doubles) and doubles in size to 3.55 – more closely in line with parameter choices in the macroeconomic literature. This is expected, as the use of the global tariff database lowers measurement error in the tariff variable, thereby lowering the attenuation bias that drives the tariff elasticity in specification (2) towards zero. Now, a 3 percentage point reduction in tariffs boosts bilateral trade by between 7% and 15%. The effects of the dummy variables, however, no longer differ from zero in terms of usual statistical significance. This result is surprisingly robust. For example, it persists when services trade is added to the sample, or when other trade data are used (such as the WIOD data).

This is an unexpected result. It suggests that the measurement bias present in specification (2) inflates the estimate of the deep PTA dummy as the trade-creating effect of the agreements is not appropriately accounted for by the mismeasured tariff variable. Taking specification (3) at face value, non-tariff provisions in PTAs *per se* do not increase bilateral trade. In principle, this can be due to two reasons: either the non-tariff provisions in PTAs do not lower trade costs at all, or they lower trade costs in a non-discriminatory (MFN) fashion so that trade costs fall with all trade partners (not just the ones in a PTA). Since we include domestic trade flows in our analysis, so that different treatment of domestic versus international trade flows is possible, the failure to find a significant PTA effect would imply that trade agreements put foreign trade partners on a par with domestic ones. In contrast, tariffs – by their very definition, discriminatory – have a strong and precisely identifiable effect. One interpretation of this finding is that, if policymakers want to use trade preferences for geostrategic purposes, they should focus on tariff reductions. Deep non-tariff provisions tend to diffuse and benefit all trade partners, potentially including those that the agreement does not directly address.

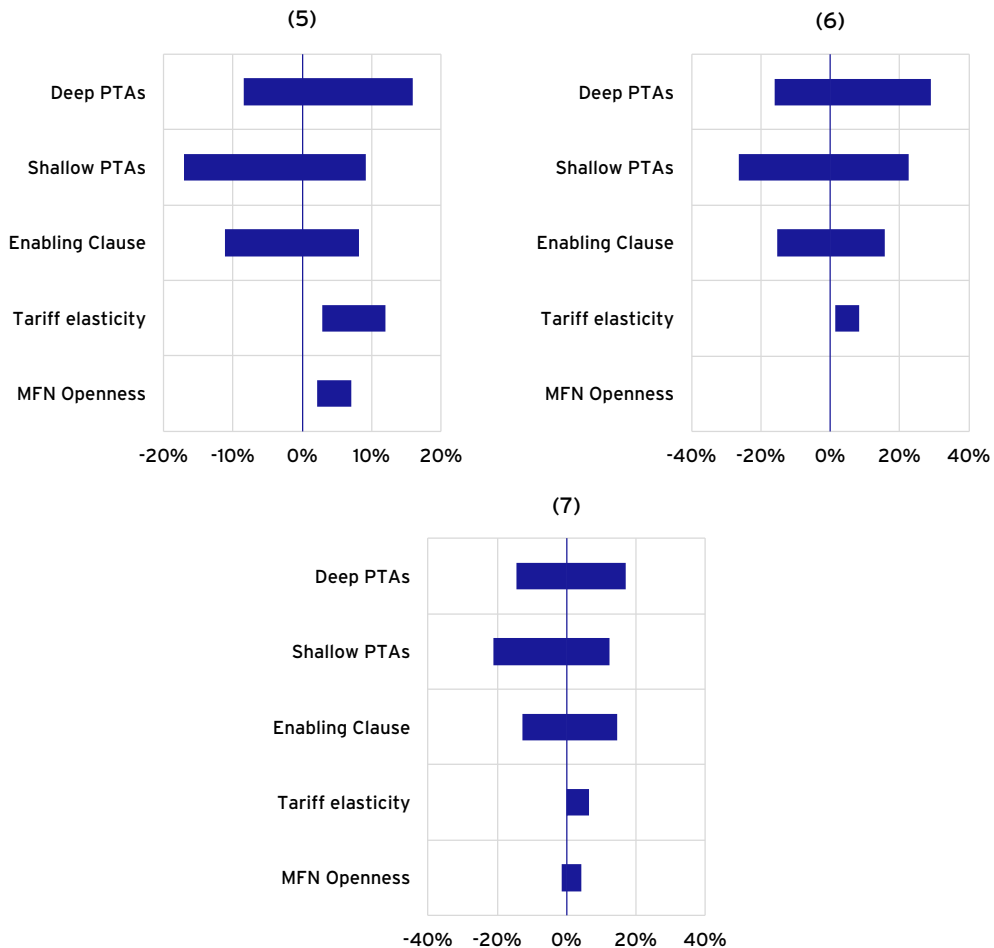
The larger sample used in model (4) resuscitates a statistically significant effect (at the 5% level) of deep PTAs, which now have an independent effect of increasing bilateral trade by between 0% and 37% (95% confidence interval). A tariff cut of 3 percentage

points increases trade by between 6% and 14%, an effect in the same ballpark as with the smaller sample. Hence, we have strong evidence that (discriminatory) tariff cuts boost bilateral trade and some, albeit weaker, evidence for discriminatory trade creation by deep non-tariff trade provisions.

## DO DEEP TRADE PROVISIONS CREATE TRADE NON-DISCRIMINATORILY?

Figure 6.2 shows regression results based on the large sample which test whether MFN provisions in deep trade agreements facilitate trade between signatories of PTAs and all their trading partners. The variable ‘MFN Openness’ counts MFN provisions in PTAs at the country level. Whenever a country signs a new FTA that includes MFN provisions not included in earlier PTAs, the count variable grows by one unit.

**FIGURE 6.2 95% CONFIDENCE INTERVALS OF ESTIMATED TRADE EFFECTS (MANUFACTURING AND AGRICULTURE), 1989-2015 (CONT'D)**



Note: All specifications use importer-sector-year, exporter-sector-year, and pair-sector fixed effects and use the new global tariff database as source for tariff data. N=638,290 for all specifications. Confidence intervals are based on standard errors that are clustered three ways for importer, exporter, and year. Deep PTAs, shallow PTAs, and Enabling Clause are binary variables; MFN Openness counts multilateral provisions in all trade agreements of the importer or exporter.

Source: Own estimations.

Specification (5) shows that adding the MFN Openness variable undoes the discriminatory effect of deep PTAs, while the tariff elasticity is still precisely estimated. Figure 6.2 illustrates the effect of doubling the number of MFN provisions in place. In specification (5), this leads to additional trade by 2% to 5% with all trade partners. Note that, even with importer and exporter-year-sector fixed effects (present in all specifications), the effect can be identified, because the MFN Openness variable varies between domestic and foreign trade partners.

Specifications (6) and (7) are very demanding in that they include time-varying border controls to account for general trends in globalisation. This reduces endogeneity concerns, but makes inference difficult as very little variation is left unexplained by the combination of fixed effects and globalisation controls. It is, therefore, not overly surprising that, compared to specification (5), this more demanding model does not lead to different conclusions regarding the effects of non-tariff provisions in trade agreements. While the discriminatory tariffs remain statistically significant (but, as the figure shows, with lower estimated effects), the MFN Openness variable in model (7) fails to be statistically different from zero, albeit at a small margin.

## CONCLUSIONS

Deep non-tariff provisions in trade agreements have gained a lot of policy attention. However, the effects of tariffs and non-tariff provisions are often conflated when analysing the effects of preferential trade agreements. Furthermore, tariff data are often severely mis-measured across countries. In this chapter, we leverage a new global tariff database to estimate the effects of tariff and non-tariff provisions in PTAs on trade flows. We do not find a robust independent trade-creating role for non-tariff provisions, while tariffs – once properly measured – are robustly shown to be potent inhibitors of trade. Nevertheless, we present some evidence that in deep PTAs, non-tariff provisions create trade in a non-discriminatory fashion. This is welcomed from a welfare-theoretic point of view. However, if policymakers want to use trade agreements to grant preferences between geopolitically aligned countries, tariffs are the better choice.

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**Feodora Teti** has been working as a trade economist and deputy department head at the ifo Center for International Economics since 2015. She received her PhD from Ludwig-Maximilians-University in Munich in 2020 and was a research visitor at the Tuck School of Business at Dartmouth College in the United States and the London School of Economics. Her research focuses on trade policy, particularly trade agreements and sanctions. Working for the ifo institute she contributed to several policy consultancy projects, among others for the German Ministry of Economics and the World Bank.

## **SECTION 4**

# **LABOUR AND MIGRATION**





# CHAPTER 7

## Perverse effects of child labour provisions in PTAs

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*The increase in labour market provisions, in particular relating to child labour, has been a key feature of preferential trade agreements (PTAs) over the last two decades. While well-intentioned, there is limited evidence on the effects of these provisions on labour market outcomes. This chapter uses data on PTAs along with survey microdata for 101 developing countries to study the effects of PTAs on changes in child labour market outcomes. It finds that in agreements with no child labour provision, child employment rates decline and school enrolment increases. Surprisingly, agreements with a child labour provision are associated with higher child labour employment and lower school enrolment rates. This is rationalised through a general equilibrium framework where child labour bans decrease child wages and therefore induce low-income households to increase child labour supply. This evidence suggests other policy tools may be more effective in stimulating education rates and decreasing child labour in the developing world.*

In January 2022, the Office of the United States Trade Representative announced a new strategy to combat forced and child labour (USTR 2022). In the words of Ambassador Tai: “In order to prevent this human exploitation, and protect the 25 million individuals – including women and children – forced to work against their will in harsh conditions, we need to come together as a global community and create collective action. I am committed to working with our trade partners to create a fair, rules-based international trading system where the use of forced labour in traded goods and services, including forced child labour, becomes a thing of the past.” Similarly, the European Union’s trade policy strategy announced in February 2021 aims to promote the respect for core human and labour rights, including actions against child labour (European Commission 2021).

In light of the renewed attention in advanced economies to labour provisions in trade agreements, this is a good moment to review the data and bring new evidence on the effects of these provisions on labour outcomes. The existing literature is mostly silent on these effects. The studies on trade agreements that focus on non-trade outcomes such as labour and the environment are mostly theoretical, asking the question when such issue linkage is beneficial (Ederington 2002, Limão 2005, Maggi 2016). Exceptions include the work by Abman et al. (2021) and Baghdadi (2013) on how environmental provisions in preferential trade agreements (PTAs) shape environmental outcomes. But the empirical

work on the impact of labour provisions in PTAs has so far focused on their impact on trade outcomes, finding that on average these clauses do not have a statistically significant impact on exports (Carrère et al. 2022; Robertson 2021).

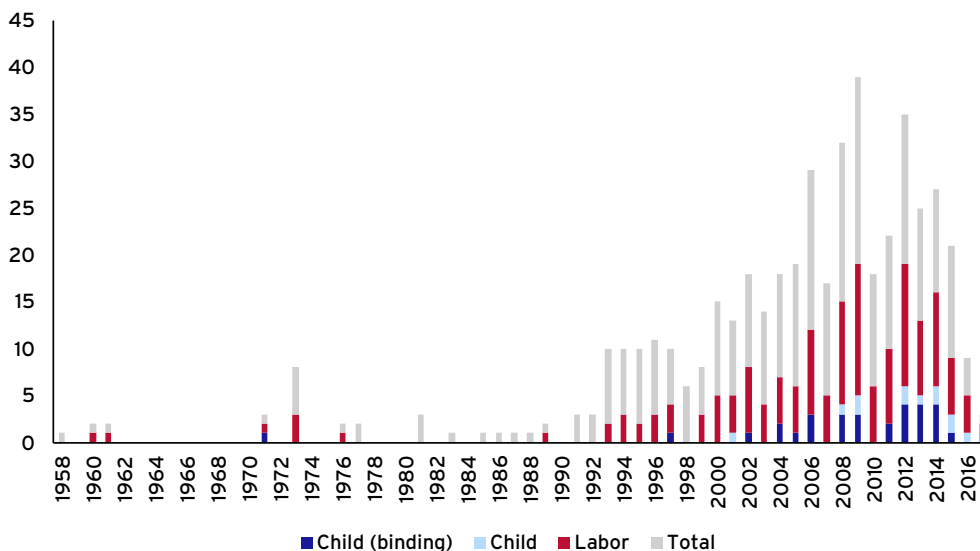
In a recent paper (Abman et al. 2023), we offer a first assessment of whether and how labour provisions in trade agreements affect labour outcomes. Specifically, we study the effect of child labour standards in PTAs on a variety of child labour market outcomes, including employment, education, and household inequality. We find that PTAs without child-labour bans lead to reductions in child employment and increases in school enrolment. Somewhat surprisingly, results show that child labour bans in PTAs perversely increase child employment and decrease school enrolment. While more research is needed, these findings point to the need to rethink the current design of child labour provisions in PTAs.

### **CHILD LABOUR PROVISIONS IN PTAs HAVE INCREASED OVER TIME**

The emphasis on the centrality of labour standards for trade policy by EU and US authorities is certainly new. Yet labour provisions in trade agreements, though sparse prior to 2000, have been increasingly common in the 2000s and 2010s as trade agreements became more expansive in scope and increasingly covered non-trade areas (Mattoo et al. 2020). Specifically, while the rules of the World Trade Organization (WTO) do not contain labour provisions but for the prohibition to import goods made with prison labour, an increasing number of PTAs containing labour provisions have been signed starting in the early 1990s and with child labour standards since the early 2000s (Figure 7.1). Of the 283 trade agreements notified to the WTO and in force in 2017, 43 PTAs contained child labour provisions, including all agreements signed by the European Union and the United States with third countries after 2000. A majority of these provisions are legally binding and subject to a state-to-state dispute settlement in case the respect of the agreement is put into question.

In our research, we combine these data on child labour provisions in PTAs with harmonised income survey microdata from 170 countries for the period between 1960 and 2020. The data include over 1,700 unique nationally representative survey years covering over 180 million respondents. We exploit quasi-experimental methods to obtain plausibly causal estimates on a sample of 101 developing countries to assess within-country changes in child labour market outcomes before and after a given trade agreement enters into force, and whether these effects differ for trade agreements with child labour provisions compared to those without.

**FIGURE 7.1 LABOUR PROVISIONS IN PTAs OVER TIME**



**PTAs REDUCE CHILD LABOUR, WHILE CHILD LABOUR PROVISIONS HAVE UNINTENDED CONSEQUENCES**

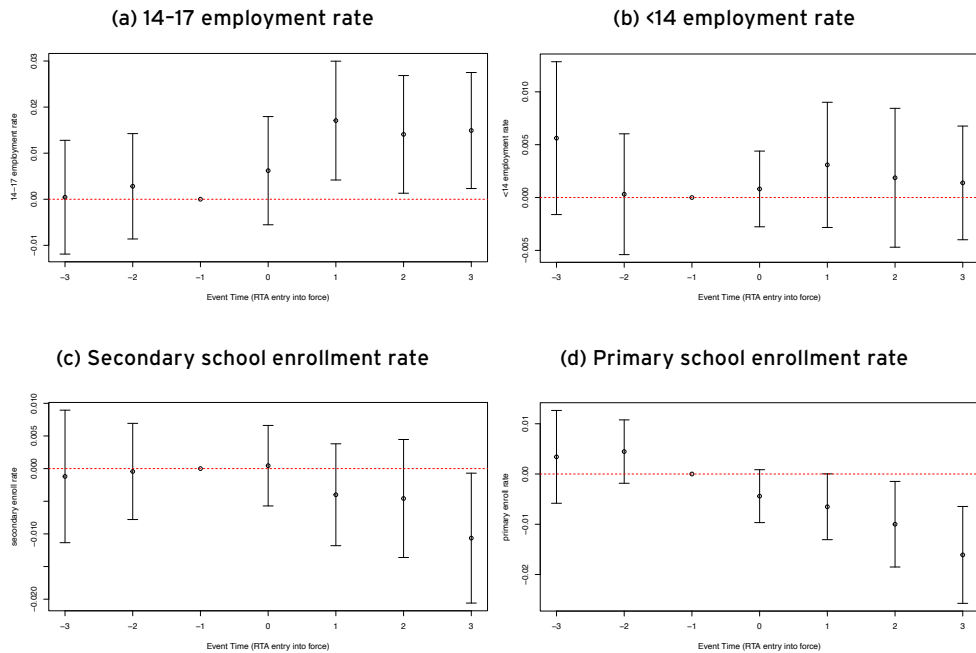
We find evidence that a trade agreement with no child labour provision reduces the fraction of 14–17 year-olds in the labour force by a statistically and economically significant amount, with corresponding increases in secondary school enrolment. We find similar effects for children under the age of 14, but these estimates are imprecise and not statistically significant. The pattern is consistent with an interpretation that a developing economy joining a trade agreement opens up possibilities for low-skill export employment, raising incomes for low-income households thereby reducing the need to send children into the labour market, and is consistent with the empirical findings of Edmonds and Pavcnik (2005, 2006) that opening trade can reduce child labour in developing economies.

The inclusion of child labour prohibitions in PTAs surprisingly increases child labour – the opposite of their intended effect. We find statistically and economically significant increases in the employment of 14–17 year-old children and statistically imprecise but economically significant increases in the employment of the under-14 year-olds who are the targets of the ban. We find corresponding drops in both primary and secondary school enrolment rates following entry into force of PTAs with child labour prohibitions,

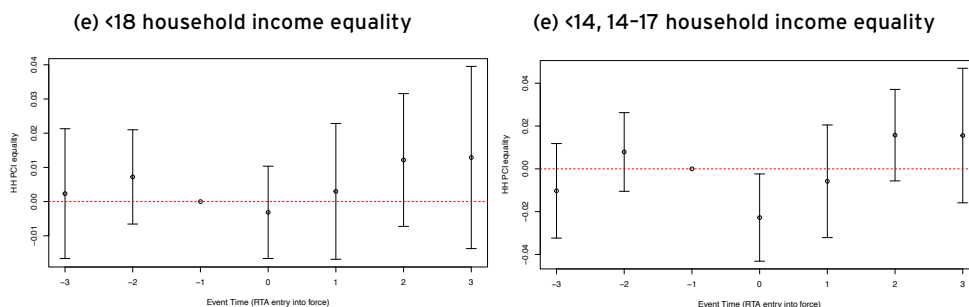
relative to PTAs without such provisions.<sup>1</sup> Finally, we find some evidence that these provisions decrease inter-household income inequality for households with children, presumably through increases in child labour income.

We develop a stylised general equilibrium model of child labour in an open economy to provide the intuition for the underlying forces shaping these outcomes. If the child labour ban requirement in the PTA is enforced by national authorities through a fine imposed on employers, it will tend to depress child wages, inducing the household to increase total labour supply in order to make up the lost income – including the household child labour supply. This may result in an increase in employment of 14–17 year-olds as well as under-14 year-olds. Our results and intuition of the impact of child labour provisions in PTAs are similar to those predicted in a closed-economy setting by Basu (2005) and found empirically in Bharadwaj et al. (2020), a case study of the 1986 ban in India.

**FIGURE 7.2 EVENT STUDY**



1 It is possible that employment effects are not well measured for the younger children, since families with children working illegally may be reluctant to report that information to survey-takers. The strongly significant reduction in school enrollment rates for both age ranges, which is larger for elementary school enrollment, suggests that there may be an employment effect for the younger children that is missed in the data.



Notes: this figure presents coefficient estimates with 95% confidence intervals from fully specified two-way fixed effect event studies for main child labour outcomes. All models include country-PTA fixed effects and event time fixed effects. Coefficients correspond to dynamic effects of entry into force of PTAs that include child labour provisions relative to PTAs that do not (normalised to the year prior to entering into force). All models are estimated on backward interpolated balanced panels and include two-way cluster-robust standard errors clustered by country-PTA and country-year.

## CONCLUSION

Child labour provisions are commonly found in modern preferential trade agreements, especially those signed between developing countries and the US or EU. In this chapter, we examine how the inclusion of such provisions affects child labour standards. We find that labour provisions in PTAs are effective in shaping behaviour in a developing country context, as they affect child labour outcomes and other relevant non-trade outcomes such as schooling and household inequality. On the other hand, the evidence suggests that opening opportunities for low-skill intensive exports is more effective at reducing child labour in developing countries than an outright ban. Child labour bans in PTAs tend to be counterproductive because they push down the income of households who use child labour as an income source, requiring them to double down on the use of child labour.

The policy implications of this work are subtle. While more research is needed, this analysis suggests that PTA provisions aiming at eliminating child labour are a powerful tool and should be used judiciously. However, well-intentioned policymakers should consider other approaches to complement or substitute for explicit child labour bans, such as the introduction of direct payments to households for school attendance, as discussed in Doran (2013), and other active labour market and education policies.

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# CHAPTER 8

## Deep trade agreements and international migration: The role of visa provisions

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*An important element of recent deep preferential trade agreements (PTAs) is labour market provisions aimed at easing the administrative costs of cross-border migration. This chapter leverages data on PTAs from the World Bank and migration data from the United Nations to study the effects of visa-related provisions on bilateral migration flows. The results from migration gravity models point to positive and significant effects of visa provisions on bilateral migration stocks. In addition, these effects are stronger between countries belonging to different income groups and stronger in destinations with a lower vote share of extreme right-wing parties. From a policy perspective, this evidence suggests visa-related provisions can help coordinate migration policy liberalisation efforts in a similar way as trade liberalisation efforts.*

The migration policies of most destination countries in the world are very restrictive. Besides the political opposition to more open migration policies, there are two important reasons for deadlock in this policy area. First, destination countries' migration policies often apply equally to potential migrants from any country of origin – in an effort to limit discrimination on the basis of race, ethnicity, religion, and so on. However, this limits the ability of countries to tailor policies to economic goals which may be specific to certain regions. Second, there is no international organisation for migration equivalent to the World Trade Organization, which allows countries to negotiate *reciprocal* trade barrier reductions. This implies that migration policy changes are mostly unilateral and are not negotiated.

Preferential trade agreements (PTAs) can help address both of these issues. First, they allow countries to differentiate the extent of migration policy liberalisation across sources of potential migrants *on the basis of economic and trade links between countries*. Second, PTAs allow countries to coordinate on migration policy liberalisation efforts, i.e. to exchange mutual concessions in terms of migration policy. These advantages of PTAs in terms of migration policy have not been emphasised in the migration literature, yet they are very important from a policy point of view.

In recent work (Levelu et al. 2023) we take a first step, building on previous work by Orefice (2015) and Figueiredo et al. (2016), in analysing the impact of PTAs on migration flows. An increasing number of PTAs contains provisions regulating and easing the bureaucratic procedures to obtain visas and the cross-border movement of individuals. These provisions reduce the administrative cost of moving across member countries and therefore affect the optimal migration choice for potential migrants at origin – for a given number of visas. The migration provisions may also increase the total number of visas granted by destination countries, to the extent that new PTA-specific visas are created.

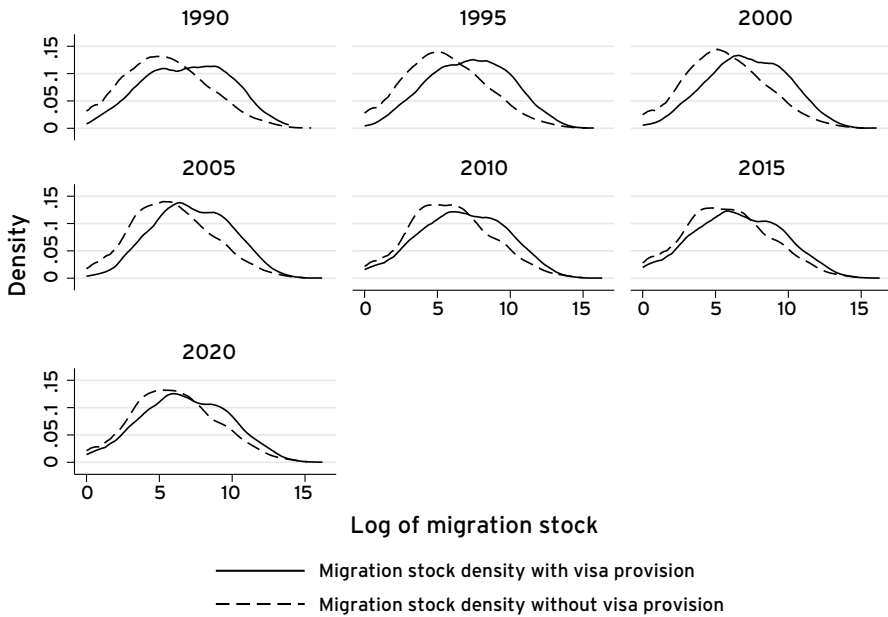
Our empirical analysis is based on the recent World Bank data on the content of PTAs and studies the effect of visa-related provisions in PTAs on the bilateral settlement of migrants. Using United Nations data on bilateral migration stocks in the period 1990–2020, we show that including visa provisions in PTAs stimulates bilateral migration stock by 5.9%. We use an instrumental variable (IV) approach to address the endogeneity concerns and confirm the positive effect of visa provision on bilateral migration. We also show a strong heterogeneous effect of visa provisions: the impact of visa provision is stronger when the origin and destination countries belong to different income groups,<sup>1</sup> and it is dampened in destinations with a large share of votes for extreme right parties.

## DATA AND SUMMARY STATISTICS

Our analysis is based on two main data sources. First, we exploit the World Bank Deep Trade Agreements database (Mattoo et al. 2020). This source provides detailed information on the content of deep trade agreements (DTAs), which are defined as trade agreements covering additional policy areas besides trade. For instance, DTAs may include provisions regarding international flows of investment and labour, as well as environmental or intellectual property protection provisions. The World Bank Deep Trade Agreements database contains 18 distinct chapters, each of them authored by lead experts. We focus on Chapter 8, “Visa and asylum”, which discusses “*the presence, depth, and geographical distribution of visa and asylum provisions in preferential trade agreements (PTAs)*”. The World Bank DTA database covers 279 PTAs, 100 of which include visa-related provisions. For these 100 PTAs, additional information is provided through a set of 30 binary-choice questions (i.e. categorical variables). We construct a ‘Visa’ dummy variable which is equal to one if a trade agreement contains at least one visa related provision, and zero otherwise. Based on the 30 binary-choice questions, we also test the effect of specific types of visa provisions.

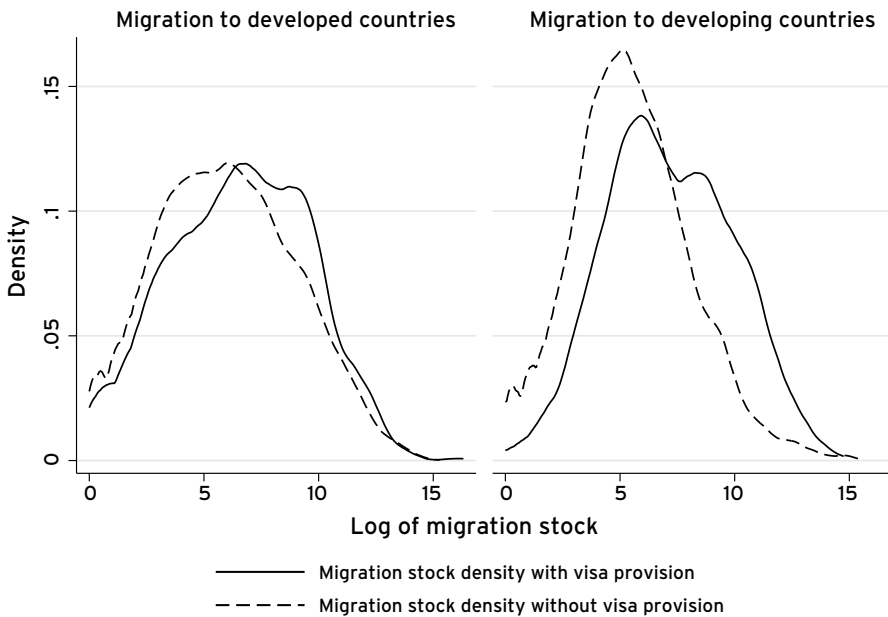
1 We adopt the World Bank classification of countries’ income group.

**FIGURE 8.1 BILATERAL MIGRATION STOCKS AMONG COUNTRY-PAIRS WITH AND WITHOUT VISA PROVISIONS**



Source: United Nations Population Division and World Bank Deep Trade Agreements database (Mattoo et al. 2020).

**FIGURE 8.2 BILATERAL MIGRATION STOCKS AMONG COUNTRY-PAIRS WITH AND WITHOUT VISA PROVISIONS: DEVELOPED VERSUS DEVELOPING DESTINATION COUNTRIES**



Source: United Nations Population Division and World Bank Deep Trade Agreements database (Mattoo et al. 2020).

We also use the United Nations Population Division Migrant Stock data, which provide information on the stock of international migrants by origin and destination for 232 countries between 1990 and 2020, at five-year intervals (DESA 2020). The main source of these data is population censuses, complemented by additional information from population registers and nationally representative surveys. Finally, we add information on country-pair characteristics from the CEPII ‘Gravity’ database (Conte et al. 2021), which allows us to construct the following variables: the GDP of both origin and destination countries, a common religion dummy, a common language dummy, and a colonial linkages dummy. We access information on the share of right-wing (i.e. nationalist party) votes from the Manifesto Project Database (MPD).

The kernel density analysis in Figure 8.1 shows that the empirical distribution of bilateral stocks of migrants among countries that are party to PTAs with visa provisions is shifted to the right compared to that of countries that are party to PTAs without visa provisions. The difference in the kernel distribution of bilateral migration stocks between countries in PTAs with and without visa provisions is starker for developing destination countries (see Figure 8.2).

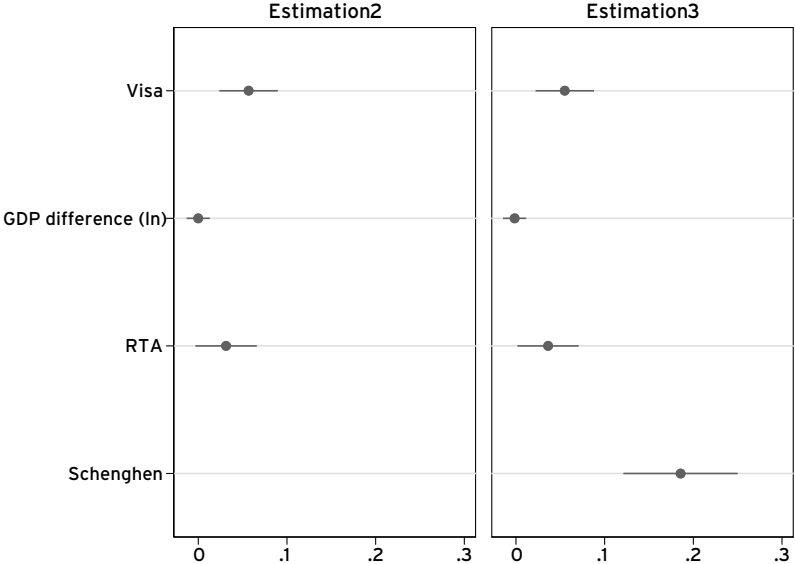
## EMPIRICAL SPECIFICATION AND RESULTS

We estimate a migration gravity model of the time-varying bilateral stock of migrants, from a given source to a given destination country, on the visa provision time-varying dummy variable and the PTA time-varying dummy variable. We include destination-by-year fixed effects, origin-by-year fixed effects as well as country-pair fixed effects. The introduction of pair fixed effects implies that we account for the fact that some countries have, on average over time, stronger economic, cultural and institutional ties with each other. Importantly, controlling for the time-varying PTA dummy variable allows us to capture *changes over time* in the extent of these links, as captured by the signing of the regional trade agreement. We therefore identify our coefficient of interest based on the within-pair time variation in bilateral migration stocks and presence of visa provisions, after netting out the fact that the two countries signed a PTA (either at the same time or sometime before). The main threat to identification of a causal effect is that the increase of bilateral migration in a five-year window may trigger the inclusion of visa provisions in the same period of time. This is unlikely because changes in PTAs take time for institutional reasons. However, we still address this concern by using an instrumental variable strategy. We also show results omitting the dyadic country-pair fixed effects and explicitly control for gravity variables such as distance, language, colony and religion.

We also control for time-varying controls, specifically: a Schengen dummy variable (equal to one if the country pair belongs to the Schengen agreement in a given year) and the difference in (log) per capita GDP between origin and destination countries in a given year. We use the non-linear PPML estimator (Santos-Silva and Tenreyro 2006) to deal with heteroskedasticity of the error term. Finally, we confirm the robustness of our

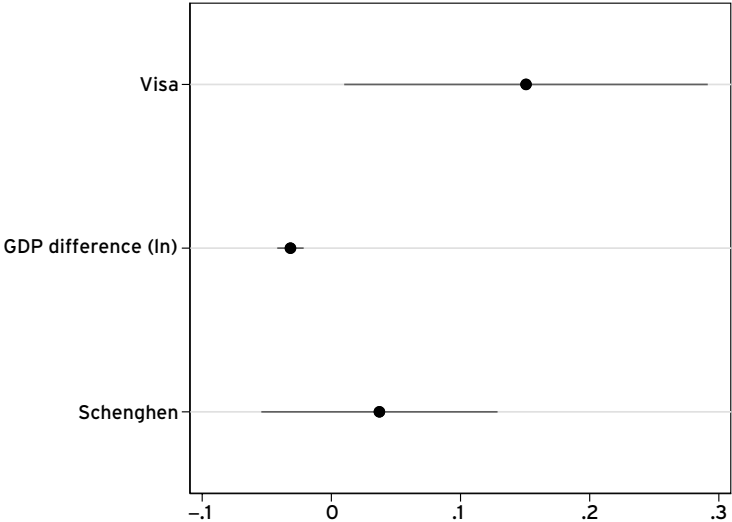
results with an IV strategy that follows Orefice (2015). We instrument the visa dummy variable with the propensity that each country in the pair has to include visa provisions in their PTAs with third-country partners.

**FIGURE 8.3 THE EFFECT OF VISA PROVISION ON BILATERAL STOCKS OF MIGRANTS**



Notes: The figure reports the point estimates of baseline specifications (2) and (3) of Table 2 in Levelu et al. (2023). The dependent variable is the stock of immigrants in country j originating from i. Country-pair and country-year fixed effects always included. Continuous lines around point estimates indicate 90% confidence intervals.

**FIGURE 8.4 VISA PROVISION AND MIGRATION STOCKS: IV ESTIMATION**



Note: The figure reports the point estimates of the 2SLS of table 10 in Levelu et al. (2023). The dependent variable is the stock of immigrants in country j originating from i. Country-pair and country-year fixed effects always included. Continuous lines around point estimates indicate 90% confidence intervals.

Our estimates in Figure 8.3 show that the presence of a visa-related provision increases the bilateral stock of immigrants by 5.6%. This result is confirmed by the IV approach reported in Figure 8.4. The average positive effect of visa provision on international migration is, however, heterogeneous across different types of countries. The effect of visa-related provisions is greater between countries with different levels of income (i.e. North–South pairs), and is attenuated for destination countries with a large share of votes for extreme-right parties (see Tables 3 and 8 in Levelu et al. 2023). In countries characterised by a zero share of votes for right-wing parties, a visa provision boosts bilateral migration by 9.6%; in countries where the share of votes for nationalist party is equal to the median, the presence of a visa-related provision increases the bilateral stock of immigrants by 8.3%. We also uncover a strong heterogeneous effect of different types of visa-provisions (see Table 4 in Levelu et al. 2023). Provisions that facilitate the procedure to obtain a visa are the most effective in stimulating bilateral migration stocks. Finally, visa provisions have a stronger positive effect for low-skilled immigrants, relative to high-skilled ones.

## CONCLUSIONS

As highlighted by the other chapters in this publication, modern preferential trade agreements cover many different dimensions in addition to trade and tariffs reductions. In Chapter 7, for example, the authors examine the effects of child labour bans in PTAs on child labour employment outcomes. In this chapter, we focus on another labour market aspect – the impact of visa provisions on migration flows between countries. We use data from the World Bank Deep Trade Agreements database as well as the United Nations Population Division Migration Stock data to estimate migration gravity models of the time-varying bilateral migration stocks. Our estimates suggest that visa-related provisions increase the migration stock by 5.6%, even after netting out the fact that the two countries signed a PTA. However, these effects are heterogeneous, and depend on the income group of countries, the vote share of extreme right-wing parties, and are generally stronger for low-skilled immigrants. The results can be encouraging for policymakers seeking to influence bilateral migration flows when other preferential migration policies are politically infeasible.

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## **SECTION 5**

# **ENVIRONMENTAL PROTECTION AND CIVIL RIGHTS**



# CHAPTER 9

## Non-trade provisions in deep trade agreements and non-trade outcomes

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*Trade agreements increasingly incorporate non-trade provisions (e.g. labour standards, environmental protection, and civil and political rights). Whether this leads to improvements in associated non-trade outcomes is an important and under-researched question. This chapter uses data covering more than 180 countries and 279 trade agreements to assess this question. It finds that the inclusion of environmental provisions is associated with changes in some environmental indicators, but no relationship between non-trade provisions and labour, civil, or political rights. Furthermore, there is substantial variation in the sign of estimated relations associated with binding versus non-binding non-trade provisions, and suggestive evidence that binding (non-binding) non-trade provisions are associated with a reduction (increase) in official development assistance for the respective non-trade issue area. Overall, the results suggest that non-trade provisions in trade agreements have not resulted in better non-trade outcomes.*

Recent decades have seen steady growth in the number of preferential trade agreements (PTAs) that address behind-the-border regulation pertaining to both economic and noneconomic issues (Limão 2016, Fernandes et al. 2021). Non-trade provisions (NTPs) often pertain to labour standards, environmental protection and human rights-related provisions (Borchert et al. 2020). Whether NTPs improve the performance of signatory countries with respect to the policy domain they target is an under-researched question.

### INVESTIGATING NON-TRADE PROVISIONS

The existing empirical evidence is mixed, context specific, and depends on the indicators considered (Ferrari et al. 2021). Given that a country may join various PTAs over time and that similar countries may participate in different PTAs, it is difficult to identify causal relationships between signing a PTA that includes NTPs and associated outcomes. Research has tended to investigate specific provisions and specific indicators. For example, Abman and Lundberg (2020) explore the causal impact of environmental provisions on forest cover loss, finding that PTAs increase deforestation in developing countries which is partially offset by the inclusion of binding environmental protection obligations.

In a recent paper, Francois et al. (2023), we investigate the relationship between NTPs in PTAs and a range of specific non-trade outcome indicators. We focus on three policy areas – environmental protection, labour standards, and civil, social and human rights – in each case differentiating between binding provisions (those subject to formal dispute settlement procedures) and non-enforceable (‘soft law’) provisions. We allow for the effect of a NTP in a PTA to be heterogeneous, depending on the countries involved and on the power relations among the signatories.

We combine the World Bank Deep Trade Agreements database (Mattoo et al. 2020) with different measures of environmental, labour market and human rights performance from Manchin (2021), and apply the synthetic difference-in-differences estimator proposed by Arkangelsky et al. (2021) to evaluate whether:

1. an NTP in one of the domains of interest is associated with a change in outcome indicators in a signatory country;
2. estimates differ depending on the type of NTP – enforceable or non-binding; and
3. relationships depend on whether the countries participating in the agreement include the European Union or the United States.

We focus on all agreements signed by non-OECD low- and middle-income countries, including those signed with the European Union and the United States. We consider a country to be ‘exposed’ to a provision if it signs an agreement including the provision of interest in a given year, which is taken as the reference year.<sup>1</sup> Due to data limitations and to preserve a sufficiently long pre- and post-treatment period, we further restrict the sample to all agreements signed in the period 1995–2010.<sup>2</sup> Exposed and control countries are matched based on country characteristics and factors that may shape a country’s willingness to implement NTPs, including trade openness, the extent of trade with specific partners (the European Union or United States), and official development assistance projects targeting the policy areas of interest in signatory countries.

## FINDINGS

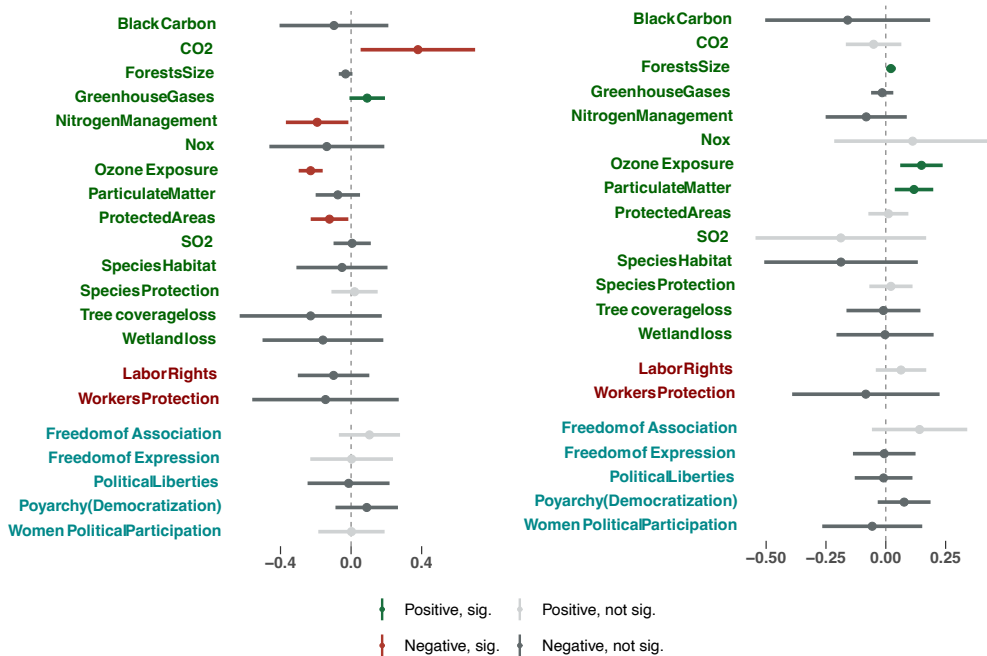
The results reveal that (i) NTPs seldom are associated with improved performance in environmental, labour or civil rights indicators; and (ii) relationships vary substantially depending on the type of NTP, countries involved in a PTA and the policy areas covered. Legal enforceability is not necessarily associated with better outcomes. Binding and non-binding provisions often have very different relationships with outcome indicators. In the case of environmental outcomes (Figure 9.1, top block), a non-binding NTP is accompanied by a significant reduction in overall greenhouse gas emissions, but worsened

1 If a country signed more than one agreement containing the same provision in the period of interest, the earlier one is chosen to set the reference year.  
 2 Data limitations are particularly relevant for the policy outcomes considered. Overall, we cover a period of 25 years, from 1990 to 2015. The first and the last five years in the sample help provide a reasonably long pre- (post-)treatment period.

ozone exposure, protected areas coverage and agricultural nitrogen management. Conversely, binding NTPs are associated with ozone exposure improvement, as well as forest coverage increase and particulate matter reduction (PM 2.5). When all PTAs and partners are considered, we find no significant relationship with civil and human rights or labour standards-related indicators (Figure 9.1, centre and bottom blocks).

As the European Union and the United States are the major proponents of NTPs in PTAs, we also investigate whether the results in Figure 9.1 reflect specific sets of agreements or the type of provisions in different subsets of PTAs. We again find that NTPs are not associated with labour or civil rights indicators, whether binding or non-binding. The notable exception is binding provisions in EU PTAs, which are associated with a deterioration in a broad measure of worker protection.

**FIGURE 9.1 AVERAGE TREATMENT EFFECT ON THE TREATED**



Notes: Standardised ATT effect. The charts report the point estimates of the standardised coefficients with their 95% confidence interval.

Source: Francois et al. (2023).

Statistically significant estimates are heterogeneous, with a mix of positive and negative associations for some indicators that differ across EU, US and rest of the world (ROW) agreements. Several statistically significant estimates imply that NTPs are associated with worse outcomes, i.e. that any detrimental consequence to a non-trade area from greater trade is not offset by the inclusion of an NTP. A comparison of the estimates for non-binding and binding NTPs reveals that non-binding NTPs are associated

with improved performance in some areas where binding provisions are not, and vice versa. This suggests that the efficacy of the two types of NTPs may be issue-specific and potentially affected by the complementary policy instruments.

One such policy is issue-specific development assistance projects in areas addressed by NTPs. In Francois et al. (2023), we find some evidence that development assistance increases with non-binding provisions and decreases for some policy areas in cases where countries have agreed to binding NTPs. This is consistent with the idea that other factors may play a role in making PTAs with non-binding NTPs more effective in improving non-trade outcomes (Bilal and Hoekman 2019, RESPECT 2021).

## CONCLUSION

High-income countries increasingly pursue non-trade policy objectives in their preferential trade agreements (PTAs). As discussed in Chapter 1, the literature on the effects of PTAs on non-trade objectives is mixed and context-dependent. In this chapter, we use data from over 180 countries to examine the effects of trade agreements on labour standards, environmental protection, and civil and political rights performance. Estimates from a synthetic difference-in-differences design suggest there is little evidence that the inclusion of non-trade provisions (NTPs) in trade agreements improves non-trade outcomes in partner countries. We also find substantial heterogeneity across types of provisions: non-binding NTPs may do more to improve performance in some areas than binding provisions, and vice versa. This suggests that the efficacy of NTPs may depend on the issues addressed, the type of NTP, and the use of complementary policy instruments.

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# CHAPTER 10

## Strengthening environmental agreements through trade policy linkage<sup>1</sup>

Clark Lundberg,<sup>a</sup> Daniel Szmurlo,<sup>b</sup> and Ryan Abman<sup>a</sup>

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*Preferential trade agreements (PTAs) often include provisions related to environmental outcomes or policies, including linkages to existing treaties. Linking trade policy to participation in and enforcement of international environmental agreements can strengthen these agreements by introducing additional punitive measures for non-compliance in the form of retaliatory trade policy. This chapter studies the effects of preferential trade agreements with provisions related to the use of ozone-depleting substances on country compliance to the Montreal Protocol. Since the original 1987 treaty, and with subsequent amendments, the Montreal Protocol has been successful in reducing ozone-depleting substances (ODS) in the atmosphere. Using data from the UN and the World Bank Deep Trade Agreements database, this chapter highlights three key results. First, it shows that signing a PTA is associated with a higher likelihood of ratifying an amendment of the Montreal Protocol. Second, signing a PTA is generally associated with increases in ODS consumption. However, the inclusion of ODS-related provisions in the PTA mitigates or fully reverses this effect. Third, there is evidence of PTAs amplifying substitution in consumption from substances covered in the Montreal Protocol to less-regulated substances.*

The Montreal Protocol has been one of the most successful international environmental agreements in history, effectively eliminating the use of ozone-depleting substances (ODS) and allowing for the eventual repair of the stratospheric ozone layer (Gonzalez et al. 2015, World Meteorological Organization 2018, McKenzie et al. 2019). Universally accepted by all members of the United Nations, the landmark 1987 treaty specified phaseout schedules for two major ODS groups and mandated that members forgo trade in related goods with countries not party to the agreement. It has since been amended five times to cover eight more substance groups. The Montreal Protocol also features clearly enumerated dispute settlement procedures to address member party noncompliance.

<sup>1</sup> The findings and conclusions in this chapter are those of the authors and should not be construed to represent any official USDA or U.S. Government determination or policy. This research was supported in part by the U.S. Department of Agriculture, Economic Research Service.

However, dispute settlement resolution under the Montreal Protocol focuses on assisting non-conforming countries to move into compliance – punishment mechanisms are fairly limited to extreme cases in which a country loses signatory rights and privileges.<sup>1</sup>

Preferential trade agreements (PTAs) can play a role in supporting the goals of international environmental treaties like the Montreal Protocol by introducing further punitive measures for non-compliance that go beyond the scope of the original treaty. By linking environmental commitments to trade agreements, non-compliant countries become exposed to retaliatory trade policy. Through these enforcement linkages, environmental commitments in trade agreements can limit environmental degradation that might otherwise arise from economic growth and increased industrial output. In a recent study (Lundberg et al. 2023), we provide causal evidence that the signature of new PTAs leads to increases in ODS consumption relative to Montreal Protocol targets. Environmental provisions aimed at controlling ozone-depleting substances offset the increase in ODS consumption observed in PTAs without such provisions. We find that the effect is rooted in preventing a ‘reduction in overcompliance’ to the Montreal Protocol observed in PTAs without provisions. We also find that countries party to PTAs with environmental provisions concerning ODS exhibit quicker ratification of amendments to the Montreal Protocol.

## DATA AND EMPIRICAL FOCUS

We identify the content of environmental provisions in PTAs using the World Bank Deep Trade Agreements database (Mattoo et al. 2020). This is the most extensive effort to date to document environmental provisions in trade agreements. The environmental provisions coded include environmental goals, specific commitments, compliance with multilateral environmental agreements, enforcement mechanisms, and external assistance and collaboration. We focus on provisions requiring compliance with the Montreal Protocol or otherwise limiting the use of ODS. Figure 10.1 displays the frequency of PTAs over time, with the incidence of ODS-related provisions. We identify Montreal Protocol participation, including country-level emissions of seven ozone-depleting substances, as well as country-level ratification dates of Montreal Protocol amendments, from the United Nations Environment Programme (UNEP).<sup>2</sup> Table 10.1 displays the substances regulated under the Montreal Protocol and the amendment that introduced each substance’s phaseout schedule.

1 “Indicative list of measures that might be taken by a Meeting of the Parties in respect of non-compliance with the Protocol” (<https://ozone.unep.org/node/2080>).

2 See <https://ozone.unep.org>.

FIGURE 10.1 PTAs AND ODS PROVISIONS BY YEAR OF ENTRY INTO FORCE

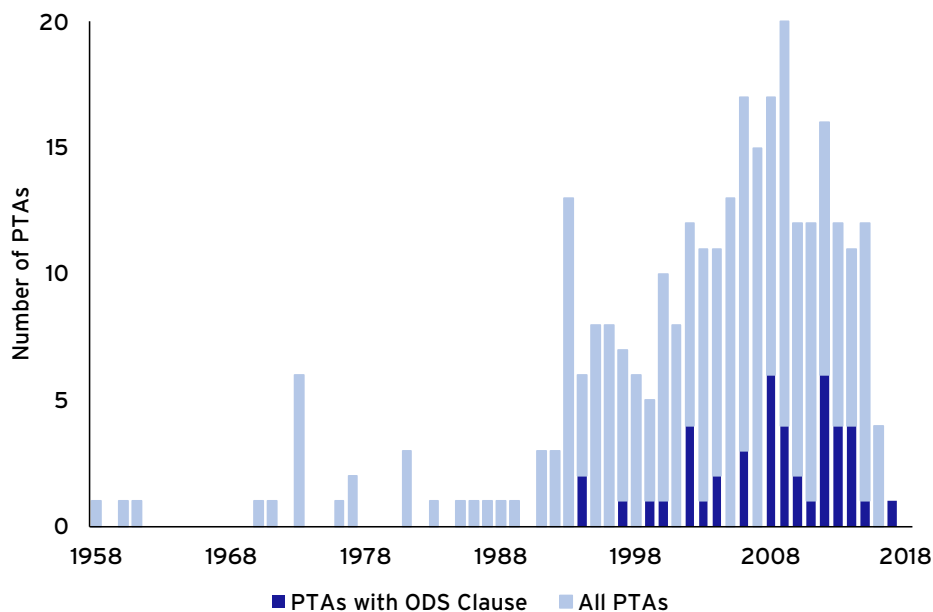


TABLE 10.1 MONTREAL PROTOCOL REGULATED SUBSTANCES

Substance	Full Name	Introduction	Common uses
<b>Annex A</b>			
CFCs	chlorofluorocarbons	Montreal Protocol (1987)	Refrigerant, propellant
halons	halons	Montreal Protocol (1987)	Fire suppression
<b>Annex B</b>			
"other CFCs"	"other" chlorofluorocarbons	London Amendment (1990)	Not widely used at phaseout
CTC	carbon tetrachloride	London Amendment (1990)	Feedstock, solvent
TCA	methyl chloroform	London Amendment (1990)	Solvent
<b>Annex C</b>			
HCFCs	hydrochlorofluorocarbons	Copenhagen Amendment (1992)	CFC replacement
HBFCs	hydrobromofluorocarbons	Copenhagen Amendment (1992)	Not widely used at phaseout
BCM	bromochloromethane	Beijing Amendment (1999)	Not widely used at phaseout
<b>Annex E</b>			
MB	methyl bromide	Copenhagen Amendment (1992)	Fumigant, pesticide
<b>Annex F</b>			
HFCs	hydrofluorocarbons	Kigali Amendment (2016)	HCFC replacement

Source: Brack (2017)

We consider two aspects of policy linkages between trade and environmental policy using detailed data on trade agreement content from the World Bank Deep Trade Agreement database. First, we empirically investigate the use of trade agreements to induce accession to international environmental agreements – a phenomenon referred to as ‘participation linkage’ in the literature. As mentioned, the Montreal Protocol limits trade in ODS-related goods with non-member countries. Therefore, member countries may lobby to include Montreal Protocol accession as a requirement in trade agreements with non-members in order to more effectively open trade while avoiding any barriers under the Montreal Protocol. Second, we consider ‘enforcement linkage’ between trade agreements and reductions in use of ODS. In contrast to participation linkages – in which commitments bind via the Montreal Protocol – we also consider ODS commitments directly enumerated in trade agreements themselves that bind via PTA dispute settlement mechanisms. In particular, we study whether such enforcement linkages are effective at mitigating ODS emissions.

### **PTAs ENCOURAGE RATIFICATION OF MONTREAL PROTOCOL AMENDMENTS**

We find that trade liberalisation is associated with faster ratification of Montreal Protocol amendments. We estimate a variety of survival regression models of amendment ratification that include cumulative exposure to PTAs and control for time- and country-specific characteristics. Our findings hold across all amendments we consider and across all econometric specifications. Signing a PTA increases the likelihood of ratifying an amendment in a given year by between 33% and 61%. We attribute this finding to the institutional features of the Montreal Protocol – in particular, prohibitions on trade in ODS and ODS-related products with non-member countries. These prohibitions on trade with non-member countries extend to substance groups regulated under Montreal Protocol amendments in addition to substance groups regulated under the original 1987 treaty. For example, trade in hydrochlorofluorocarbons (HCFCs) and HCFC-related products is prohibited with countries that have not ratified the 1992 Copenhagen Amendment, which introduces regulations and phaseout schedules for HCFCs.

The inclusion of Montreal Protocol linkage (and ODS-related content more broadly) in trade agreements speeds up ratification of Montreal Protocol amendments even further. The inclusion of ODS-related provisions in a signed trade agreement increases the likelihood of ratifying an amendment in a given year by between 23% and 181%. This effect is especially acute for the 1992 Copenhagen Amendment (181%), which introduces regulation of HCFCs – a substitute for the more strictly regulated chlorofluorocarbons (CFCs) phased out under the original Montreal Protocol.

## **ODS PROVISIONS IN PTAs MITIGATE INCREASES IN REGULATED EMISSIONS ARISING FROM FREE TRADE**

We find that the signature of PTAs leads to reductions in overcompliance of Montreal Protocol targets – meaning that ODS consumption increases while still remaining under maximum allowances specified by the Protocol. We estimate regressions of country deviations from Montreal Protocol targets using UNEP data on ODS emissions and country-specific target phaseout schedules. We include signature of PTAs as well as the presence of ODS-related provisions in our econometric approach and we control for country and PTA factors that might otherwise confound our findings. For CFCs – one of the main substance groups covered under the original protocol – we find an increase of approximately 980 tonnes of ozone-depleting potential (ODP), which corresponds to a 100-year global warming potential (GWP) of roughly 7.7 million tonnes of carbon dioxide. We find similar results for halons – another class of gases regulated by the original protocol. Signature of a PTA leads to an increase of 97 ODP tonnes of halons with a 100-year GWP equivalent to 25,000 tonnes of carbon dioxide. We find similar patterns with Annex B CFCs, carbon tetrachloride (CTC) and 1,1,1-trichloroethane (TCA) – positive but imprecisely measured increases in ODS consumption following the signature of a PTA. For gases regulated under the 1992 Copenhagen Amendment – HCFCs and methyl bromide – we find that PTAs lead to reductions in consumption. The effect is sizable and statistically precise for HCFCs.

We find that the inclusion of ODS-related provisions in PTAs mitigates or entirely reverses the effects described above for both Annex A and Annex B gases. For CFCs, the inclusion of ODS-related provisions entirely reverses increases in CFC consumption observed following signature of PTAs without the provisions, with significant net declines. For halons, we find the provisions entirely offset increases seen in PTAs without the provisions. We also find imprecisely measured net declines in Annex B substances (CTC, TCA and Annex B CFCs).

Notably, we find that the effectiveness of these provisions is not predicated on separate, provision-related dispute settlement mechanisms. Instead, the effectiveness of the provisions appears to be related to enforceability under the legally binding Montreal Protocol itself, or under the umbrella of PTA disputes more broadly. Because countries remain, on average, in compliance with Montreal Protocol commitments during our study period, we believe that enforceability under the PTA is likely the dominant driver of provision effectiveness.

## **PTAs CAN ACCELERATE SPILLOVERS TO LESS REGULATED SUBSTANCES**

We find clear evidence of substitution to less regulated substances under the Montreal Protocol. Among refrigeration and air conditioning applications, CFCs were replaced by HCFCs, and HCFCs were later replaced with hydrofluorocarbons (HFCs). A 1%

drop in CFC consumption targets under the Montreal Protocol phaseout schedule (i.e. an obligated reduction in CFC consumption) is associated with a 0.08–0.10% increase in HCFC consumption. Similarly, a 1% drop in HCFC consumption targets under the Montreal Protocol phaseout schedule is associated with a 0.19–0.26% increase in HFC consumption. Signing a PTA amplifies this substitution to HFCs. Inclusion of ODS-related provisions does not affect this spillover channel since HFC consumption remained unrestricted until the 2016 Kigali Amendment. In contrast, PTAs with and without ODS-related provisions seem to mitigate spillovers from CFCs to HCFCs, possibly due to HCFCs also being a tightly regulated substance group under the Copenhagen Amendment of the Montreal Protocol.

## CONCLUSION

Despite the widely regarded historical success of the Montreal Protocol in reducing global ozone destruction, it remains an important international environmental institution. Over time, the Montreal Protocol has expanded in scope to include regulation of widely used ozone-depleting substance substitutes that have extraordinarily high global warming potential (e.g. HFCs). Furthermore, recent evidence suggests that some countries may be increasing production and consumption of ODS in violation of Montreal Protocol commitments, raising unprecedented challenges to the treaty (Rigby et al. 2019, Western et al. 2022). We demonstrate that trade policy linkage, through explicit ODS content featured in PTAs, supports the goals of the Montreal Protocol by decreasing country ratification times of Protocol amendments and preventing ‘reductions in overcompliance’ in the consumption of ODS. ODS provisions, however, amplify spillovers to less regulated HFCs.

Our findings suggest that trade policy linkage could play an important supporting role in international environmental agreements. We find that trade policy can support binding environmental agreements like the Montreal Protocol, but potential gains from policy linkage are likely to be even greater for international agreements that lack strong enforcement mechanisms or otherwise feature voluntary compliance. In particular, trade policy linkage may provide opportunities to strengthen the 2015 Paris Agreement and other future international efforts to directly address global climate change.

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## **SECTION 6**

# **OPEN RESEARCH QUESTIONS**



# CHAPTER 11

## Non-trade objectives and new frontiers for research in international economic policy

**Emily Blanchard**

U.S. Department of State, Dartmouth, and CEPR

*Globalisation has moved away from a specific focus on trade and tariff reduction to cover a large range of objectives. As the chapters of this eBook have shown, these include investment protections, intellectual property rights, child labour, migration flows, and environmental standards. The Covid-19 pandemic has further accelerated this process – new international initiatives put high emphasis on how, where, and with whom economic value is created. This chapter outlines a new research frontier in international economics. Empirical research should focus on mapping supply networks, estimating firms' agility in these networks, and measuring the social value-added content in trade. Advances along these dimensions will complement new conceptual approaches to the design of optimal policies. Policymakers will benefit substantially from careful, evidence-based research along these lines when tackling the problems of the 21st century.*

### **ECONOMIC RELATIONS AND POLICIES AFTER COVID-19**

Covid-19 has forever changed globalisation and the economic policy environment that supports it. The pandemic disrupted a seemingly stable world economic order through a series of synchronised shocks to global supply, demand and logistics. Shortages of critical goods and essential workers were compounded by dramatic overnight shifts in consumer spending as demand surged for some products and services and cratered for others. Changing patterns of production and consumption triggered shipping snarls that are only now resolving.

Policymakers and business leaders are working to craft a new normal, defined by resilient, secure and durable global supply chains that can better withstand unexpected events. At the same time, consumers are increasingly attentive to how and where goods are made, often demanding that products reflect their own values, from environmental sustainability, respect for universal human rights and economic inclusivity to privacy and security. Geopolitical changes and the rise of authoritarianism add further impetus to the shifts underway, as many governments pursue deeper economic partnerships with some countries and regions in order to reduce dependence on others. Three years after the virus broke out, the international economic policy landscape has been remade.

This post-pandemic evolution of policy objectives may ultimately mark the beginning of a fundamentally new era of deeper and more complex behind-the-border policy arrangements. Already, the world is witnessing a host of new international initiatives to reshape how, where and with whom economic value is created in the modern economy. From the US-EU Trade and Technology Council and the Americas Partnership for Economic Prosperity to the Indo-Pacific Economic Framework and Minerals Security Partnership, governments are actively taking measures to simultaneously strengthen and rewire global supply chains.

Policymakers will need to balance determination with caution in implementing policies to meet new objectives. There is no handbook for the novel policy changes that are now being debated and discussed in capitals around the world. The need for smart, creative, evidence-based research has never been greater.

### **A NEW RESEARCH FRONTIER**

A new frontier in international economic research is needed to study the objectives, design and consequences of the unprecedented initiatives, tools and agreements under consideration and underway. This research should encompass a host of areas running deep behind national borders, including digital security, standards and privacy; supply chain transparency; export controls, sanctions and trusted trade networks for advanced technologies; labour practices; environmental sustainability; governance and corruption; and enabling frameworks to accelerate the green energy transition and global elimination of forced labour. The chapters in this eBook illustrate some of the excellent work already undertaken to understand the broad-ranging consequences of deep agreements, but there is much more to do.

Two simple but critical observations are useful in charting a path forward for future research. First, despite recent rhetoric, goods (and increasingly services) are made in the world through global value chains. This is unlikely to change (nor should it) due to the inescapable logic and force of comparative advantage. But exactly how and where production happens in the world is sensitive to targeted policy nudges, particularly when those nudges work in tandem with market forces. It is far easier to divert or channel a river's current than to dam it completely.

Second, many of today's post-Covid-19 policy initiatives are designed precisely to shape the pattern of production and trade outside of a country's own national borders. For trade economists especially, this shift constitutes a fundamental change in how to think about (and model) governments' objectives. Traditionally, distributional considerations are restricted to the domestic sphere and foreign policies, practices and production are relevant only to the extent they influence a country's terms of trade.

The upshot: economists need both a richer empirical description of global production patterns and linkages as well as an updated theoretical toolbox to study the changing international economic policy landscape. Excellent work is underway on both fronts, positioning research to inform policy implementation in the coming pivotal years that will shape the global economy of the future.

On the measurement front, there are three core challenges: mapping supply networks, estimating the elasticity of linkages (or firms' agility) in these networks, and measuring the 'values' embedded in the value-added content of products beyond a simple pecuniary price tag. On the first front, mapping supply networks, the primary challenge is in the level of aggregation. There is a chasm between the refinement and richness of product-, transaction- and even firm-level data and the highly aggregated measures of input-output linkages (and by extension, trade in value added). We need greater granularity to identify the nodes and linkages in supply chains where market power and bottlenecks create security or other vulnerabilities to global shocks.

In contrast, recent research has already made significant progress in measuring trade elasticities at the product and even bilateral-product level, but identification requires strong assumptions. Perhaps more challenging are the underlying counterfactual questions about the extent to which elasticities measured using relatively modest observed deviations in supply or demand can be scaled up to yield predictions for major disruptions or synchronised global shocks. A related challenge is in estimating the extent to which inventories or the creation of new extensive-margin supply networks may serve to mitigate the impact of future global shocks. To the extent that some firms have begun stockpiling or diversified their buyer and supplier networks since Covid-19, supply networks may prove more agile, elastic and resilient than pre-pandemic measures suggest.

Measuring the environmental, labour and social value-added content is hardest of all. Yet, it is arguably most crucial for answering critical policy questions around the design and consequences of policy initiatives to build a more sustainable and inclusive global economy. Here too there is progress. Recent ambitious government initiatives to develop natural capital accounting will significantly advance the potential for substantive economic analysis of the non-pecuniary consequences of policy changes. Likewise, direct scientific measurement of greenhouse gas emissions has advanced dramatically in recent years and promises to be a critical input for future policy. Finally, there is a rapidly growing body of firm- and firm-worker-level research that matches labour practices and outcomes with firm production and trade. Coupled with the emerging literature on micro, small and medium-sized enterprises, this work yields valuable insights into the international policy initiatives to foster economic inclusion.

## BRINGING REFINED EMPIRICAL APPROACHES AND POLICY DESIGN TOGETHER

Recent and future advances in measurement will complement new conceptual approaches to optimal policy design. Theory-based research on international economic policy is on the cusp of renaissance. The practice of policy design has much to gain from the crisp logic and clarity economics provides. Each new policy initiative can be held to the light. What problem is the policy designed to solve? What aren't markets getting right on their own (what is the nature of market failure)? What are the design features of the first- (or second-)best policy, and what are the likely unintended consequences or spillover effects? Finally – and in close keeping with the questions explored in this book – what role, if any, can international cooperation play at the bilateral, plurilateral and multilateral level?

Governments today are grappling with thorny questions tied to ambitious objectives and new challenges. Climate change, security risks embedded in new technologies, the rise of authoritarianism and a new awareness of the potential for synchronised, systemic, global shocks demand consideration of policy initiatives informed by careful research. The post-Covid-19 imperative for new research in international economic policy is as urgent as it is exciting. No time to waste. Godspeed and good luck.

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**Emily Blanchard** is Chief Economist at the U.S. Department of State. She is a leading expert on international economic policy, a professor at Dartmouth's Tuck School of Business, and a CEPR Research Fellow. Professor Blanchard's research lies at the intersection of international economics and public policy. She has written extensively on how foreign investment and global value chains are changing the role of trade and trade agreements in the 21st century, and how globalization and education shape policy outcomes and the distribution of income within and across countries. Her research is published in leading journals and has been covered by major publications including the *Wall Street Journal*, Bloomberg, *Financial Times*, *Washington Post*, and the *New York Times*. She has partnered with leading institutions including the World Trade Organization, the World Bank, the UN, and the IMF, to bring research to practice; she has recently served on the editorial boards of the *Journal of International Economics*, *Review of World Economics*, *Economics and Politics*, and the *World Trade Review*; and she is former Chair and a Founding Board member for the national non-partisan, non-profit National Economic Education Delegation.

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Trade agreements increasingly include disciplines aimed at achieving non-trade objectives: promoting FDI, technology transfers, workers' movements, but also improving labor conditions, environmental quality and achieving other broader social goals. This eBook brings together a group of leading economists to investigate the economic rationale for including non-trade objectives in trade agreements and whether these disciplines actually achieve their intended goals. The evidence shows some successes, such as in the area of FDI, technology transfers and the environment, but also the limits of regulating non-trade policy areas in trade agreements, especially with regards to social outcomes such as child labour.

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