

DRAFT – NOT FOR QUOTATION

Have international investment agreements (IIAs) had an impact on Science, technology, and innovation (STI) in the Asia-Pacific region? Preliminary Analysis

Abstract

The Asia Pacific region is a major player in FDI, with developing Asia's FDI outflows alone accounting for 1.1 times the dollar value of North American outflows and 1.4 times that of Europe in 2014. East Asia alone accounted for 43% of all developing-economy FDI. Increasingly International investment Agreements (IIAs) are being put in place to manage and control these investment flows. According to UNCTAD, by the end of 2014, there were more than 3,200 IIAs in place, where almost half, or 1,500, have been signed by one or more parties from the region. With the focus shifting towards crafting IIAs to attract the 'right' types of foreign direct investment (FDI), there has been more attention on high-technology industries and knowledge economies, and fostering STI competence and capabilities through FDI. In this regard, Science, technology and innovation (STI) related provisions are increasingly included in IIAs and other relevant trade/investment agreements.

This paper examines the current landscape of IIAs in regard to STI in the Asia-Pacific region. As there are no empirical studies identified which deal with STI-related provisions in IIAs of the region, the paper initially examines the degree to which STI-related provisions are included in IIAs and other relevant trade/investment agreements which includes one or more parties from the region. The paper reports the outcomes of an analysis of a sample of signed agreements which include an adequate representation of the population of agreements signed in the region. This analysis consists of a categorization of the types of STI-related provisions based on common themes such as technological and technical cooperation, information technology, clean technology, and Intellectual Property Rights (IPR). It also examines if there are any significant differences by the types of agreements, level of development of signed parties, year of signature, and/or other characteristics. Also, it will attempt to identify if there are any enforcing mechanisms that would prompt countries to implement/revise relevant policies. It strives to examine if these STI provisions in IIAs have any relationship with STI competence and capabilities in host countries.

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1. Introduction

For decades international investment agreements (IIAs), primarily through bilateral investment treaties (BITs), have been used to underpin the active foreign direct investment (FDI) agenda in the Asia and the Pacific region. This has contributed to the region becoming a major player in FDI. Developing Asia has now firmly establishing itself as the world's largest investor region –accounting for 43% of total global inflows (\$533 billion) in 2014. The region is also gaining prominence as a major outward investor, continuously increasing its share of global FDI outflows since 2005, despite a very small dip in 2010 and 2011. By pursuing outward-oriented growth strategies, a number of Asia-Pacific economies have pursued development by emphasizing the openness and integration into the global economy in recent decades.

While IIAs have historically been put in place to protect investors from expropriation, increasingly they are being used to manage and control investment flows. According to UNCTAD, as of May 2016, more than 2,700 IIAs have entered into force, with more than half, or 1,160, having been signed by one or more parties from the region. This is in response to the shifting landscape of the traditional technology transfer approach. Increasingly, investment is sought in high-technology industries and knowledge products, whose goal is to foster STI competence and capabilities through FDI. The issues and exposures companies and countries face in this new landscape have thus changed, becoming more nebulous and difficult to measure. Thus the question becomes, how, if at all, have IIAs changed to match this new landscape.

This paper undertakes a review of the current landscape of IIAs in the Asia-Pacific region in regard to STI provisions. The paper will first provide short literature review and key discussions raised in this context. Then, it will examine the STI provisions that are included in bilateral investment treaties (BITs) including one or more parties from the region, both in number and in substance. This analysis consists of a categorization of STI provisions based on common language used such as technological and technical cooperation, information technology, technology related definitions, specific mention of permits or licenses related to science or technology, repatriation of technology related profits, science, and IPR. It will also examine if there are any significant differences by level of development of signed parties, year of signature, and/or other characteristics. Also, it will attempt to identify if there are any enforcing mechanisms that would prompt countries to implement/revise relevant policies. It will also examine the how BITs are used to promote STI in countries by examining some specific countries.

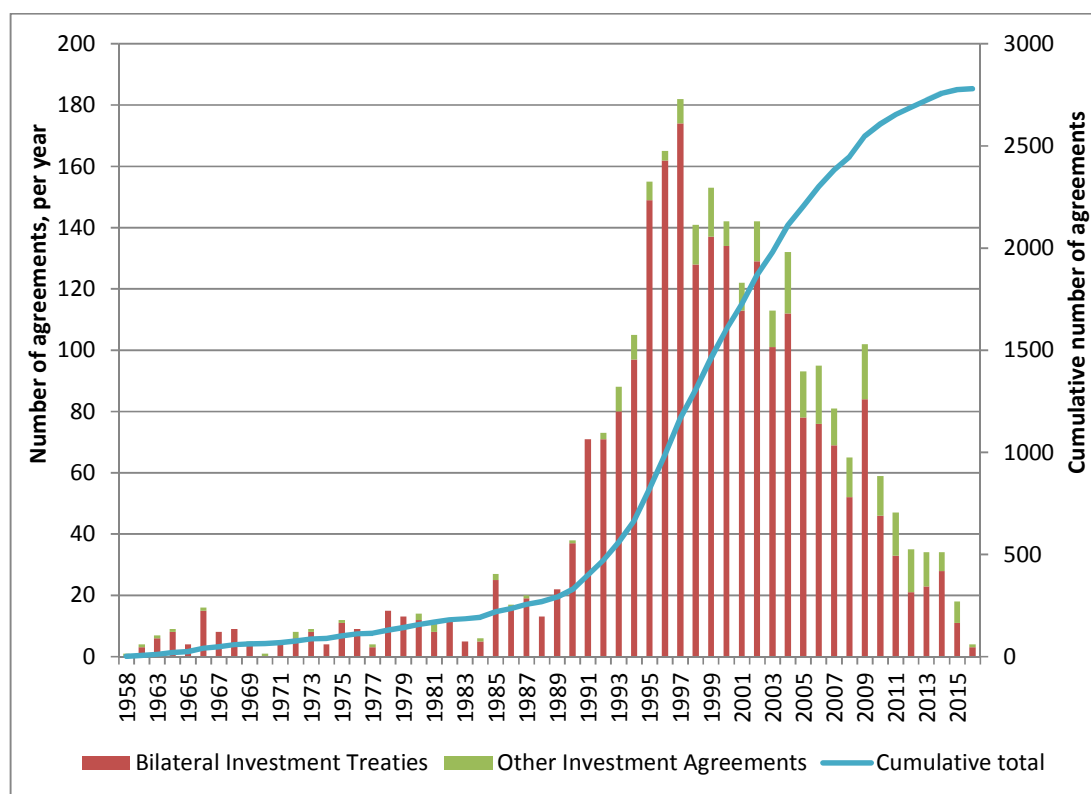
2. Current landscape of IIAs

International Investment Agreements, IIAs, refer generally to any international agreement which covers issues related to investment or investor rights. The vast majority of IIAs are bilateral investment treaty, or BITs. These are agreement between two countries regarding promotion and protection of investments made by investors from respective countries in each other's territory¹.

¹ <http://investmentpolicyhub.unctad.org/IIA>

Over the past decades, BITs and other forms of IIAs have proliferated. There are approximately 2,319 bilateral investment treaties (BITs) in force and over 200 other IIAs, as of May 2016 (see figure 1)². As figure 1 shows the number of agreements which cover investment issues has been growing. There have been some attempts to establish a multilateral agreement on investment (MAI), notably through the International Trade Organisation (ITO) of the Havana Charter in 1950, which failed due to a lack of consensus. Without a multilateral set of investment rules, countries sought to protect their respective interests by entering into bilateral and regional investment-related agreements. This has resulted in a scattering of investment agreements with different terms and conventions that, to various degrees, overlap.

Figure. 1. BITs and Other IIAs entering into force by year and cumulative of the total number, worldwide



² From the UNCTAD IIA Navigator database from Investment Policy Hub at: <http://investmentpolicyhub.unctad.org/IIA>

2.1. Types of IIAs

Bilateral Investment treaties

BITs are a principal element of the current framework for foreign direct investment (FDI), primarily focusing on: 1) the protection of investment against nationalization or expropriation; 2) assurances on the free transfer of funds; and 3) provision for dispute-settlement mechanisms between investors and host States (UNCTAD 2004)..

Other IIAs – Multilateral and regional/plurilateral agreements

There are economic agreements other than BITs that include investment-related provisions, e.g. investment chapters in economic partnership agreements (EPAs) and free trade agreements (FTAs), regional economic integration agreements and framework agreements on economic cooperation. While there is no comprehensive investment framework, there are some scattered disciplines which have implications for foreign investment in some multilateral trade agreements (Houde and Yannaca-Small 2004):

- Agreement on Trade-Related Investment Measures (TRIMS): prohibits a number of trade-related measures that could be imposed on foreign investors in a discriminatory bases (e.g. local content and trade balancing requirements);
- General Agreement on Trade in Services (GATS): recognizes commercial presence (i.e. FDI) as one of the four modes of services trade;
- Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS): sets minimum standard for Intellectual Property Rights (IPR); and
- Energy Charter Treaty (ECT): extends WTO trade rules to energy products and equipment and accords investment protection at levels normally found in higher end BITs.

2.2. IIAs – Impacts and roles

BITs serve as core element to deal with international investment between countries. BITs could be referred and used to encourage States to implement domestic reforms and enhance the transparency and predictability of the legal framework for investors (UNCTAD 2004). BITs, in this sense, impact national investment policies, and enhance/reduce the attractiveness of countries to FDI.

For multilateral and regional/plurilateral agreements, being across a larger group of countries, often include institutional structure to support their implementation. On the other hand, the necessity of finding common language suitable to a large number of countries often leads to their provisions being very general in nature and thus more difficult to achieve agreements on more detailed topics relating to FDI. This accounts for the lack of comprehensive instruments of this type at this stage. (UNCTAD 2004)

The impact of BITs and other IIAs has to be seen in the context of the overall host country circumstances such as: the size and growth potential of the host market; the availability and costs of natural resources; capacities and skills of domestic labour markets; development of local institutions; and level of infrastructure services. These economic determinants interact with national and international investment policies, enhancing or reducing the attractiveness of countries to FDI and

play a role determining the types of provisions included in agreements. (UNCTAD 2009; Guimón 2013)

While there are an increasing number of studies investigating the impact of BITs and RTAs on FDI flows, the empirical evidence has remained ambiguous (UNCTAD 2009; Berger et al. 2010). According to an UNCTAD (2009) overview of recent literature, for FDI inflows from developed countries into developing countries, BITs appear to have a positive impact on FDI inflows. Although most BITs would not change the key economic determinants of FDI, they are shown to have marginal impact that could improve several policy and institutional determinants. Those developing countries that engage in BIT programmes tend to receive more FDI (UNCTAD 2009). However, this impact is not limited to BITs. There is evidence that investment provisions or chapters in wider regional trade or economic partnership agreements actually have a larger impact on investment flows than bilateral investment treaties (Leshner and Miroudot 2007). This could be attributed to the informational effects, that trade agreements institutionalize commitments to liberal economic policies, hence making these commitments more credible and thus boost FDI (Büthe and Milner 2008).

The implications here is that the inclusion of provisions regarding STI should be associated with increased or new FDI flows in high technology and/or knowledge products areas. If, as the evidence suggests, the inclusion of investment provisions signals a commitment to credible policy development, the inclusion of STI provisions should be a signal of a readiness to investment in high technology areas.

IAs became the main instrument to govern investment relationships among countries of different levels of economic development, since the first BIT which was concluded in 1959 between Germany and Pakistan. These traditional investment agreements focused on investors' protection, by reducing political insecurity faced by Western companies in developing economies. These agreements included several core substantive provisions to ensure fair and equitable treatment for foreign investors by their host state, compensation in the case of direct or indirect expropriation, and the right to move investment-related capital freely across borders. This set of investment provisions is still at the core of modern investment treaties. (Berger 2015)

In the 1990s and until mid-2000s, the global IIA regime expanded at great speed, with increased global trade and investment flows (see figure 1). At the end of 1980s, only 381 BITs existed. Their number increased five-fold throughout the next decade, to reach 2,067 by end of 2000. In parallel, regional and plurilateral IIA rule making increased substantially, with the landmark event of the establishment of the WTO in 1994. (UNCTAD 2015)

In the mid-2000s, the number of new IIAs began to slow down from its fast expansion seen in the previous decade. This slowdown was accompanied by a paradigm shift for IIAs, especially after the global financial crisis. Specially, agreements began to be increasingly exposed to ISDS cases. Specifically, Canada and the United States of America (USA) exposed to a greater number of investor arbitration in the context of NAFTA, began to create 'new model' BITs which aimed to clarify the scope and meaning of investment obligations, including the minimum standard of treatment and indirect expropriation. Also, these new models specified that the investment protection and liberalization objectives of IIAs must not be pursued at the expense of the protection of health, safety, the environment and the labour rights. (UNCTAD 2015)

2.3 Call for a balanced approach

The shift in the paradigm includes moves to a more balanced investment regime that serves the interests of both foreign investors and host countries. This is in reaction to criticisms that the original template for IIAs overemphasized investment protection and promotion, with little or no regard for preserving the regulatory space of host countries (Berger 2015).

While a detailed examination of all provisions across but is beyond the scope of this paper, two areas require special mention, especially as they have an impact on the more balanced approach espoused in the new BITs. Firstly, provisions on standards of protection, and secondly, those that cover dispute settlement.

Standards of protection

Among the provisions that could have potential in delineating the balance between investment protection and the right to regulation in the public interest are:), national treatment (NT), and the fair and equitable treatment (FET).

The NT clause calls for equal treatment between domestic and foreign investors, aiming to ensure a level playing field. This includes rights under most favoured nation (MFN) trade provisions. In recent years, an increasing number of IIAs has included pre-establishment commitments, allowing investors to establish an investment in their territory on terms no less favorable than those that apply to domestic investors (NT) or investors from third countries (MFN). By the end of 2014, pre-establishment IIAs totaled 228 (103 BITs and 125 Other IIAs), more than doubled in a decade, most of which involved developed economies (UNCTAD 2015).

While these non-discrimination clauses strive for equal treatment, in actual practice, these standards have been used to challenge any type of governmental conduct that investors deem unfair. In fact, almost all ISDS cases to date have included an allegation of a FET breach (UNCTAD 2015). The ability of foreign investors to bring actions for a broad range of real or perceived grievances under FET can impact on a domestic economy's ability to regulate. (Berger 2015; UNCTAD 2011b).

Investor-State Dispute Settlement

Investor-State Dispute Settlement (ISDS) are increasingly recognized and used as a powerful instrument to enforce investor's property rights vis-à-vis their host states. Since 1987, the number of known investment arbitration cases amount to 608 (Berger 2015). ISDS was created for the settlement of disputes between investors and host governments, with the purpose of creating a neutral forum that offers the possibility of a fair hearing before a tribunal unencumbered by domestic political considerations. In practice, however, there are concerns about issue creep as most disputes in ISDS, increasingly involve matters such as environmental protection, public health, or other issues of public governance. (UNCTAD 2014)

The recently negotiated Trans Pacific Partnership (TPP) trade deal, has raised some concerns that the ISDS provisions included could be used against the public interest. Some examples include: possible threats to the Sustainable Development Goals (SDGs) (Friends of the Earth International 2015) and misuse by foreign investors seeking restitution in an international tribunal for alleged diminution of their potential profits as a result of regulation (Stiglitz 2015). While some claim that

these fears on sovereign risks are overblown (Fitzgerald 2015), TPP have included provisions enabling national regulations in the areas of environment, public welfare and health, as well as in areas covering investment authorizations. (Hodgson 2015)

3. Science, Technology and Innovation in IIAs

3.1. Science, Technology and Innovation through foreign direct investment

Science, technology, and innovation (STI) can be conceptualized as an integrated life-cycle where science leads to new technologies from which innovations develop. There is a strong body of literature examining how FDI results in technological progress. The benefits of this technology transfer, have been acknowledged to be one of the crucial spillover effects from FDI. At the same time development and infrastructure in support of STI are crucial absorptive capacities needed to maximize the benefits from FDI. While STI has been seen as a fundamental basis for development for a long time, it is gaining in importance in the international investment arena. This rising prominence can be traced to the globalization STI activities. Out of many potential channels of STI globalization - international collaboration and strategic alliances; transnational technology contracts and licensing; international trade in high technology products; and international flows of human capital - FDI is used as one of most crucial. Global R&D networks are becoming more multi-polar, with emerging and developing countries emerging as more relevant both as destinations and sources of R&D intensive FDI. This trend can be ascribed largely to the growing attractiveness of China and India, two of mega-economies of Asia-Pacific region. (Guimón 2013)

The idea that technologies can be transferred on a large scale from industrialized to developing countries through economic activity has been around for many decades. The underlying argument rests on foreign firms from more advanced economies have access to cutting-edge technologies – which can be embodied in the capital or intermediate goods employed in production or in the organizational and managerial know-how – and domestic firms are then able to learn from interacting with, or from observing the activities of these firms. This argument is supported by the fact that firms operating internationally have been found to be more productive compared to domestic-only firms, by several orders of magnitude, and to spend more on R&D³.

The channels through which this technology is transferred can be direct or indirect. Direct transfers involve explicit transactions from one party to another, such as trade in goods embodying technology or the licensing of technologies themselves. Indirect transfers consist of (often unintended) spillovers and externalities from the mere presence, or exposure to, foreign technology. This has the important implication that the introduction of foreign technology in a country can be considered a form of transfer, in the hopes that it will subsequently spread throughout the rest of the economy.

Empirically, while there is ample evidence supporting the existence of and benefits from direct spillovers from FDI, the evidence on indirect spillovers remains inconclusive (Havranek & Irsova 2011). Several explanations have been put forth to explain the lack of indirect spillovers gains. First,

³ See, for example, Helpman, Melitz and Yeaple (2004), “Export Versus FDI with Heterogeneous Firms”, *American Economic Review* V9(1).

if well trained labour and managers are maintained within the company directly receiving the technology transfer, there is little opportunity for benefits to make their way further in to the host economy (Aitken & Harrison 1999). Second, the rest of the economy may have little ability to use the knowledge or technology beyond the immediate company, due to lack of appropriate skills or industrial base (i.e. limited absorptive capacity).

It has also been argued that the benefits exist, but they are much more diffuse and thus difficult to measure. Intuitively, the degree to which indigenous ideas and methods have developed as a result of being exposed to foreign technology or know-how is impossible to measure directly. Thus, arguments in favour of the existence of these broader gains, or spill-over benefits rely on more general evidence, including ex-post productivity gains, or the fact that no economy has managed to develop or realize substantial growth without being open to both trade and FDI, and that those companies which engage in international markets (as exporters, GVCs suppliers or multinational affiliates) have higher levels of productivity and pay higher wages than their domestic only counterparts.⁴

But as the opportunities and channels for technology to be transferred expand, have the underlying agreements governing FDI flows responded? There are, to the authors' knowledge, no papers examining the degree to which IIAs support or promote the transfer of technology through investment flows. Hence, this paper initially examines the degree to which STI provisions are included in BITs. It reports the outcome of this analysis based on the BITs which have entered into force and includes one or more parties from the Asia-Pacific region. The analysis begins with the categorization of the types of STI provisions. We also examine trends identified by year the agreement entered into force, income levels of parties, and other factors. We examine how BITs are used to promote STI in countries by examining some countries more closely. We trace the evolution of BITs in their STI provisions over time and we also examine the relationship for STI provisions in BITS with STI development in a country, with the export sophistication index.

3.2. Methodology

BITs are the main channels of negotiating on investment rules among countries, although the number of RTAs which contain some investment provisions is consistently increasing. The total list of current regional BITs was extracted from the UNCTAD International Investment Agreements Navigator (IIA Navigator)⁵, which offers the most comprehensive list of BITs globally. From this list of almost 1480 agreements, we examined those BITs that are currently in force and at least one part is in the Asia-Pacific region (simply referred to as 'regional').⁶ There are 1019 of these BITs (see table 1) as of May 2016. Out of these 1019, we were able to review 657 (64%), which had publicly available English full text.

⁴ See e.g. Hidalgo & Hausmann (2009); Poncet & Starosta de Waldemar (2013). Of course the direction of causality is difficult to definitively substantiate.

⁵ The database is available from Investment Policy Hub at: <http://investmentpolicyhub.unctad.org/IIA>

⁶ This is defined as all ESCAP member States and Associate Members excluding non-geographic members, plus Taiwan, Province of China.

Table 1: Number of agreements including one or more partners from the Asia-Pacific region

BITs	Other IIAs	Entered Into Force	Signed	In Negotiation	Number of agreements
X	X	X	X	X	1477
X	X	X	X		1472
X	X	X			1161
X		X	X	X	1303
X		X			1019

We then examined the 657 agreements to see whether they reflected the population of 1019 agreements. We compared the agreements based on population overall to see how well they reflected the general population of agreements. We examined in the year the agreements entered into force and income level at that time, using the World Bank Country Classifications, with four categories of countries: High Income Countries (HIC); Upper Middle Income Countries (UMIC); Lower Middle Income Countries (LMIC); and Lower Income Countries (LIC).⁷ It showed that 657 agreements adequately reflected the composition of the population. (see table 2)

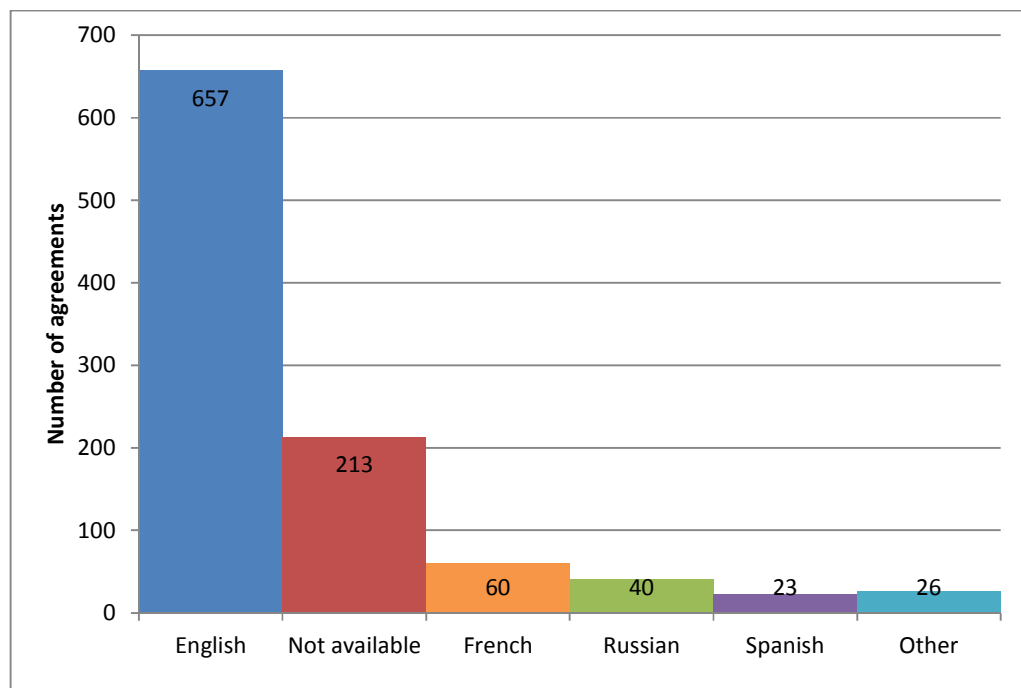
Table 2. Composition of the sample against the population

Year grouping	Number in sample	Category compared to total sample	Number in total population	Category compared to total population
-75	17	3%	20	2%
76-85	25	4%	40	4%
86-95	157	24%	234	23%
96-00	206	31%	313	31%
01-05	128	19%	199	20%
06-10	94	14%	159	16%
11-15	30	5%	54	5%
Classification				
North-North	33	5%	46	5%
North-South	338	51%	497	49%
South-South	286	44%	476	47%
Income classification				
Has HIC	371	56%	543	53%
Has LIC	287	44%	449	44%
Has LMIC	332	51%	533	52%
Has UMIC	206	31%	315	31%
Grand Total	657		1019	

⁷ The WB Country Classification categorizes countries based on income (GDP).

One inherent limitation of the review is from the sample selection. As agreements with English full texts were selected due to practical reasons, not all sub-regions and/or countries are equally well-represented. The most underrepresented countries compared to the total population are France, Russian Federation, Iran (Islamic Republic of), Uzbekistan, Armenia, and Kazakhstan. Figure 2 shows the breakdown of the 1019 BITs by whether full text is available or not; and by which language the full text is available. In particular, 97 of the 213 agreements without any available full text were from Central Asian countries⁸.

Figure 2. Population - breakdown by languages



It needs to be clearly stated that this review does not intend to provide analysis on legal implications of STI provisions in BITs – although this would be one area for further research. The aim of the paper is to identify how often STI provisions appear in BITs, and the types of provisions included. Analysing the agreements, we identified similarities in wordings and structures of STI provisions, and developed a categorization of 14 indicators based on the findings. The two preliminary rounds also gave us a comprehensive list of words for identifying provisions through word search. Search word included: Science, Tech, Intellectual Property, Trademark, WTO, Dispute, Research, Innovation, Copyright, Patent, Personnel, Entry, License, Royalties, Sojourn, and Permit.

For the analysis we have grouped agreements together based on (a) the year they came into force, and (b) the income classification of one or both partners. Income classification is based on World Bank (WB) Country Classifications.. The income classifications of countries are based on the year the treaty came into force, so a country can be classified as one income level in one agreement and a different income level in another agreement.

⁸ Central Asia is defined here as: Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Turkmenistan, and Uzbekistan

4. Analysis

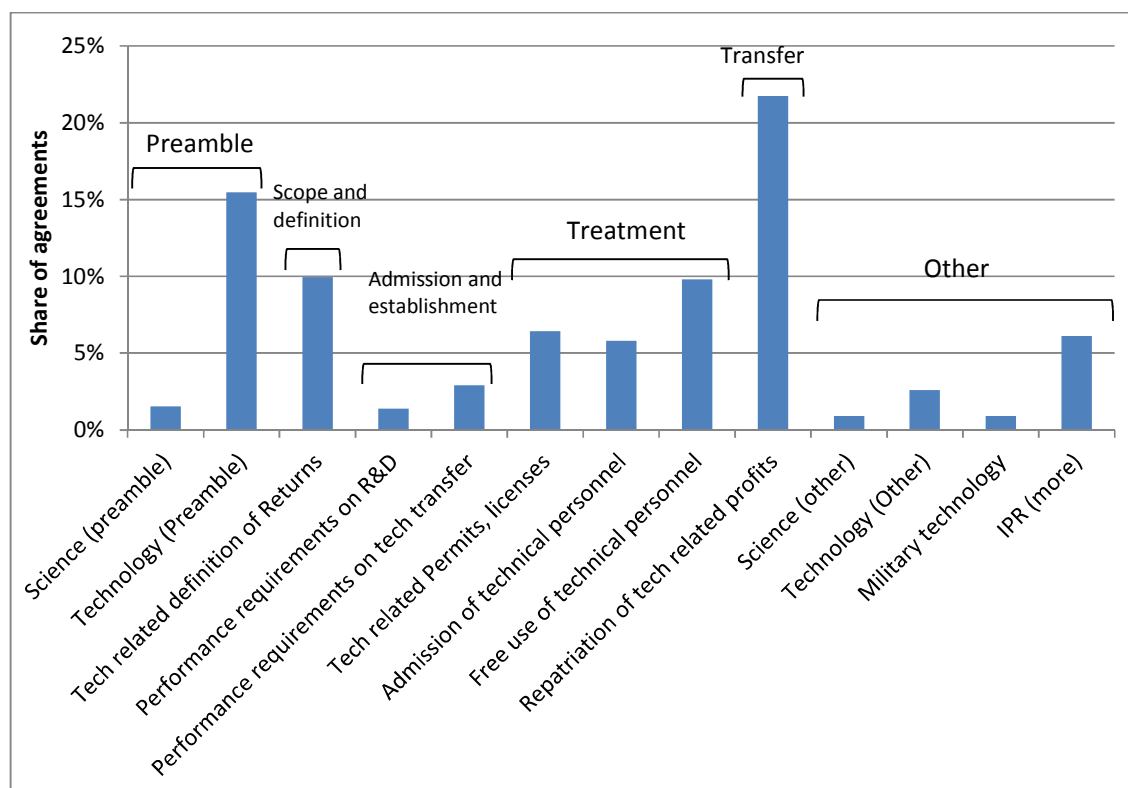
4.1. STI provisions in BITs

The review of Asia-Pacific BITs reveals that STI provisions are found in a majority of agreements. However, the provisions vary in terms of the depth of these provisions as judged by wording, subjects and areas, and locations within BITs, which in turn, can have different implications and effects. Besides mentions of IPR in the definitions, which featured in 99% of the agreements, 55% of the agreements were found to have at least some form of STI provisions; and the share of BITs which include STI provisions has been increasing in the last few years. STI provisions appear in several parts of the BITs examined. As with many provisions in BITs in general, STI provisions commonly follow a standardized pattern, often with the exact same clauses in multiple agreements. Following the UNCTAD framework for analysing BITs⁹, we have found STI provisions to be the most common in the Preamble, Scope and Definition, Admission and Establishment, Treatment, and Transfer parts of agreements. Beyond these are also some less common clauses found in various other sections. Table 3 shows a complete list of all STI provisions identified in the review within their respective BIT sections, and Figure 3 shows the share of each STI provisions. The sections and provisions are explained below.

Table 3. STI provisions under BIT sections

BIT sections	STI provisions
Preamble	Science (Preamble) Technology (Preamble)
Scope and definition	IPR as investment Technology related definition of Returns
Admission and establishment	Performance requirements on R&D Performance requirements on technology transfer
Treatment	Technology related permits and licenses Admission of technical personnel Free use of technical personnel
Transfer	Repatriation of technology related profits
Other	Science (Other) Technology (Other) Military technology Technology Transfer IPR (extended)

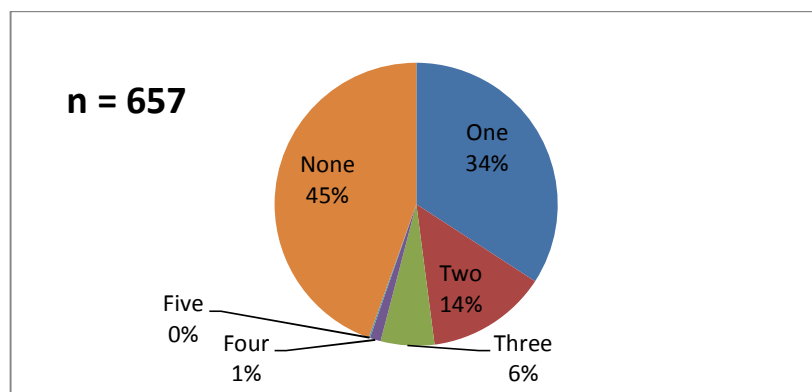
⁹ The framework is loosely based on a number of series from “Issues in International Investment Agreements”, from UNCTAD on various elements of BITs. Available from [http://unctad.org/en/pages/DIAE/International%20Investment%20Agreements%20\(IIA\)/UNCTAD-Series-on-issues-on-international-investment-agreements.aspx](http://unctad.org/en/pages/DIAE/International%20Investment%20Agreements%20(IIA)/UNCTAD-Series-on-issues-on-international-investment-agreements.aspx)

Figure 3. Share of STI provisions – categorized under BIT sections¹⁰

4.2. Overall Trends

Before turning to the individual provisions found in BITs, we examine the overall trends of STI provisions. We have excluded the indicator “IPR as investment”, as this one is found in nearly all the agreements. Out of all the agreements, 55% have one or more of the other STI provisions in them, the majority of those containing one provision. Other STI provisions are usually spread across agreements and not clustered in a few agreements with many provisions (see figure 4).

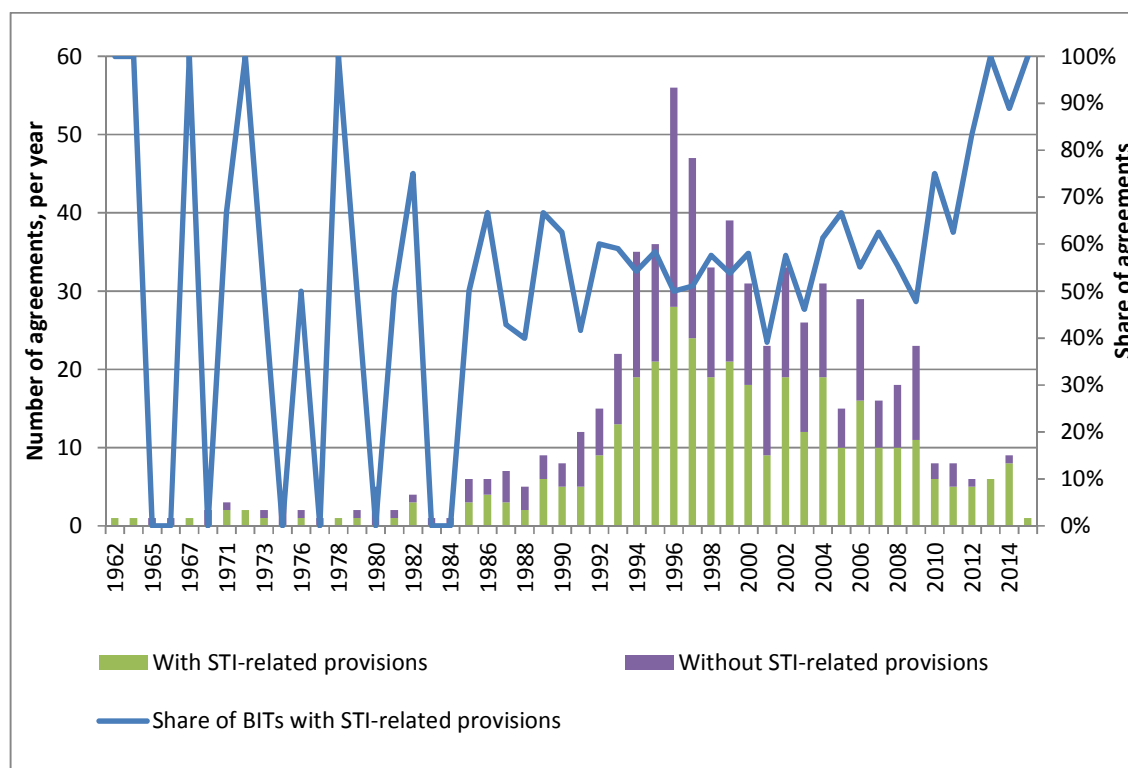
Figure 4: BITs by number of STI provisions, in share of 657 BITs



¹⁰ This and all subsequent figures showing shares show the share of agreements within a certain category containing a certain STI-related provision. Because agreements can include several provisions, the sum does not add up to 100%

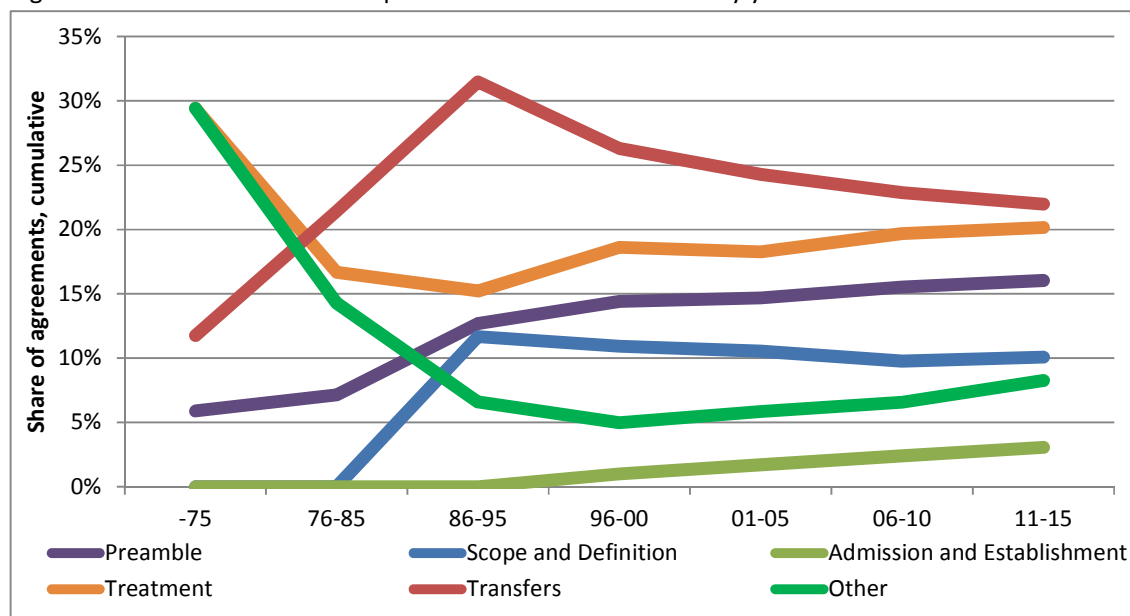
Figure 5 shows both the numbers of BITS entered into force each year, with or without STI provisions, plus share of BITS with STI provisions in a given year. The proportion of BITS with STI provisions has been stable since the mid-90s. However, the share of new IIAs (newly entered into force) containing STI provisions has dramatically increased in the recent years (2011-2015). Indeed, very few agreements since 2012 do not contain STI provisions. The share of BITS containing STI provisions is also shown to have increased sharply since the 2008 financial crisis.

Figure 5: BITS entered into force each year, with or without STI provisions



Within the group of BITS containing STI provisions; however, the relative prevalence of different types of provisions has varied markedly over time. Figure 6 shows the prevalence of the different types of STI provisions over time. For a comparison over time, we grouped BITS into ten-year periods for the first two periods, and five year periods for the remaining, based on the year the agreements entered into force.

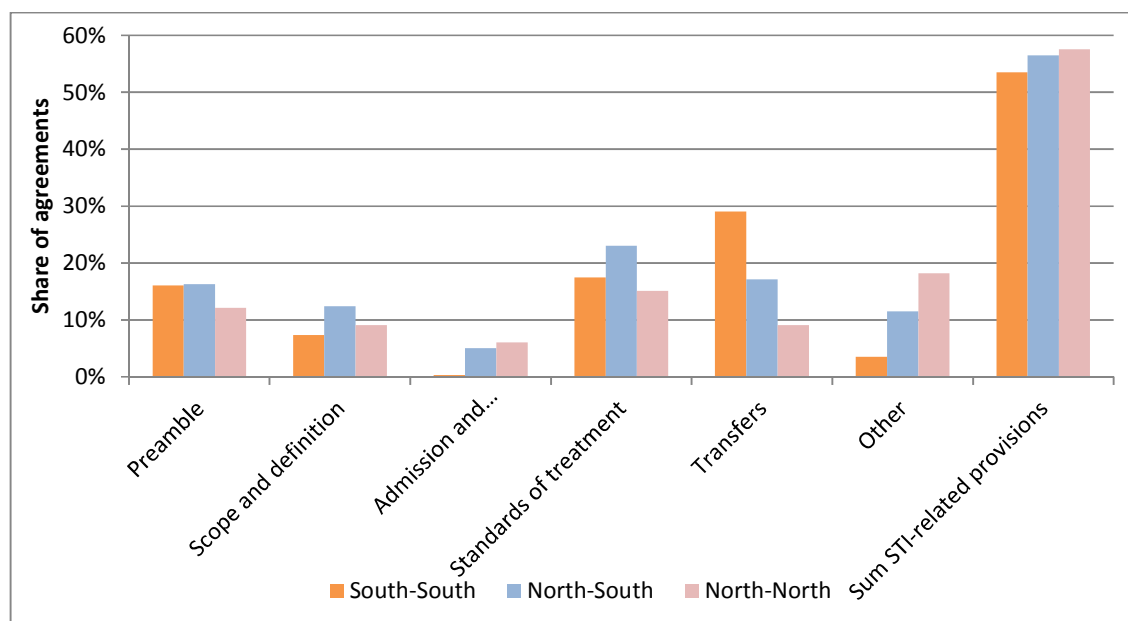
Figure 6. Cumulative share of STI provisions under BIT sections by year



“Transfer” has for a long time been the most common STI provision. However since its peak in 1986-1995 it has gradually declined, as newer BITs entered into force contained such provisions with decreasing frequency. Meanwhile, other categories such as “Treatment”, “Preamble”, and “Admission and Establishment” have seen steady rises in prevalence since 1986-1995, as these provisions have become more popular over time. Two types of provisions, “Scope and Definition”, and “Admission and Establishment” are seemingly modern types of STI provisions, as they only emerged in the 86-95 and 96-00 year groups respectively. As mentioned above, provisions categorized as “Other” have decreased dramatically in popularity after the initial period, as BITs became homogenized and partners adopted the standardized templates informing the framework used here. The slight increase in the 00’s and 10’s is mainly due to an increase in “IPR (extended)” provisions.

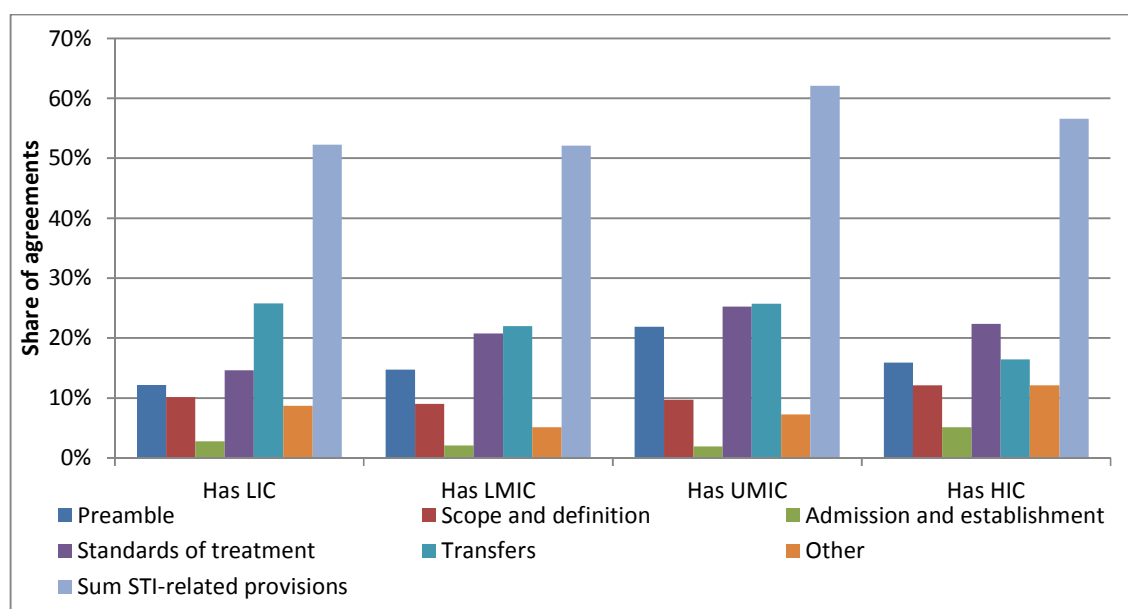
Further, we have looked at factors related to the agreements and their partners. Figure 7 shows the share of agreements within the classifications containing STI provisions between the two partners categorized by income level. Overall, North-North agreements are more likely to contain provisions (58% of these agreements contain them), while South-South agreements are the least likely (53% of agreements), although the differences are small. Between the provision categories, the provisions appear with differing frequencies between the types of agreements. “Transfer” is highly overrepresented in South-South agreements, while barely appearing in North-North agreements; presumably because the issue of free capital transfer is bigger between developing countries. Provisions categorised as “Other” are also markedly more popular in North-North agreements, while barely figuring at all in South-South agreements. Looking horizontally, the most frequent STI provisions vary significantly between the partner categories; for North-North agreements “Other” is the most common; for North-South “Standards of treatment” is the most common, while for South-South agreements “Transfer” is by far the most common.

Figure 7. Share of agreements with STI provisions, by BIT section



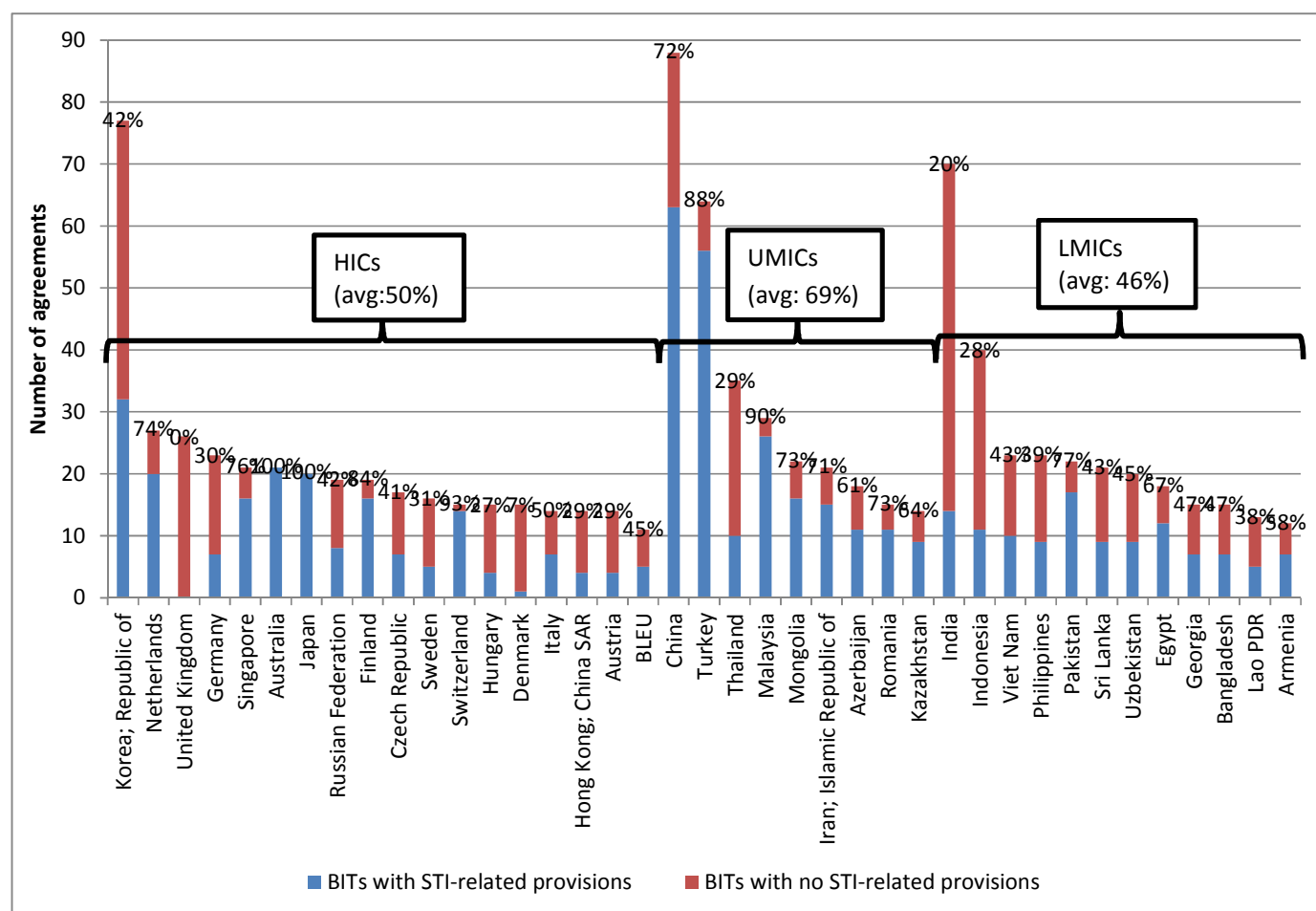
Looking at the categories of provisions in relation to the income level of individual partners, we find big variations. Figure 8 shows the prevalence of the six different categories of STI provisions based on the agreements by countries per income level. UMICs are most likely to have any STI provisions in their BITs, but generally the difference in overall prevalence is relatively small. As for individual provision categories, “Transfer” is once again evidently more popular among developing countries, especially UMICs and LICs, while HICs show a lot less interest in such provisions. “Preamble” mentions of STI are more common in treaties including UMICs, while a lot less common for LICs. “Standards of treatment” show a similar pattern.

Figure 8. Share of agreements with STI provisions, by BIT section and income level of partners



Looking closer at the country level, there is a great deal of variation with regards to adding STI provisions in their BITs. Figure 9 shows all partners with more than 10 total agreements, grouped by WB Country Classification. Note that this figure uses the current (2015) country classifications. The percentage values show the share of all agreements by that partner containing STI provisions. The average scores for each country classification are for the countries in the figure only. In general, UMICs have more STI provisions than other income groups, with all but one country having over average (55%) prevalence. For HICs, the picture is more mixed, with large variance between countries.

Figure 9. Number and share of BITs with STI provisions by countries, categorized by income level



4.3. STI provisions – breakdown by BIT sections

4.3.1. Preamble

The preamble sets out general objectives, desires and visions for what the agreement is meant to achieve, and is sometimes used to put these points in a wider context of bilateral relations. In terms of STI, the preamble is mainly used to: 1) convey a desire to promote scientific, technical and/or technological cooperation, and 2) emphasize the importance of the agreement on flows of technology together with FDI. While mentions of scientific cooperation in the preamble are rare (9 agreements out of 657, or 1%), technology is much more commonly mentioned in the preamble (102 agreements out of 657, or nearly 16%). Of the 9 agreements with science in the preamble, 6 of them also have technology in the preamble, leading to a total of 105 agreements with STI preambles (16% of all agreements). No agreement is found which contained innovation in the preamble.

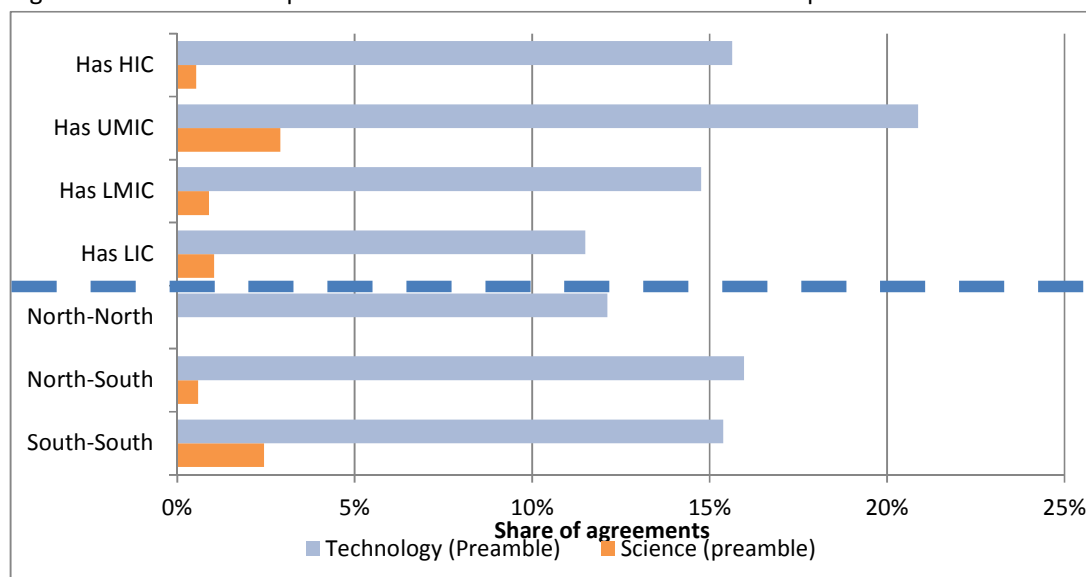
Below are provided two examples of how preambles that include mentions of technology and science respectively:

Recognizing that agreement upon the treatment to be accorded such investment will stimulate the flow of capital and technology and the economic development of the Parties, (Turkey-Ukraine 1996)

[R]ecognizing that the promotion and mutual protection of investments on the basis of the present Agreement will stimulate the development of the mutually beneficial commercial, economic, scientific and technical cooperation, (Lebanon-Russian Federation 1997)

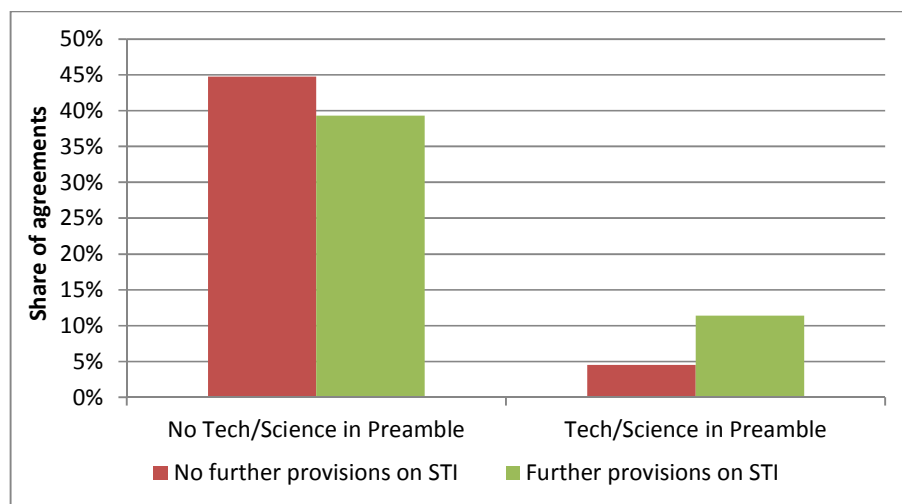
Figure 10 shows the prevalence of preamble (technology) and preamble (science) across income levels of partners. Provisions of both technology and science in the preamble are markedly more prevalent in agreements by UMICs. Meanwhile, no North-North agreements have mentions of science in the preamble, while they are more common in South-South agreements. Technology cooperation might be more relevant for North-South country pairs, where the difference between technological levels is the biggest, but mentions of technology in the preamble are only marginally more common in such pairs than in South-South agreements.

Figure 10: Prevalence of preamble mentions of STI based on income of partners



It is interesting to note that agreements that mention of STI in the preamble are on average more likely to have further STI provisions in them (see figure 11), which might indicate that the preambles are more than empty promises, and signal the commitments of partners on STI related issues.

Figure 11. STI provisions in agreements with STI mentions in the preamble and those without (share of total agreements)



4.3.2. Scope and definition

The overwhelming majority of BITs open with a section defining the scope of the agreement and the definitions of key terms used in the agreement. This includes not only the agreement's geographical and temporal coverage, but more importantly also its subject-matter coverage (UNCTAD 2011a). In terms of STI, the most relevant definition is of "Investment" and in particular whether it covers Intellectual Property (IP). Out of the 657 agreements reviewed, all but 7 agreements included IP in its definition of investment (meaning 99% of the agreements), although with some variance in the specific wording. Variable definitions in the IP part of investments include: intellectual property rights, industrial property rights, copyrights, trademarks, patents, industrial designs, layout-designs of integrated circuits, new varieties of plants, indications on source or geographical indications, and technical processes¹¹.

Following are two examples showing the range of ways IPR is defined as investment. The first is a vague and rather lenient definition, while the second is substantially more specific.

For the purpose of this Agreement

The term "investment" shall mean every kind of asset and in particular, though not exclusively, includes:

...

(d) intellectual property and industrial property rights as recognized by the law of the Contracting Party in whose territory the investment is made, know-how and goodwill; (Democratic People's Republic of Korea-Thailand 2002)

¹¹ This list is often explicitly noted as not exclusive nor exhaustive.

For the purposes of this Agreement:

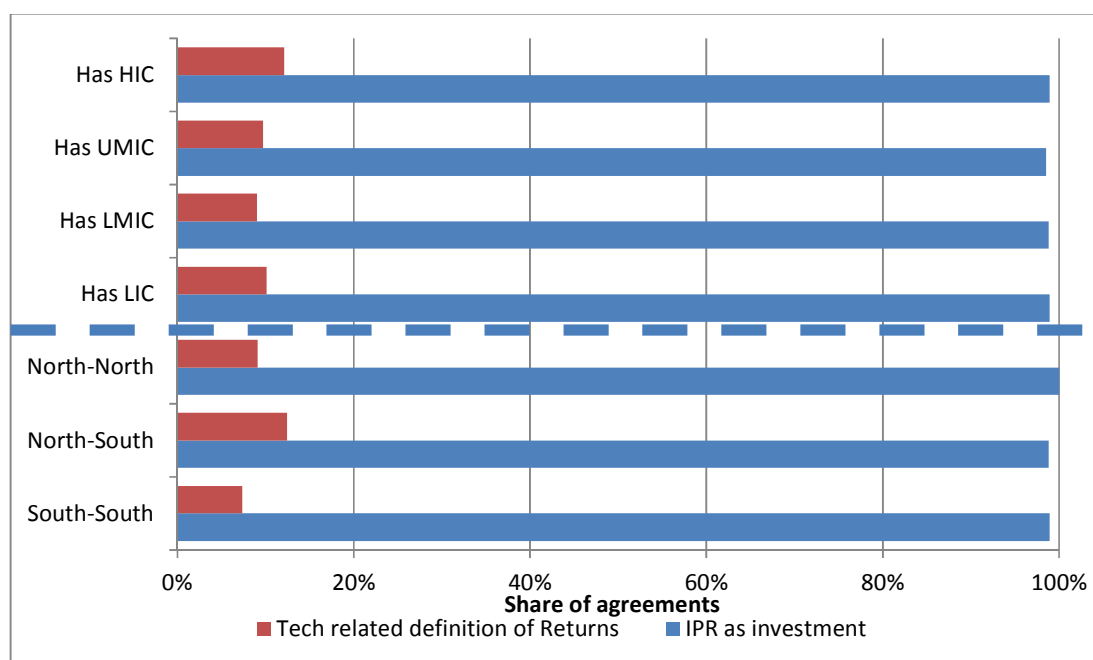
(a) the term “investment” means every kind of asset owned or controlled, directly or indirectly, by an investor, including:

...

(vi) intellectual property rights, including copyrights and related rights, patent rights and rights relating to utility models, trademarks, industrial designs, layout designs of integrated circuits, new varieties of plants, trade names, indications of source or geographical indications and undisclosed information; (Japan-Myanmar 2013)

Another definition with direct relevance for STI is the inclusion of technical assistance fees in the definition of “Returns”. This appears in 10% of all agreements. This is often (but not always) linked to provisions on repatriation of returns, for example as explicitly stated in the US Letter of Transmittal for the Mongolia-USA (1994) BIT. Another (more common) implementation of this is by including technical assistance fees in the repatriation of returns clauses (see 3.2.5. Transfer). Technology related definition of returns provisions are included at similar rates across income classes, although appears to be slightly more common agreements with high income economies (see figure 12). As more middle income economies (such as Malaysia and Thailand) increase their share of high technology markets, it will be interesting to see if these provisions are increasingly included in their IIAs. As IPR as investment is so ubiquitous, no trend is discernible.

Figure 12. Prevalence of Scope and definition of STI based on income of partners

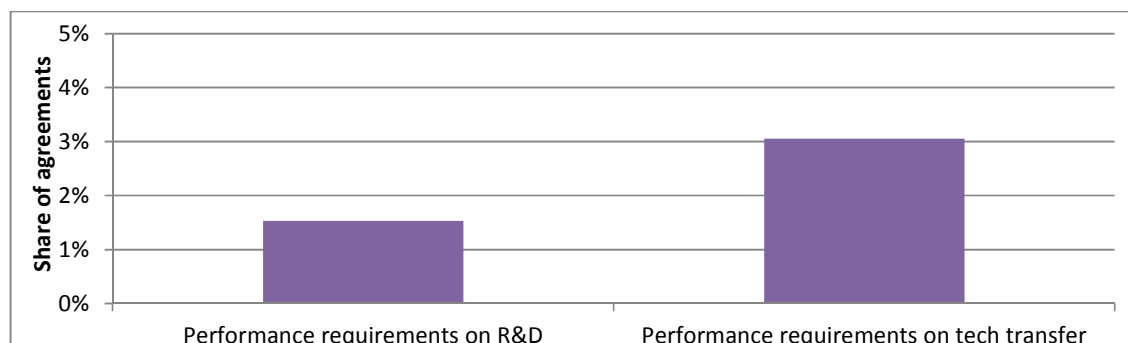


4.3.3. Admission and establishment

Most BITs contain provisions obliging host countries to allow foreign investments in general, but some are more specific in the language used. In particular, some BITs prohibit specific barriers to entry such as performance requirements. In terms of STI, performance requirements can be related to technology transfer as well as levels of research and development (R&D). These performance requirements are not banned by the WTO Agreement on Trade Related Investment Measures (TRIMS). Prohibitions on both these types of performance requirements are found in BITs, albeit

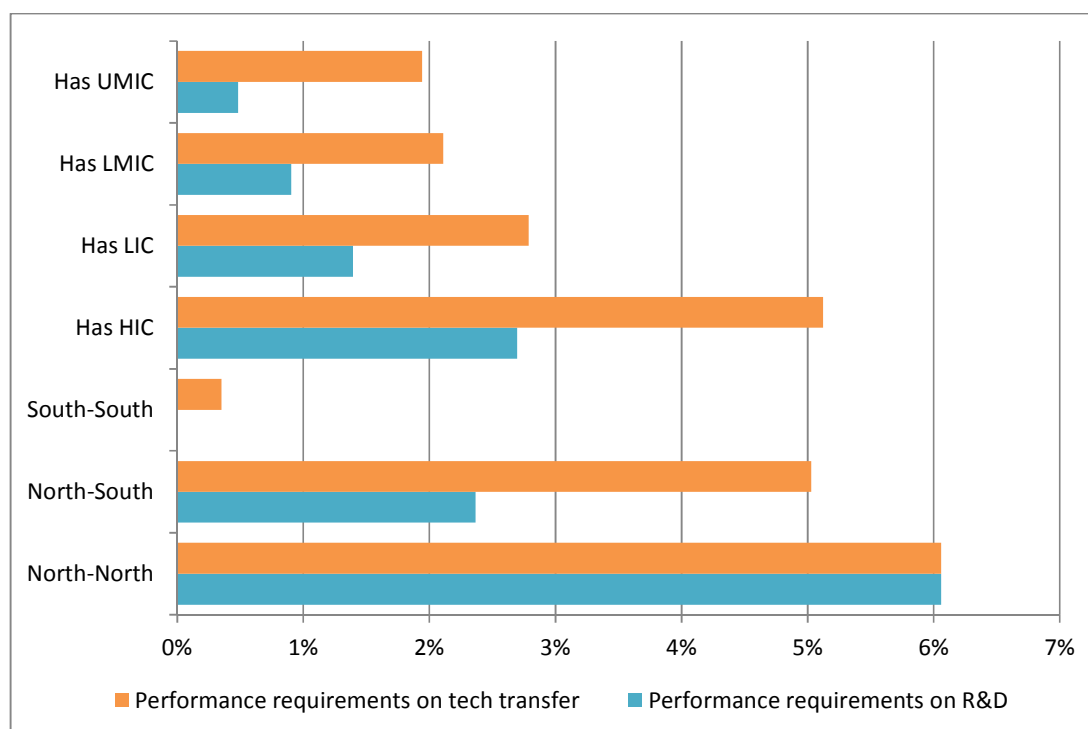
rarely, occurring in 3% and 1.5% respectively. All 10 agreements with prohibitions on R&D requirements also have prohibitions on technology transfer requirements, making the total number of agreements with STI provisions in admission and establishment 20 (3% of all agreements). (see figure 13)

Figure 13. Share of BITs with STI provisions under Admission and establishment



Somewhat surprisingly, agreements involving high income economies are the ones most likely to feature prohibitions on performance requirements (see figure 14). Such provisions are slightly more common in North-North agreements than in North-South agreements, where one assume performance requirements to be an issue of greater concern. HICs are seemingly the drivers behind implementing these provisions in agreements, as agreements without them (South-South) barely features these provisions at all.

Figure 14: Prevalence of Admission and establishment mentions of STI based on income of partners



Two agreements (Belgium-Luxembourg Economic Union (BLEU)-Thailand 2002; Myanmar-Thailand 2008) stand out, in their utilisation of a committee for approving investments, defying the trend of liberalizing provisions in a more general manner. These appear to be targeting STI (among other issues) as they specifically mention the significance of technology and science in approving investments. In all the 657 agreements reviewed, this is possibly the strongest pro-STI provisions found as they specifically safeguard these measures. The following excerpt illustrates the approval of Thai investments in Myanmar in relation to STI:

[from Article 2 Scope of Application]

1. The benefits of this Agreement shall apply only in cases where the investment by investor of one Contracting Party in the territory of the other Contracting Party has been specifically approved in writing, if so required, by the competent authorities of the latter Contracting Party. ...

[from Annex (A) to Article 2(1)]

4. In granting the C.A.P. [Certificate of Approval for Protection], the Committee shall take into consideration the benefits that would result from the applicant's intended investment in relation to, inter alia:

...

(c) technology transfer and research for development; (Myanmar-Thailand 2008)

4.3.4. Treatment

While the previous section focused on the admission of investments into the country, this section involves the treatment of investors once they are inside the partner country. The main types of treatment provided to foreign investors are National Treatment (NT) and Fair and Equitable Treatment (FET), as well as provisions on Most Favored Nation (MFN) Treatment. These provisions are designed to ensure that foreign investors are not discriminated against.

While the standards of treatment are usually stated to apply to all investments and in all cases, some agreements pay particular heed to STI-related issues in investment protection. Three types of STI provisions are found within the articles on treatment; Technology related permits and licenses, Admission of technical personnel, and Free use of technical personnel.

Provisions on “Technology related permits and licenses” underline the importance of issuing and granting permits and licenses to foreign investors for conducting businesses. An example from the Korea, Republic of - Mauritius BIT (2007) illustrates clearly:

Each Contracting Party shall use its best endeavours to grant, in accordance with its laws, the necessary permits in connection with the carrying out of such investments and, whenever necessary, licensing agreements and contracts for technical, commercial or administrative assistance. (Korea-Mauritius 2007)

The two other provisions relate to the entry and use of technical personnel related to the investment. Provisions on “Admission of technical personnel” obliges the host country to facilitate the necessary permits for admitting foreign technical personnel to enter, stay and work in the country. Provisions vary in how strongly they are worded, for example including the caveat that the

admission abides to local laws and regulation, and whether the demand is absolute or just an endeavour. One example states:

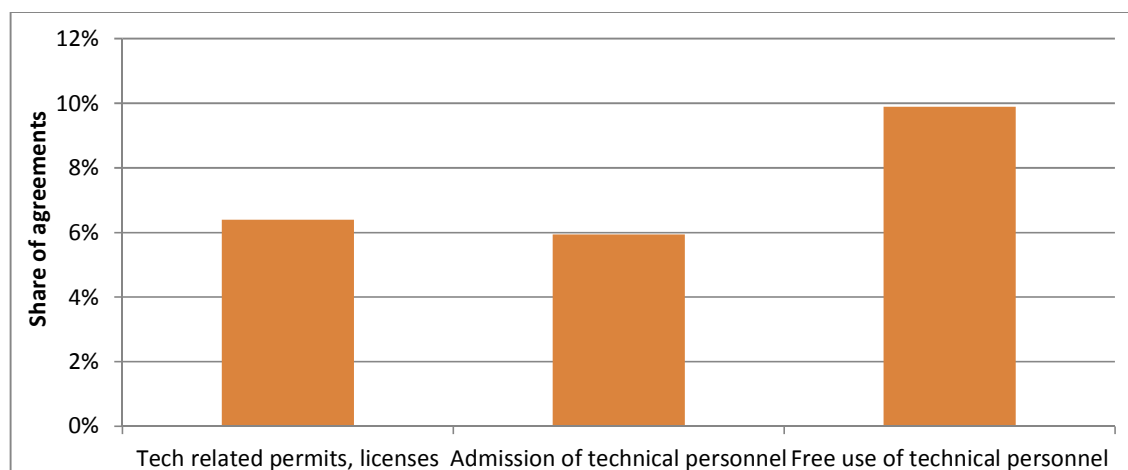
Each Party shall, subject to its laws and regulations relating to the entry, stay and work of natural persons, grant investors of another Party, and key personnel who are employed by such investors or by investments of such investors, temporary entry and stay in its territory to engage in activities connected with the management, maintenance, use, enjoyment, expansion or disposal of relevant investments, including the provision of advice or key technical services. (Korea-Switzerland 2005)

“Free use of technical personnel” clauses give investors freedom to employ staff regardless of nationality. This is a growing issue on the trade agenda more generally. Indeed, some countries are taking unilateral action on this front.¹² Example is from Cuba-Turkey 1997 BIT:

When a Party has admitted investments in its territory, it shall grant, in conformity with its laws and regulations, the necessary permits relating to these investments, including the authorizations for the hiring by the investors of the highly qualified managerial and technical personnel of his choice, regardless of his nationality.

STI provisions on standards of treatment are quite common, appearing in a total in 133 agreements (20% of all agreements). Disaggregated, the numbers are: Technology related permits and licenses in 42 agreements (6%); Admission of technical personnel in 39 (6%); and Free use of technical personnel in 65 agreements (10%). (see figure 15)

Figure 15. Share of BITs with STI provisions under Treatment (% of total)

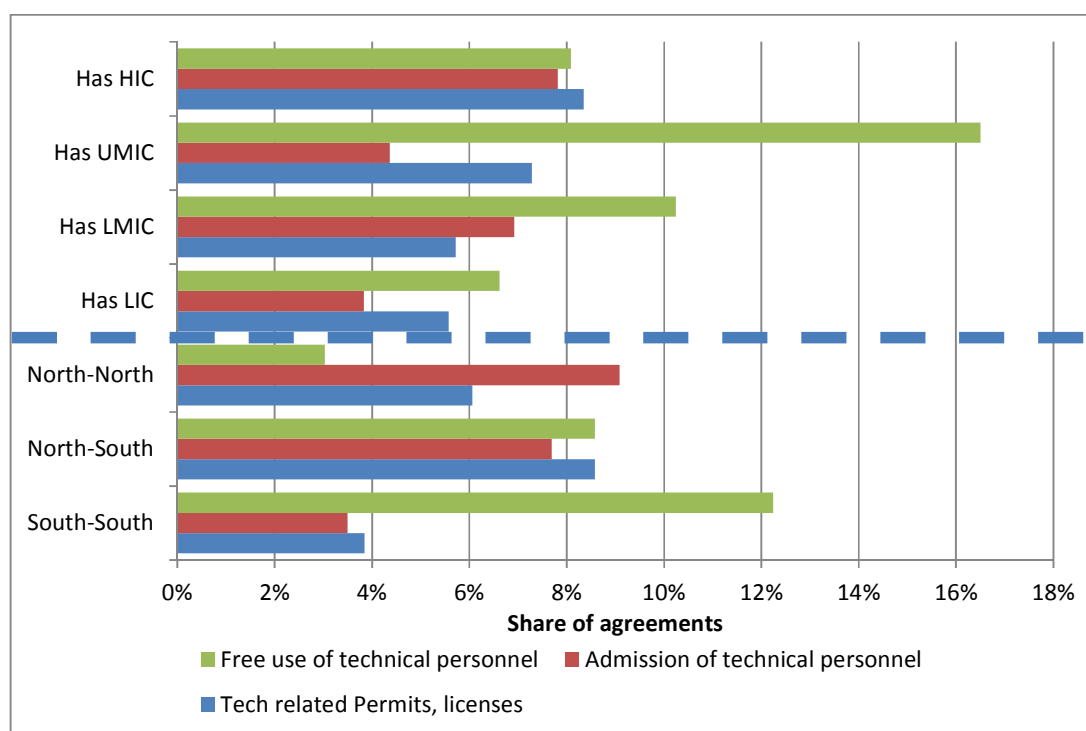


Disaggregating the agreements based on partners’ income levels, we see that the free use of technical personnel provisions is much more prevalent in agreements with at least one UMIC, as well as in South-South agreements (see figure 16). Conversely, provisions on the admission of technical

¹² For example China’s opening of Shanghai as noted in ESCAP (2016).

personnel are more common in agreements with at least one HIC, especially when combined with a South-country. The admissions of technical personnel clauses are most common in North-North agreements. This could be due to the higher level of expertise generally needed in activities in high income economies. For example, along value chains high valued added activities (such as R&D, design and financing) requiring personnel with highly technical skills, are more often located in high income economies (WTO/IDE JETRO, 2011).

Figure 16: Prevalence of Treatment-related mentions of STI based on income of partners



4.3.5. Transfer

Chapters on transfers of funds or repatriation are included in BITs to guarantee that investors are free to transfer capital back to their home country. Such chapters usually involve a) the scope of the available transfers, in terms of what types of transfers are guaranteed, and b) exceptions to the general provisions, in particular related to balance-of-payments issues (UNCTAD 2000). STI provisions are found in the first category, listing technical services fees and technical assistance fees in the list of affected transfers.

An example illustrates a standard format of implementing these provisions:

1. Each Contracting Party shall guarantee to investors of the other Contracting Party the free transfer, on a non-discriminatory basis, of their capital and the returns from any investments. The transfers shall be made in a freely convertible currency, without any restriction or undue delay. Such transfers shall include in particular, though not exclusively:

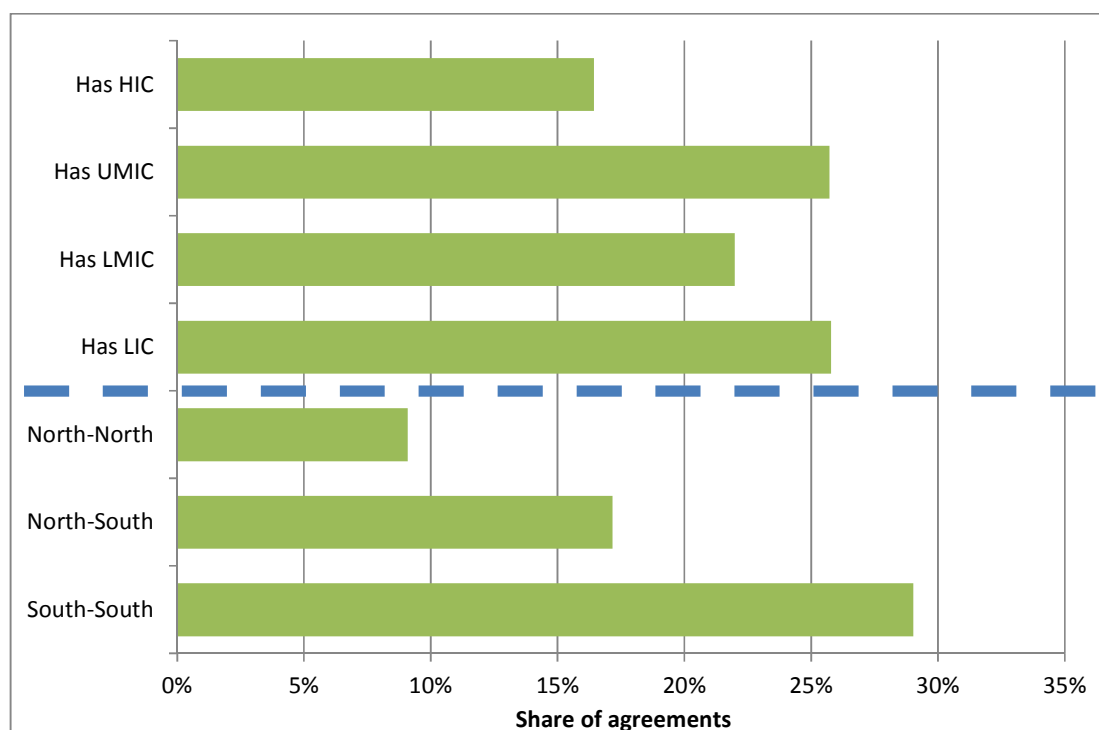
...

(e) payments in respect of technical assistance, technical service and management fees;

(Singapore-Slovenia 1999)

Provisions including technical services and technical assistance fees in transfer chapters are the most common STI provisions among the BITs reviewed. A total of 144 agreements included this, amounting to 22% of the total agreements under review. Disaggregating the numbers on partner income levels, however, we find big differences in prevalence. STI provisions on transfer are much more common in South-South agreements, and much less common in North-North agreements, reflecting the difference in priorities. LICs and UMICs are more likely to include such provisions in their BITs, in particular with each other. HICs include such provisions relative more rarely, and much less when they sign agreements with each other, which suggests these provisions are not areas of great concern. In this instance, it may be a reflection of a greater reliance in the rule of existing laws within high income economies. (see figure 17)

Figure 17: Prevalence of Transfer-related mentions of STI based on income of partners



4.3.6. Other

Beyond provisions appearing in these highly standard parts of BITs, there are a small number of additional provisions. These belong to two different (although sometimes overlapping) categories. First are the provisions found in rare chapters not included in standard parts of BITs - namely “Military Technology” and “IPR (extended)”. Second are provisions found scattered throughout agreements in various sections.

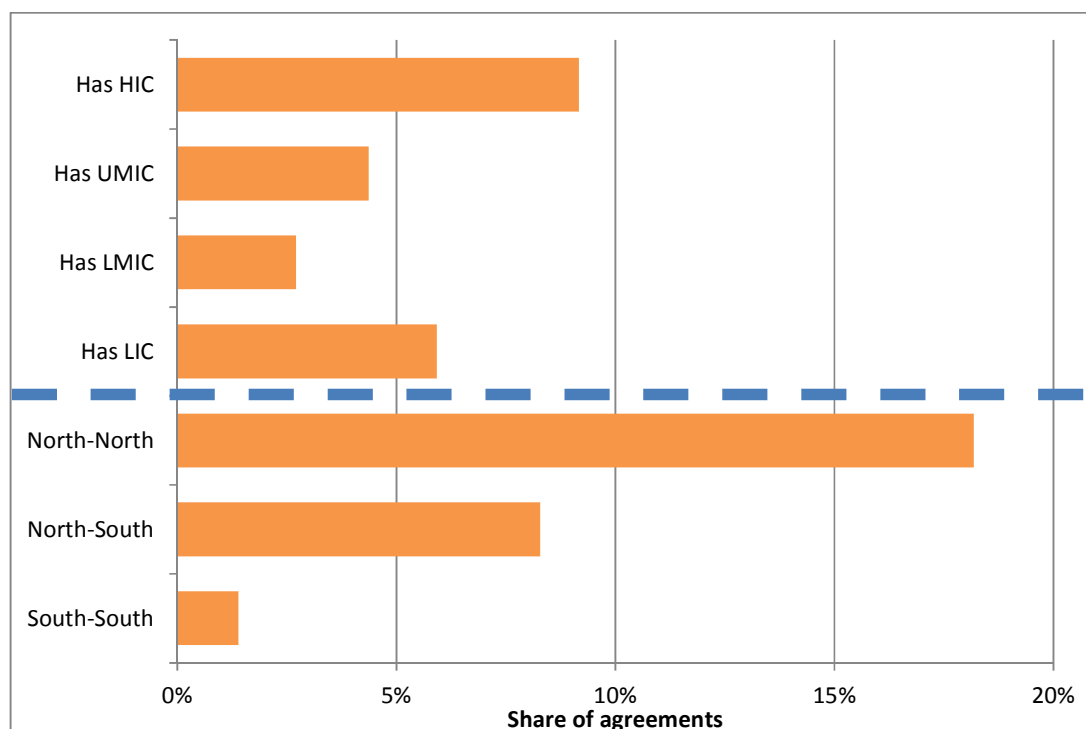
“Military technology” appears in provisions excluding military technology from the further provisions in the agreement. These are included either in chapters on general exceptions or in specific chapters on “security interests” (for example Azerbaijan-Czech Republic 2011). In total there were only 7

agreements with such provisions (1% of all agreements). This type of provision is a very recent development in BITs, and appears only in BITs entering into force after 2007¹³.

“IPR (extended)” is a residual category of all the IPR provisions that go beyond the mention of IPR in the scope and definition. This ranges from clauses reinforcing parties’ commitments to other international agreements such as the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) or World Intellectual Property Organization (WIPO)-administered treaties, by emphasizing the exceptions under which compulsory licensing is allowed. In total 38 agreements include such provisions, amounting to 6% of all agreements. Breaking it down by partner income classification, extended IPR provisions are markedly more prevalent in North-North agreements (although note that in absolute numbers this means 6 out of 33 agreements). Developing countries on average are less likely to include these provisions in their treaties, especially when negotiating treaties with each other (South-South agreements). (see figure 18)

Figure 18.

Prevalence of IPR (Extended) provisions based on income of partners



“Technology (Other)” and “Science (Other)” are residual categories where all technology and science-related provisions not captured by the other categories were put. For technology, this includes inter alia: provisions reaffirming partners’ commitment to technological cooperation, facilitation of imports in relation to technical work on behalf of government bodies, and extensive and detailed provisions on technological cooperation. In terms of science, this includes further

¹³ Military technology appear in the following agreements: Azerbaijan-Czech Republic (2011), Czech Republic-Georgia (2009), Cambodia-Czech Republic (2008), Senegal-Turkey (2010), Azerbaijan-Turkey (2011), Azerbaijan-Tajikistan (2007), Canada-China (2012)

provisions on scientific cooperation. These two categories make up only 2% and 1% of all agreements respectively, with a majority being in older agreements (more than half were before 1995). This suggests that BITs started out heterogeneous and became more streamlined and homogeneous in terms of STI provisions over time.

An example from the 1988 Netherlands-Pakistan BIT illustrates the significance STI can have in BITs, although as mentioned, this is strictly irregular compared to the majority of other agreements (this has been classified as both Technology (Other) and Science (Other)):

Article 2

The Contracting Parties shall within the framework of their laws and regulations and taking into account their international obligations, do their utmost to develop and strengthen, on a mutually advantageous basis, economic and technological cooperation between the two countries.

Article 3

1) The Contracting Parties shall in particular encourage and promote economic and technological cooperation on a, long term basis between:

- (a) nationals of the respective States;*
- (b) nationals of the one State and the other State or its agencies.*

2) The cooperation which the Contracting Parties undertake to encourage according to paragraph (1), shall in particular include the establishment of projects and enterprises. Such cooperation may be undertaken through equity participation, loan finance, joint venture or otherwise.

Article 4

The Contracting Parties recognize that the cooperation may concern inter alia industry, mining, energy, land and water development, commerce, agriculture, area and rural development, infrastructure, transportation-infrastructure, communications, engineering and other services. They shall inform each other of specific sectors in which they consider cooperation desirable.

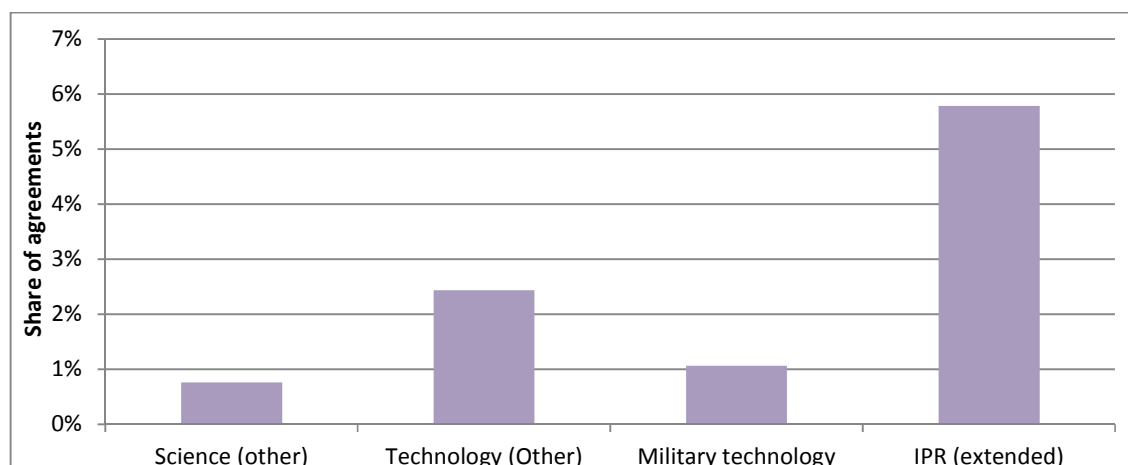
Article 5

The technological cooperation referred to in Article 3 may be implemented, subject to the laws and regulations of either Contracting Party, through projects and enterprises in which economic cooperation between their respective nationals will be initiated or enhanced. Such cooperation may include inter alia:

- (a) the facilitation of direct contacts, the exchange of information and the elaboration of programmes;*
- (b) the joint conduct of research projects*
- (c) the exchange of visits and study tours of specialised delegations, research personnel and specialists;*
- (d) the development or training techniques and systems and the training of technical personnel;*
- (e) the provision of managerial and technical expertise;*
- (f) the convening of symposia and meetings on subjects of mutual interest.*

Figure 19 shows the prevalence of the four types of provisions making up the “Other” category.

Figure 19. Share of BITs with STI provisions categorized as “Others”



5. BITs & STI development in the Asia-Pacific region

In the previous section, BITs were examined with respect to specific STI provisions, which appear under different BIT sections and income level of partners.

In this section, we will examine how BITs are used to promote STI in specific countries. Given China and Republic of Korea have the largest number of BITs in force, and have improved their classification two and one steps respectively, we examine how their agreements have changed over time. By tracing the evolution of BITs by these two countries, we would examine to the extent that BITs might vary in their STI provisions as its income level is changing.

China went from being an LIC to LMIC in 1998, and then further to become UMIC in 2010. In table 4 we can see that this had a small impact on (a) the treaty partners (North-South/South-South), and (b) whether its agreements included STI provisions. The total share of BITs with STI provisions fell with the increase in income. However, this does not seem correlated with a change in treaty partners, as the share of STI provisions fell in both North-South and South-South agreements, and on average North-South agreements are more likely to contain STI provisions (see above). This could be a reflection of a greater strengthening of domestic law in this respect.

Table 4: Prevalence of STI provisions in China's BITs based on its income classification over time

Year	Income classification	North-South agreements	of which contained STI-related provisions	South-South agreements	of which contained STI-related provisions	Total agreements	of which contained STI-related provisions
~1997	LIC	15 (27%)	67%	41 (73%)	80%	56	77%
1998-	LMIC				71%	27	63%
2009		10 (37%)	50%	17 (63%)			
2010~	UMIC	1 (20%)	100%	4 (80%)	50%	5	60%

Republic of Korea went from being classified as UMIC to HIC in 1995 (with three years as UMIC again 1998-2000). Albeit with a small sample size, table 5 shows how Republic of Korea has signed different treaties in terms of STI provisions with its increased income. Interestingly, while the agreements signed with developing countries have remained the same in terms of overall prevalence of STI provisions, the agreements it has signed with developed countries have been much more likely to contain STI provisions after it became classified as developed itself.

Table 5: prevalence of STI provisions in Republic of Korea's BITs based on Republic of Korea's and its partners income level (Developed = HIC, Developing = UMIC, LMIC, LIC)

		Partner	
		Developed	Developing
Republic of Korea	Developed	7 (70%)	14 (38%)
	Developing	3 (30%)	8 (40%)

5.1. Methodology - BITs & STI development

We also examined to what degree countries producing more technologically sophisticated products include STI provisions in their IIAs. For the measurement of STI development in a country, we use export sophistication as a proxy. Following the methodology used in the UNIDO 2016 Industrial Development Report, countries' exports are categorized into four groups based on the Standard International Trade Classification (SITC) revision 3 classification; Resource-based, low tech, medium tech, and high-tech exports (UNIDO 2016)¹⁴. In this paper, Export Sophistication is calculated as the share of high-tech exports in total exports. The values for export sophistication reflect the year the agreements entered into force. It is noted that only 448 agreements had sufficient data for analysis on export sophistication, and only for the years 1988-2015. While the export sophistication is not a perfect measurement of the actual technological capacities of a country (Srholec 2007), it gives a basic overview comparable across countries and times.

5.2. Analysis - BITs & STI development

Using the export sophistication data we look at its relationship to STI provisions in BIT in two ways. First we look at variables related to the agreements (which consist of two values for export sophistication for both partner countries). Secondly, we look at three countries and follow the evolution of their export sophistication over time.

For the first we have constructed four variables related to the agreement; (a) the average export sophistication, (b) the export sophistication gap between parties of the BIT, (c) the maximum export

¹⁴ See (see Annex B5 for classifications). For detailed information on export sophistication indices, refer to Hausmann, Ricardo, Jason Hwang, and Dani Rodrik, 2007, "What You Export Matters," *Journal of Economic Growth* 12(1): 1–25.

Anand, R, Mishra, S, and Spatafora, N (2012). Structural Transformation and the Sophistication of Production. IMF Working Paper. Available from <https://www.imf.org/external/pubs/ft/wp/2012/wp1259.pdf>

sophistication, and (d) the minimum export sophistication. Table 6 shows the average values for all agreements grouped by the pair's income level. As expected, average, maximum and minimum export sophistication increases with income level. Furthermore, the gap between the partners' export sophistication is largest in North-South agreements, although only marginally. This implies that regardless of income level, STI provisions may be more a function of the level of technical sophistication of the economy.

Table 6: Average values of export sophistication in BITs based on relative income level

Row Labels	Average export sophistication	Export sophistication gap	Max Export sophistication	Min Export sophistication
North-North	22%	0.14	29%	14%
North-South	15%	0.18	25%	6%
South-South	11%	0.13	17%	4%
Grand Total	14%	0.16	21%	6%

Table 7 show the average values for agreements featuring the provision categories. From the first two categories, we can see that there is very little difference between agreements with any STI provisions and the ones without any. However, the technological gap is greater between members including STI provisions and those that do not. This seems reasonable assuming that the closer the levels of technology, the higher the likelihood of a domestic regulatory environment would be to support these issues.

When we examine the specific provisions, we see greater differences. Agreements with STI provisions in Preamble on average have a relatively small gap in export sophistication between the two partners. Further, the average agreement with Preamble-STI provisions is likely to be between countries with lower export sophistication than average agreements. While the degree of sophistication of production's effect on overall economic growth is still being debated (Anand et al. 2012), this corroborates the earlier observation that Preamble provisions are more common in agreements with developing countries, and in particular UMICs, with limited overall technology.

Similarly, agreements with Scope and Definition provisions are also more likely to be with countries with lower export sophistication. This is in contrast with the income level data, which showed Scope and Definition being more common in North-South agreements and for agreements with HICs in general. This discrepancy suggests that these types of agreements are mostly found in North-South agreement where the developed country is below average technologically advanced.

On the other hand, agreements with provisions in Admission and Establishment are more likely to appear than average between technologically advanced countries. The same is true for Transfers, where the trend is even stronger. For Transfers, the gap is also drastically bigger than average, and the minimum export sophistication level within the pair is smaller than average. This indicates that "Transfer" provisions are more commonly found in agreements between technologically advanced countries and less advanced countries. We have seen earlier that Transfers was one of the categories with a big difference between income levels, being substantially more prevalent in South-South agreements, and especially with LICs and UMICs. This indicates that STI provisions in the

“Transfer” category are most common in agreements between the technologically advanced UMICs and less advanced LICs.

Table 7: Average values of export sophistication in BITs containing STI provisions

Provision	Average export sophistication	Export sophistication gap	Max Export sophistication	Min Export sophistication
WITH ANY	13.5%	16.8%	21.9%	5.1%
WITHOUT ANY	13.8%	14.2%	20.9%	6.7%
Preamble	9.3%	9.6%	14.2%	4.5%
Scope and definition	8.9%	11.3%	14.5%	3.2%
Admission and Establishment	17.7%	17.0%	26.2%	9.2%
Standards of Treatment	11.8%	13.7%	18.7%	4.9%
Transfers	16.6%	22.6%	27.9%	5.3%
Others	15.4%	16.0%	23.4%	7.4%
Total population	13.6%	15.7%	21.5%	5.7%

(Squares indicate the numbers is far from the average of the total population)

From the table 7 above, we saw that all four variables on export sophistication are similar between the agreements with and without provisions. Figures 20-23 looks closer at the overall number of agreements with and without any STI provisions. The figures show the share of all agreements with export sophistication variables containing STI provisions, grouped by the value of export sophistication. Agreements with higher export sophistication gap and max export sophistication are on average slightly more likely to contain STI provisions, except for on the highest levels. For the two other variables, average export sophistication and has only very small differences in share, and minimum export sophistication is too heavily skewed towards the bottom (0-5) to give any meaningful results. These findings suggest that the similar averages found in Table X above are due to the small amount of agreements found in the upper categories, while in reality these tend to contain STI provisions more often.

Figure 20: Number of agreements with STI-related provisions (left axis) and share within group (right axis), by groups of average export sophistication

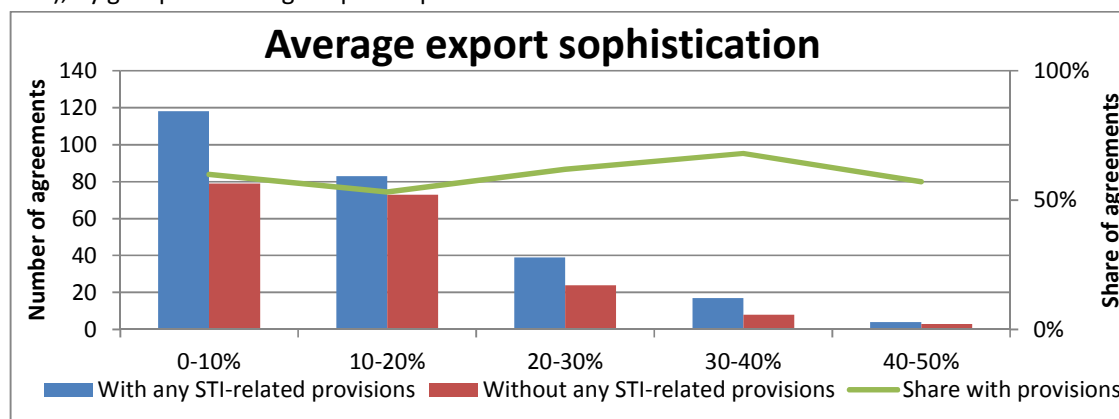


Figure 21: Number of agreements with STI-related provisions (left axis) and share within group (right axis), by groups of export sophistication gap

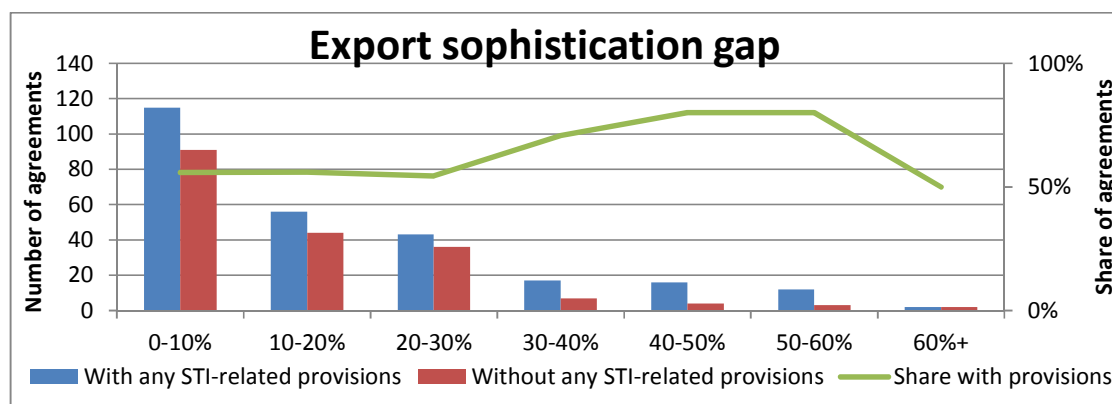


Figure 22: Number of agreements with STI-related provisions (left axis) and share within group (right axis), by groups of max export sophistication

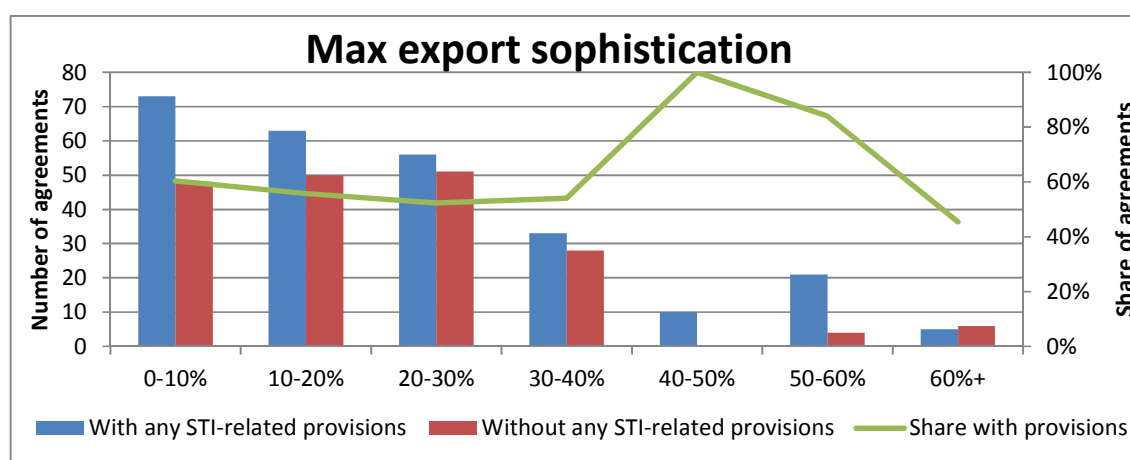
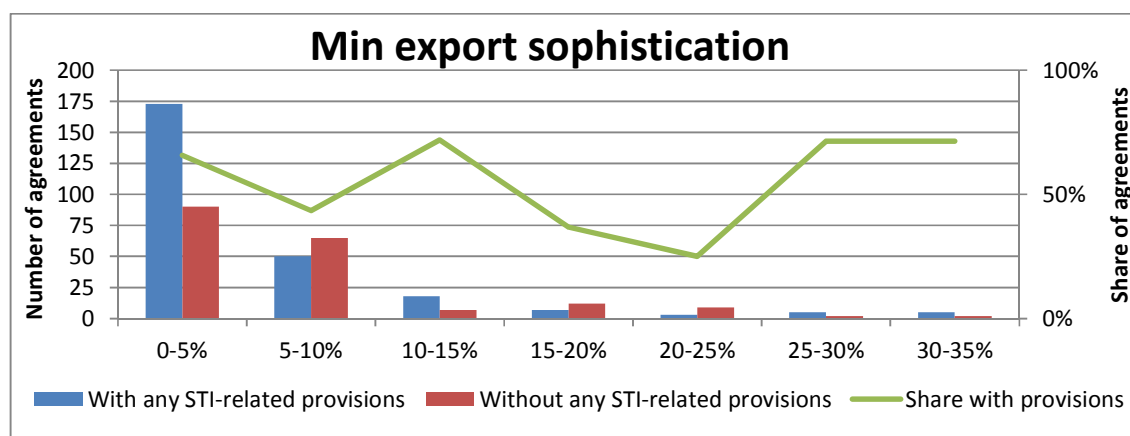
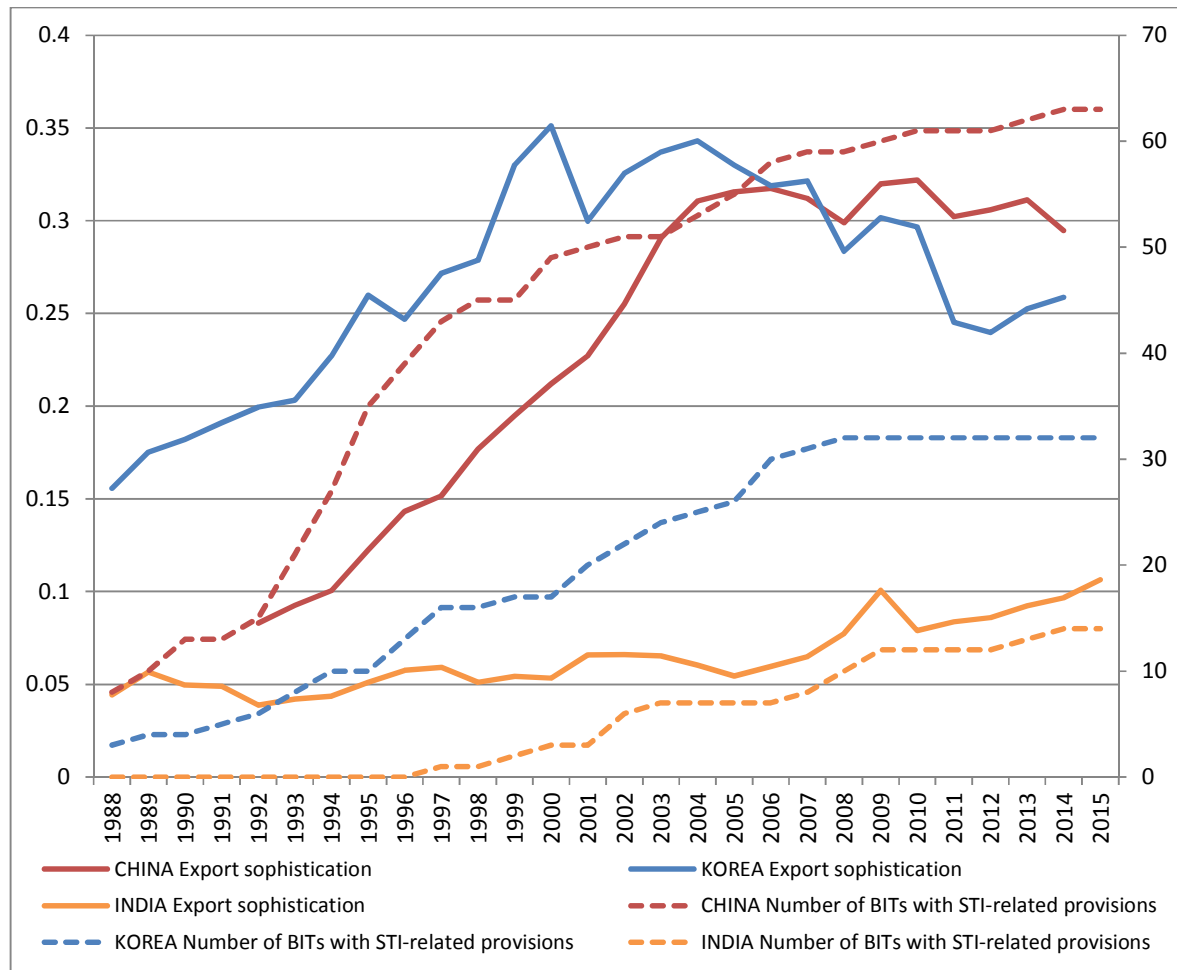


Figure 23: Number of agreements with STI-related provisions (left axis) and share within group (right axis), by groups of minimum export sophistication



For the second part we have examined the three most common BIT-partners; China, Republic of Korea, India. For these countries, cumulative numbers of BITs which entered into force with STI provisions were traced and compared with the changes of the level of export sophistication over time. One can draw similar trends between these two trends, although for Republic of Korea, it is not as clear as other two countries. The evolution of export sophistication, in turn, STI development, is impacted by numerous factors; therefore attributing any change to one factor, such as the signing of a BIT with STI-related provision is difficult. However, it is noted that over time, their export sophistication values and cumulative number of BITs with STI provisions are correlated.

Figure 24: Export sophistication and cumulative numbers of BITs with STI provisions entered into force, three main countries, 1988-2015



Conclusions – To be completed

References

- Aitken, B.J. and Harrison, A (1999) Do domestic firms benefit from direct foreign investment? Evidence from Venezuela. *American Economic Review*, pages 605–618.
- Anand, R, Mishra, S, and Spatafora, N (2012). Structural Transformation and the Sophistication of Production. *IMF Working Paper*. Available from <https://www.imf.org/external/pubs/ft/wp/2012/wp1259.pdf>
- Berger, Axel (2015). Financing global development: can foreign direct investments be increased through International Investment Agreements? Available from <https://www.die-gdi.de/en/briefing-paper/article/financing-global-development-can-foreign-direct-investments-be-increased-through-international-investment-agreements/>
- Berger, Axel, et al. (2010). Do Trade and Investment Agreements Lead to More FDI? Accounting for Key Provisions Inside the Black Box. *Kiel Working Papers*, No. 1647. Available from https://www.ifw-members.ifw-kiel.de/publications/do-trade-and-investment-agreements-lead-to-more-fdi-accounting-for-key-provisions-inside-the-black-box/kwp_1647.pdf
- Büthe, Tim, Milner, Helen V. The politics of foreign direct investment into developing countries: increasing FDI through international trade agreements? *American Journal of Political Science*, Vol. 52, No. 4, Octboer 2008, pp. 741-762.
- Fitzgerald, Tomas (2015). Sovereign risk fears around TPP are overblown. Available from <http://theconversation.com/sovereign-risk-fears-around-tpp-are-overblown-39865>
- Friends of the Earth International (2015). Sustainable Development Goals threatened by secret TPP trade deal. Available from <http://www.globalresearch.ca/sustainable-development-goals-threatened-by-secret-tpp-trade-deal/5479442>
- Görg, Holger, and Greenaway, David (2004). Much ado about nothing? Do domestic firms really benefit from foreign direct investment? *The World Bank Research Observer*, vol. 19, no. 2 (Fall 2004).
- Guimón, José (2013). National Policies to attract R&D-intensive FDI in developing countries. Available from https://innovationpolicyplatform.org/sites/default/files/rdf_imported_documents/NationalPoliciesToAttractR&DIntensiveFDIInDevelopingCountries.pdf
- Havranek, Tomas, and Zuzana Irsova (2011). Estimating Vertical Spillovers from FDI: Why Results Vary and What the True Effect Is. *Journal of International Economics*, Vol. 85, No. 2, pp. 234–244.
- Hodgson, Mélida (2015). The Trans-Pacific Partnership investment chapter sets a new worldwide standard. *Columbia FDI Perspectives*. Available from <http://ccsi.columbia.edu/files/2013/10/No-160-Hodgson-FINAL.pdf>
- Houde, M. and K. Yannaca-Small (2004). “Relationships between international Investment Agreements”, *OECD Working Papers on International Investment*, 2004/01, OECD Publishing. https://www.oecd.org/investment/internationalinvestmentagreements/WP-2004_1.pdf

Keller, Wolfgang (2001). International technology diffusion. *NBER Working Paper Series*. Available from <http://www.nber.org/papers/w8573>

Liebenthal, A, Michelitsch, R, Tarazona, E (2003). Extractive Industries and Sustainable Development: An Evaluation of World Bank Group Experience. Available from http://ieg.worldbank.org/Data/reports/extractive_industries_evaluation_overview.pdf

Meyer, Klaus E. (2004). Perspectives on Multinational Enterprises in Emerging Economies, *Journal of International Business Studies*, 34, no. 4, p. 259-277. Stiglitz, Joseph E. (2015, Mar 15). On the wrong side of globalization. *The New York Times*. Available from http://opinionator.blogs.nytimes.com/2014/03/15/on-the-wrong-side-of-globalization/?_r=0

Srholec, M. (2007). High-tech exports from developing countries: A symptom of technology spurts or statistical illusion?. *Review of World Economics*, 143(2), 227-255. Available from http://www.eastwestcenter.org/fileadmin/stored/pics/0707_RWE_Srholec.pdf

United Nations Conference on Trade and Development (2004). International Investment Agreements: Key Issues. Vol. 1.

_____ (2009). The Role of International Investment Agreements in Attracting Foreign Direct Investment to Developing Countries. *UNCTAD Series on International Investment Policies for Development*. Available from http://unctad.org/en/Docs/diaeia20095_en.pdf

_____ (2011a). Scope and definition. *UNCTAD Series on Issues in International Investment Agreements II*. Available from http://unctad.org/en/Docs/diaeia20102_en.pdf _____ (2011b). Fair and Equitable Treatment. *UNCTAD Series on Issues in International Investment Agreements II*. Available from http://unctad.org/en/Docs/unctaddiaeia2011d5_en.pdf

_____ (2014). Investor-State Dispute Settlement. *UNCTAD Series on Issues in International Investment Agreements II*. Available from http://unctad.org/en/PublicationsLibrary/diaeia2013d2_en.pdf

United Nations, Economic and Social Commission for Asia and the Pacific (2015). Asia-Pacific Trade and Investment Report 2015: supporting participation in value chains. Sales No. E.15.II.F.15. Available from <http://www.unescap.org/resources/asia-pacific-trade-and-investment-report-2015-supporting-participation-value-chains>

_____ (2016). Harnessing Science, Technology & Innovation for Inclusive and Sustainable Development in Asia and the Pacific. Sales No. E.16.II.F.12.

United Nations Industrial Development Organization (2015). Industrial Development Report 2016. The Role of Technology and Innovation in Inclusive and Sustainable Industrial Development. Vienna.

WTO/IDE-JETRO (2011). Trade Patterns and Global Value Chains in East Asia: From Trade in Goods to Trade in Tasks. Available from https://www.wto.org/english/res_e/booksp_e/stat_tradePAT_globvalchains_e.pdf