Quantifying TPP and TTIP Spillovers on India

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Abstract: The Trans-Pacific Partnership and Transatlantic Trade and Investment Partnership will impact on substantive market regulations in a wide a range of areas bearing on market access, both by establishing substantive new horizontal and sectoral standards and by establishing requirements regarding institutional and procedural approaches to domestic market regulation. Network effects, including through other agreements involving TPP/TTIP economies, and global supply chains organized by firms in the TPP/TTIP jurisdictions, will have the effect of broadening the reach of TPP/TTIP measures beyond the immediate parties to the agreement. This study employs the global dynamic multi-region multi-sector model, GDyn, to draw inferences concerning the impact on India of the likely outcome of the TPP and TTIP in respect of market regulation. Both tariff and NTB reductions associated with TPP/TTIP as well as the rise in standards have an overall negative effect on India. Compliance with labour standards is the most costly scenario for India. On the other hand, not complying with the emerging global standards would prove counter-productive for India's exports. Based on this analysis, the study considers the preparations that India might contemplate to maintain its competitive position in global markets. The study comments on priorities based on the scale of likely impacts in different areas.

Keywords: India, TPP, TTIP, spillovers, market regulation, standards

JEL Codes: F1, F3, F4, F6, F13, F14, F15, F23, F68

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1. Introduction

The shift of activity in global rule-making from the World Trade Organisation (WTO) to preferential trade negotiations has raised interest in assessing the potential spillover effects on non-participants. Two of these negotiations – the Trans Pacific Partnership (TPP) and Trans-Atlantic Trade and Investment Partnership (TTIP) – are of particular relevance in this regard given their focus on developing WTO-plus rules in a range of areas and the fact that the parties to these negotiations host many of the multinational enterprises (MNEs) that organize global value chains and through them impose private standards on third-party suppliers.[1] If these negotiations achieve their stated levels of ambition, the standards emanating from these agreements would establish a new de facto WTO-plus trade rules regime for much of the global economy.

Preferential trade agreements raise both negative and positive spillovers. Negative spillovers are generally associated with trade and investment diversion and are routinely taken into account in quantitative modelling of trade agreements. Positive spillovers in the form of increased demand for third party exports stemming from income effects of trade agreements are also routinely factored into quantitative assessment. More recently, additional positive spillovers have been identified from regulatory convergence. The core idea is that regulatory heterogeneity increases trade costs, especially the fixed costs of market entry (Kox and Lejour, 2006; Kox and Nordas, 2007). By the same token, regulatory convergence, especially between the pace-setting major markets, reduces these costs, not only for the harmonizing jurisdictions but for third parties that sell into these markets, and even possibly for trade between third parties insofar as they individually and unilaterally harmonize to the standards set by the global leaders.

Positive spillover effects from regulatory convergence have been analysed in several quantitative studies, all focussing on the TTIP. CEPR (2013), Lejour et al. (2014) and Cai et al. (2015) take into account both direct spillovers (a reduction in trade-related costs for third parties due to regulatory harmonization between the EU and US) and indirect spillovers (from adoption of compatible regulatory reforms by third parties). In the CEPR study, the reduction of trade costs also extends to trade amongst third parties themselves.

Comparatively little attention has been paid to the costs incurred by countries upgrading their regulations because of regulatory convergence, which is an additional form of spillover. Petri, Plummer and Zhai (2011) assign a negative weight for labour and environmental standards in constructing their goods NTB shocks, implying that TPP measures to enhance labour and environmental standards raise rather than lower goods NTBs. Ciuriak and Xiao

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[1] Other mega-regionals of note include the Regional Comprehensive Economic Partnership (RCEP) which involves ASEAN and its "Plus-One" partners – China, India, Japan, Korea and Australia-New Zealand – and the Trade in Services Agreement (TISA) which now counts 25 participants, including the key parties to the TPP and TTIP – the United States, the EU and Japan. Successful conclusion of the RCEP and TISA negotiations would have important market access implications for non-parties; however, the issues of regulatory spillovers can be adequately addressed from consideration of the TPP and TTIP alone since RCEP is unlikely to advance the rules agenda and the TISA outcomes on rules will likely mirror the outcomes of TPP and TTIP, given the dominant presence of the US and EU in these respective negotiations.

(2015) incorporate labour and capital cost increases on lower income countries for meeting environmental and labour standards for their exports to the TTP-TTIP economies. However, this study does not take into account the implications of capital modernization for productivity.

Finally, while some studies introduce a trade-increasing liberalization shock from the adoption of higher intellectual property standards (e.g., Petri, Plummer and Zhai, 2011, assign a positive weight to the intellectual property provisions in reducing NTBs), additional compliance costs for meeting these higher standards are not incorporated.

Accordingly, on a number of counts, the existing treatment of spillovers remains incomplete.

There has also been comparatively little attention paid to the spillover impacts on India. While India is typically mentioned in spillover studies, it has not been the prime focus of attention in the existing literature. One reason is that India is not a major player in the import markets of the major TPP/TTIP partners: India's exports constitute merely 2% of US imports, 1% of EU imports and less than 1% of Japan's imports.

Nonetheless, India is a leading economy in the world, with the third largest GDP in purchasing power parity terms and on track to be even larger in the coming years. Moreover, TPP/TTIP partners are important to India: of India's total exports, over 50% go to countries involved in TPP/TTIP negotiations; about 40% of its imports originate from these countries. Further, India has deep inter-connections with TPP/TTIP countries via global supply chains. Thus, any major policy initiative by these countries is likely to affect India significantly.

India's government is focusing on reinvigorating growth in what is now clearly a post-BRICs era. This calls for a strategic approach to respond to the spillover effects of the TPP and TTIP (Ciuriak and Singh, 2015; Ciuriak, 2015). This study takes up the question of the scale of the challenges that the TPP and TTIP could potentially pose for India by attempting to develop as comprehensive an assessment of the spillovers as is possible, given the current state of the art in quantitative trade modelling. Since we focus on risks, we adopt a high level of ambition for the outcomes of the TPP and TTIP.

We contribute to the existing literature on the spillovers from the TPP and TTIP by including a comprehensive set of spillovers in our analysis. Further, we focus on India, which faces important choices in how to respond to the mega regionals.

This paper is organized as follows; section 2 describes the methodology; section 3 sets out the results; and section 4 draws out the implications for India. Annex 1 provides detailed tables documenting the quantitative framework and the detailed results in tabular form.

2. Methodology

In this section, we describe the model employed for the analysis, the assumptions underlying the baseline projection for the dynamic simulations, and the assumptions concerning the TPP/TTIP policy shocks. Further, we underline the methodological caveats of the study.

2.1 Model Description

We implement simulations based on the GTAP dynamic model (GDyn). GDyn is a multi-sector, multi-region, recursive dynamic computable general equilibrium (CGE) model. The model is described in Ianchovichina and McDougall (2001). Detailed information on GDyn database construction and parameterization of the model, as well as various applications of GDyn model are available in Ianchovichina and Walmsley (2012).

GDyn model adopts a disequilibrium approach to modelling capital mobility, allowing short- and medium-run differences in the rates of return across regions, implying imperfect capital mobility over the medium term. The dynamics of capital adjustment eliminate these differences in the long run, resulting in long-run perfect capital mobility across regions.

Investment in a given region, allocated by the global trust, depends on two factors: expectations on the rates of return and the global balance between investment and savings. Capital drifts away from regions with lower expected rates of return to those with higher ones. Over time, therefore, the expected rates of return come down, resulting in the equalization of expected and actual net rates of return within and across regions in the long run.

Financial assets (equity interests in physical capital) are incorporated in the model to capture the welfare effects of international capital mobility. In this accounting system, firms own physical capital, but rent land and natural resources from regional households, which also own financial assets, laying indirect claims on physical capital. Regional households hold equity in firms in all regions through a fictional entity called "global trust" that allocates foreign investment. Thus, their wealth is the sum of their equities in domestic firms and in the global trust. The saving of each regional household is allocated to domestic and foreign investment, on the assumption that the shares of domestic and foreign investments are held constant, subject to adding-up constraints to balance regional accounts. The model does not attempt to capture real financial sector dynamics.

GDyn has been shown to be able to realistically capture trade and investment dynamics (Ianchovichina, Hertel and Walmsley, 2014). For example, Walmsley, Hertel and Ianchovichina (2006) accurately anticipated the degree and timing of the tapering off of China's high growth and inflows of Foreign Direct Investment (FDI). This practical validation provides some confidence in the application of the GDyn model for the present purpose.

2.2 Baseline projection

For the purposes of our study, we run the model on the GTAP 8.1 Data Base, documented in Narayanan et al. (2012). The model's base year is 2007. We work with 22 countries/regions and 32 sectors, aggregated from the 134 countries/regions and 57 sectors available in the complete GTAP 8.1 Data Base. Annex 1, Table 1A sets out the region/sector aggregations.

We project the database to 2030 drawing on historical and estimated data for GDP, population and labour supply for the period to 2015 and on long-run projections from Chappuis and Walmsley (2011) for the period to 2030. These long-run projections are derived from Fouré, Bénassy-Quéré and Fontagné (2010, 2013), who develop projections for 128 countries to 2050, based on a three-factor production function (capital, labour and energy), accounting for the energy constraint through dynamic modelling of energy productivity, and applying a Feldstein-Horioka-type relationship between savings and investment rates.

We assume in the baseline that the supply of factors other than capital and labour is exogenous. Capital supply in the model is determined by the savings-investment module described above, while labour supply, for both skilled and unskilled labour, adjusts to keep the real factor price of labour fixed. In other words, this is a labour-unconstrained baseline, wherein there is unlimited supply of labour to draw from, for economic growth implied by the GDP baseline.

For convenience, we assume that the recently concluded WTO Trade Facilitation Agreement (TFA) is completely implemented by all countries by 2015. We implement this assumption by removing all the tariff equivalents of time as a barrier to trade, as estimated by Minor and Hummels (2011), by 2015. This reduces the goods sector NTBs in the baseline, hence reducing the scope for the TPP/TTIP to further boost trade.

Annex 1, Table 2A summarizes the baseline assumptions employed in this study. Almost across the board, poorer countries are expected to grow faster in terms of GDP than the developed economies. India is also expected to grow faster in terms of population and labour force. We note that there is a visible shift towards skilled labour and away from unskilled labour in many countries; this comes from the IIASA baseline for labour force, which takes into account the global trend towards improved educational and human capital attainment that would lead to increased availability of skilled labour force.[2]

2.3 Closures

Under the GTAP model's default microeconomic closure, factor endowments (i.e., the total supply of labour, both skilled and unskilled, as well as of capital and land) are fixed and factor prices adjust to restore full employment of the factors of production in the post-shock equilibrium.[3] Alternatively, the return to capital or to labour can be fixed and the supply of capital and/or labour then adjusts to restore equilibrium.[4] In the GDyn model, investment adjusts to changes in the rate of return. In addition, by fixing wage rates, we allow labour supply to adjust to changes in wages. As a result, the TPP/TTIP impacts generate "endowment" effects: that is, the amount of labour and capital in an economy change based

[2] See, International Institute for Applied Systems Analysis (IIASA), documented in KC et al (2010).
[3] This is sometimes described as reflecting a medium-term time horizon in which labour supply is relatively "sticky."
[4] The closure rule in which the rate of return to capital is fixed is sometimes described as reflecting longer-run "steady-state" growth conditions.

on changes in returns to labour and capital. Compared to simulations that adopt the default closure, our simulations will show larger impacts on quantities and less impact on prices.

As regards GTAP's macroeconomic closures, two approaches are available. First, the current account can be fixed. This assumes that the external balance is determined entirely by domestic investment-savings dynamics. When trade policy shocks result in unbalanced changes in imports and exports, the original trade balance is then restored by implicit exchange rate adjustments. Alternatively, the current account can be allowed to adjust to the trade shock. The choice of macroeconomic closure can have significant implications for the model outcomes.[5] We adopt the closure where the current account adjusts; this reflects the active role of FDI in our model.

2.4 Description of Policy Shocks

To evaluate the effects of the TPP and TTIP, it is necessary to make assumptions about the content of these agreements and the scale of the resulting policy shocks. The TPP is reportedly largely locked up although the key end-game compromises remain to be worked out (as became clear following the failure of the TPP Ministerial in Maui in July 2015 showed). The TTIP has run into relatively strong headwinds over the issue of regulatory convergence and is both on a slower track than TPP and also less certain in terms of how far, and through which modalities, it will progress.

As our concern is to demarcate the potential scope for spillovers, we adopt assumptions that represent relatively ambitious outcomes. Our scenarios are thus in the nature of a "thought experiment" rather than a forecast. We sketch out these assumptions below.

First, we remove all industrial tariffs between TPP member countries, with some exceptions for key sensitive sectors based on the 'best guess' scenario propounded by Ciuriak and Xiao (2014).[6] For the automotive and textiles and clothing sectors, we assume gradual phase-out of tariffs, consistent with outcomes of past FTAs. For agriculture, we exclude known sensitive sectors, including rice into Japan, sugar into the United States, and dairy into Canada. Otherwise we eliminate the protection in the GTAP v8 Data Base.

Second, for goods NTBs for manufacturing and agricultural sectors, commonly used estimates from Kee, Nicita and Olarreaga (2009, 2013) correspond to the early years of this millennium and are outdated at this point. We use NTBs estimated by Hummels and Minor (2009) for 'time as a barrier to trade' and reduce them as described above to take account of the WTO TFA in developing the baseline projection. The remaining goods NTBs are reduced slightly under the TPP/TTIP, to capture the reduction of duplicative conformity assessment arising from mutual recognition within the TPP/TTIP zone. This amounts to a 0.25% reduction in the cost of trade for manufactured goods, other than electronic products

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[5] See Gilbert (2001) for a comparison of the impact of using alternative macroeconomic closures in modelling the Korea-US FTA. The fixed current account simulations reduce the economic welfare gains for Korea to 3/5 the level of the simulation with flexible current account, and marginally (by 5%) for the United States.

[6] That study identifies sensitivities based on the revealed willingness of parties to make cuts in previous FTAs.

for which we assume such practical measures have already been exhausted, following Ciuriak et al. (2015).

Third, we reduce NTBs in services. We source estimates of the ad valorem tariff equivalents (AVEs) of services NTBs from Wang et al (2009) and Brown, Kiyota and Stern (2010) as implemented by Lee and Itakura (2015). Annex 1, Table 3A provides a summary of the tariff-equivalents of these NTBs. Following Lee and Itakura (2015), these AVEs are introduced into the dataset from 2007 to 2012 and then reduced by up to 20% under the TPP/TTIP.

Fourth, we assume an increase in real wages of unskilled labour in developing countries across the world as a result of increase in labour standards owing to the TPP/TTIP. These increases range from 0% to 20%, in an inversely proportionate way to the level of per-capita GDP of the country; in other words, poorer countries would face a higher increase in real wages, since they would incur higher costs in improving their presumably lower labour standards. Annex 1, Table 4A shows the extent to which we raise the real unskilled wages in these simulations.

Fifth, we adopt a similar schema for environmental standards, based on per-capita income. We identify the sectors in terms of emissions intensity, so as to introduce lower costs of compliance to these standards for less polluting industries across the world. The costs range between 0% and 3% of real costs of capital (also in Annex 1, Table 4A).

Sixth, for compliance with stronger intellectual property rights (IPR) regimes, we impose capital costs ranging between 0% and 3%, again inversely related to per-capita income. We follow USITC (2011) in specifying the shock in this manner and characterize the shock as reflecting higher computer software costs and higher capital costs for non-infringing capital equipment; since all industries use information technology, the shock applies broadly rather than to specific IPR-intensive industries. The specific policy shocks by country are summarized in Annex 1, Table 4A.

Seventh, the rise in productivity due to replacement of vintage capital is derived from the results for Japan shown by Hagiwara and Matsubayashi (2014). This study suggests two things for Japan: a productivity effect of about 0.15% per year and a total replacement-induced productivity gain from 1980 to 2007 that is more than twice the real GDP growth in this period. We assume the former to hold for the developing countries in this study. This is summarized in Annex 1, Table 4A as well.

Eighth, for modelling the expansion in market access due to compliance with standards, we assume that 20% of all the disadvantages created in terms of prices will be recovered by improved market access. This follows the CEPR (2013) assumption.

2.5 Caveats in the Methodology

While the GDyn model is quite robust, a few caveats need to be mentioned at the outset, as regards the data used for the analysis as well as in respect of the simulations.

First, a large number of provisions under negotiation in the TTIP and TPP overlap with the TFA. While we reduce the NTBs by the time cost of border transit, this may not entirely capture the NTB reducing effect of the TFA. Accordingly, our policy shock for goods NTBs might overstate the remaining room for NTB reduction under the TPP/TTIP. [7]

Second, both the TPP and the TTIP measures addressing FDI are understood to be major aspects of those negotiations. While our model does capture investment dynamics across the world quite rigorously, we do not explicitly incorporate liberalization of FDI.

Third, the shocks on services NTBs are based on ad valorem equivalents estimated by Itakura and Lee (2014); these shocks are substantially greater than has been realized in past FTAs; see, for example, the discussion in Ciuriak et al., 2014, concerning the discrepancy between services NTB shocks estimated in conventional fashion versus based on exact coding of the legal text of the Canada-Korea FTA against the OECD's Services Trade Restrictiveness Index (STRI). The scale of the shock may nonetheless be justified on grounds of reduced uncertainty about market access due to binding of commitments. Similar reservations and considerations abou the source of impact would hold for the NTBs in goods sectors as well.

Fourth, we do not explicitly take into account utilization of preferences or the costs of utilizing preferences. Utilization of preferences involved in goods trade is often low, especially for the exporters from developing countries. This has been illustrated for example in Mimouni, Narayanan and Pichot (2014). There are several reasons behind this, such as lack of awareness among the exporters, high costs of certification and compliance to meet the preferences, rules of origin, etc. Data on utilization employed by Mimouni, Narayanan and Pichot (2014) stand on a comprehensive transaction-level dataset on exports to certain parts of the world, mainly the EU and the US. We could not, however, incorporate this into our study, since this is needed for other countries as well to yield meaningful results. Thus, again, by not accounting for these costs of utilization, we are likely to be over-estimating the economic impacts of these trade agreements

Fifth, our framework lacks the linkages to fully capture the impact of increased protection for IPRs. In principle, in addition to raising capital costs through reduced access to IPR-infringing software and capital goods, increased IPRs create rents for producers, which in turn induce innovation and investment. The required market structure to capture increased rents is imperfect competition which includes markups; this mechanism is not available in the GDyn model, nor is an innovation module that would translate increases in rents for IPR-protected firms into investment in R&D. Since the benefit of increased R&D would likely flow primarily to the leading R&D centres (the US, the EU, and Japan), the absence of these additional linkage for purposes of our study of spillovers on India is relatively limited. Further, the specification of our shock is relatively crude; in USITC (2011), which focussed on China's use of IPR-infringing software and hardware, the policy shock was differentiated

[7] A related caveat pertains to the timing of implementation of the TFA versus the TPP/TTIP. For convenience we have assumed full implementation of all three as of 2015 for convenience. This may affect which agreement actually would be the first mover and which could thus claim credit for particular impacts.

across sectors based on estimates of the share of these capital inputs by sector. This could not be attempted within the scope of the present project and we adopted the simpler approach described above.

Sixth, we do not deal with liberalization of public procurement. This is of limited consequence since it is well established that most procurement is done through local presence in procurement markets (see, e.g., Kutlina-Dimitrova and Lakatos, 2014).

Finally, we tested the sensitivity of the results to different baselines. One entails assuming a faster growing set of economies in TPP and TTIP partners, while the second one involves assuming a faster growing non-TPP/non-TTIP countries. Since we found the results to be broadly in line with our base case, we do not report them as they add little value.

All these observations strengthen our view that the results from this analysis must be seen as an upper bound of what could happen in reality.

3. Results

Table 1 summarizes the net impacts from the combined TPP and TTIP policy shocks. It shows the impact on real GDP in percentage terms in 2030, once the full effects of the TPP and TTIP policy shocks have been absorbed by the economy, for each policy measure and the total.

Table 1: Real GDP Impact of TPP and TTIP combined – all measures, 2030

	Goods (TPP)	Goods (TTIP)	Services NTBs	Labour standards	Environ-mental Standards	Stronger IPRs	Vintage Capital	Standards Harmonization	Total
EU28	0.20	0.20	0.75	0.28	0.19	0.13	0.15	0.07	1.97
USA	0.20	0.22	0.27	0.34	0.19	0.13	0.12	0.05	1.52
Japan	0.30	0.23	0.17	0.38	0.24	0.16	0.18	0.06	1.72
Singapore	0.00	-0.04	0.00	-0.03	-0.03	-0.02	0.01	0.02	-0.09
Malaysia	0.20	-0.08	-0.05	-0.14	-0.08	-0.05	0.42	0.02	0.24
Vietnam	0.70	-0.01	0.08	-0.69	0.00	0.00	0.39	0.04	0.51
Australia	0.10	0.01	0.26	0.03	0.01	0.01	0.02	0.02	0.46
New Zealand	0.20	0.11	0.26	0.17	0.12	0.08	0.09	0.04	1.07
Canada	0.20	0.11	0.14	0.19	0.12	0.08	0.09	0.03	0.96
Mexico	-0.10	-0.08	-0.02	-0.11	-0.08	-0.05	0.36	0.06	-0.02
Chile	0.00	0.01	0.04	0.11	0.02	0.01	0.43	0.01	0.63
Peru	0.20	0.05	0.11	-0.24	0.06	0.04	0.55	0.02	0.79
India	**-0.50**	**-0.46**	**-0.41**	**-2.00**	**-0.45**	**-0.30**	**0.26**	**0.42**	**-3.44**
China	-0.50	-0.46	-0.54	-1.01	-0.46	-0.31	0.37	0.44	-2.47
Taiwan	-0.20	-0.19	-0.24	-0.04	-0.19	-0.13	-0.27	0.19	-1.07
Korea	0.20	0.17	0.11	0.34	0.18	0.12	0.10	0.04	1.26
Indonesia	-0.30	-0.31	-0.39	-0.73	-0.31	-0.21	0.26	0.31	-1.68
Philippines	-0.30	-0.30	-0.35	-0.74	-0.30	-0.20	0.22	0.29	-1.68
Thailand	-0.20	-0.13	-0.15	-0.27	-0.12	-0.08	0.44	0.13	-0.38
Rest of ASEAN	0.10	-0.07	-0.06	-0.10	-0.06	-0.04	0.36	0.03	0.16
Russia	0.00	0.00	0.07	-0.01	0.00	0.00	0.37	0.00	0.43
ROW	-0.10	-0.11	-0.05	-0.48	-0.10	-0.07	-0.14	0.09	-0.96

Source: calculations by the authors.

Overall, the US and the EU boost their GDP and employment quite considerably from what, by our assumptions, is a highly ambitious outcome to these negotiations. Japan also makes very significant gains in both level and percentage terms. Most of the other TPP parties make gains, but not all. Compared to the usual rankings of size of gains in TPP and other potential agreements such as the Free Trade Area of the Asia-Pacific, the present simulations more or less stand the rankings on their head – the advanced economies make the largest overall gains and the developing countries make the smaller gains. Accordingly, taking into account compliance costs of meeting higher standards reverses the relative gains from the TPP, with the major share now going to the advanced economies.

For excluded parties, the results are mostly negative, although some economies in our simulation benefit more from the positive spillovers than are hurt by the negative spillovers – Korea, Russia, and the Rest of ASEAN for example come out ahead.

India, closely followed by China, stands out as the main loser from the TPP and TTIP. India's real GDP is projected to be 3.44% lower in 2030 with both the TPP and TTIP in place than without these agreements being signed. The impact is greater on investment than on labour, with the capital stock 5.39% lower in 2030 than it otherwise would have been. The employment losses are greater for unskilled than for skilled workers.

We next unpack these results according by policy shock; the main results are as follows (see Tables in Annex B for the details):

- **Goods sector liberalization under the TPP (tariffs and NTBs)** results in relatively modest impacts, consistent with the findings of other studies. The usual trade diversion effects are visible with negative changes in employment, investment and GDP in most of the non-TPP developing countries, including India and China.
- Similar results persist when **tariff and goods NTB reductions associated with TTIP** are introduced.
- **Reductions in NTBs in services** have inconsistent impacts on TPP/TTIP parties; excluded parties – including India and China – experience negative impacts comparable to those from goods liberalization.
- The imposition of **higher labour standards** which may be characterized as levelling the playing field for the advanced countries, have that result, with significant gains being made by the advanced countries as the cost of production in India, China and other lower-income developing countries rises. For India, this effect dominates the overall results as real GDP is 2% lower than otherwise would have been the case when this effect is taken into account.
- **Raising environmental standards** has a similar effect, although somewhat smaller for most countries. For India, under our assumptions, the effect is only one-quarter the size of the labour standards shock.
- **Strengthened IPR regulations** have comparatively small effects but systematically favour the more advanced capital-intensive economies, while impacting negatively on less-advanced economies.
- Productivity improvements emanating from the **replacement of vintage capital**, owing to compliance with these standards, recoup some of the negative effects on

employment and GDP for countries that need to make investments to meet higher standards. While obviously it is not possible to draw hard conclusions about the relative size of these impacts, the general order of magnitude would appear to be similar to the negative effect of the increased capital requirements from, say, more stringent IPR requirements.

— Further, **the positive spillovers from standards harmonization** further work to offset the negative impacts on excluded countries, including India and China, while stealing away some of the gains made by some of the developing TPP member countries (Malaysia and Vietnam).

4. Implications for India

It has been widely believed that India stands to lose after the implementation of TPP and TTIP; our results provide support for that view and indeed emphasize the fact that India is the country that stands to lose the most in terms of investment, employment and GDP – in all likelihood, even taking into account the mitigation of the negative impacts of exclusion through gains generated by capital upgrading and cost reduction in trade from standards harmonization with the TPP/TTIP zone.

The results we report should not be considered as a forecast of what the TPP/TTIP will achieve, but rather as a thought experiment to illustrate the implications of what these agreements seek to achieve – to upgrade standards in a variety of areas to level the playing field, which many players in the advanced countries believe to be biased in favour of developing countries. If these goals are not achieved immediately through the TPP/TTIP, they will remain an objective of the advanced countries. TPP and TTIP in this sense stand as symbols and surrogates for the intent.

India's own developmental ambitions require a raising of its standards to those of an advanced economy; our results suggest that these ambitions entail policies to upgrade India's competitiveness through flanking measures aimed at increasing productivity of labour and capital, and the dynamism of India's innovation system – the benefits of modernization of capital and free-riding on standards harmonization within the pro-active integration zones of TPP/TTIP will not suffice.

Further, the risk of significant trade diversion should be addressed through counter-measures. As noted by Ciuriak (2015), these measures would include deepening India's internal market, deepening India's regional free trade agreements with its immediate neighbours, and taking advantage of its participation in the RCEP.

We conclude that India faces particular risk from the shift of global trade and investment rule-making from the inclusive WTO to the exclusive mega-regional forums, especially if the negotiations in the latter fora meet their stated level of ambition. Our simulations suggest that the balance of spillover effects is more likely to be negative than positive; India should prepare accordingly.

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Annex 1: Modelling Framework and Assumptions

Table A1: List of regions and sectors

	Regions		
1	Japan	12	India
2	China	13	Australia
3	Korea	14	New Zealand
4	Taiwan	15	USA
5	Singapore	16	Canada
6	Indonesia	17	Mexico
7	Malaysia	18	Chile
8	Philippines	19	Peru
9	Thailand	20	Russia
10	Vietnam	21	EU28
11	Rest of ASEAN	22	ROW
	Sectors		
1	Rice	17	Non Ferrous Metals
2	Other Grains	18	Metal Products
3	Sugar	19	Machinery
4	Other Crops	20	Electronic Equipment
5	Livestock	21	Motor Vehicles
6	Fossil Fuels	22	Other Transport equipment
7	Natural Resources	23	Other Manufacturing
8	Meat	24	Construction
9	Dairy Products	25	Trade
10	Other Food Products	26	Sea Transport

11	Textiles	27	Air Transport
12	Apparel	28	Other Transport
13	Wood and Paper	29	Communication
14	Petroleum Products	30	Financial Svc
15	Chemical Products	31	Other Private Services
16	Steel	32	Government Services

Source: Assumptions by the authors.

Table A2: Baseline Projections (Average Annual Growth, 2015-2030)

	Population Growth	Unskilled Labour force growth	Skilled Labour force growth	GDP Growth
Japan	-0.46	-1.40	0.49	1.10
China	0.31	-0.33	2.26	7.30
Korea	0.00	-1.09	1.76	1.68
Taiwan	0.24	-0.55	1.73	4.53
Singapore	0.51	-2.67	1.94	1.91
Indonesia	0.71	0.64	3.37	5.39
Malaysia	1.08	0.24	3.87	4.36
Philippines	1.35	1.53	3.56	4.42
Thailand	0.33	-0.78	2.48	4.80
Vietnam	0.82	0.57	3.51	4.59
Rest ASEAN	0.82	0.23	4.33	4.56
India	0.92	1.09	3.68	6.80
Australia	0.85	-0.11	1.51	2.02
New Zealand	0.68	0.03	1.34	2.22
USA	0.72	-0.13	1.58	2.07
Canada	0.82	0.06	0.84	2.14
Mexico	0.61	0.46	2.68	3.21
Chile	0.66	0.33	2.43	2.70
Peru	0.63	0.39	2.56	2.96
Russia	-0.45	-1.36	0.14	2.69
EU28	0.03	-1.55	1.03	1.44
ROW	1.35	1.44	3.51	3.88

Source: Calculations by the authors, based on Fouré, Bénassy-Quéré and Fontagné (2010, 2013)

Table A3: Average Tariff Equivalents (ad valorem, %) of NTBs (2015)

	Goods NTBs (Pre-TFA	Goods NTBs (Post-TFA)	Goods NTB Policy Shock under TPP/TTIP	Services NTBs	Services NTB Policy Shock under TPP/TTIP
India	**82.73**	**65.20**	**0**	**111.70**	**0**
Australia	49.36	27.46	0.03	15.38	3.03
New Zealand	44.12	22.09	0.02	10.75	2.29
USA	60.69	34.43	0.04	6.80	0.83
Canada	55.42	27.21	0.02	18.64	1.72
Mexico	78.32	53.96	0.05	50.32	10.11
Chile	69.34	48.21	0.05	22.35	4.15
Peru	75.28	42.75	0.04	43.24	8.72
Russia	96.21	72.86	0	65.64	0
EU28	59.35	39.28	0.03	8.56	1.01
ROW	59.36	38.12	0	40.52	0
Others	~60	~40	0	~30	0

Source: Adapted by the authors from Wang et al (2009), Brown, Kiyota and Stern (2010) and Lee and Itakura (2015)

Table A4: Increases in Costs and Productivity from Standards Compliance (2015-30)

	Labour Standards**	Environmental Standards*	IP rules*	Vintage Capital***
Japan	0.00	0.00	0.00	0.00
China	5.75	0.58	0.86	2.30
Korea	0.74	0.07	0.11	0.00
Taiwan	0.93	0.09	0.14	2.30
Singapore	0.42	0.04	0.06	2.30
Indonesia	8.36	0.84	1.25	2.30
Malaysia	2.29	0.23	0.34	2.30
Philippines	9.90	0.99	1.48	2.30
Thailand	4.36	0.44	0.65	2.30
Vietnam	20.00	2.00	3.00	2.30
Rest ASEAN	20.00	2.00	3.00	2.30
India	14.66	1.47	2.20	2.30
Australia	0.00	0.00	0.00	0.00
New Zealand	0.00	0.00	0.00	0.00
USA	0.00	0.00	0.00	0.00
Canada	0.00	0.00	0.00	0.00
Mexico	1.65	0.16	0.25	2.30
Chile	1.63	0.16	0.24	2.30
Peru	4.26	0.43	0.64	2.30
Russia	1.76	0.18	0.26	2.30
EU28	0.00	0.00	0.00	0.00
ROW	4.74	0.47	0.71	2.30

Notes:

*: Average % rise in real capital costs in different sectors

**: Average % rise in real labour costs in different sectors

***: Average % rise in productivity owing to replacement of vintage capital resulting from adoption to standards

Annex 2: Detailed Modelling Results

Table B1: TPP tariff shock impacts (% change unless otherwise specified), 2030

	Unskilled Employment	Skilled Employment	Investment	GDP	GDP (change in $ Millions)
EU28	0.12	0.17	0.42	0.20	25,599
USA	0.16	0.19	0.35	0.20	26,676
Japan	0.27	0.37	0.80	0.30	15,041
Singapore	0.02	0.03	0.00	0.00	0
Malaysia	0.23	0.39	0.65	0.20	470
Vietnam	0.87	1.33	3.53	0.70	743
Australia	0.11	0.12	0.23	0.10	1,196
New Zealand	0.20	0.22	0.43	0.20	387
Canada	0.21	0.22	0.29	0.20	3,931
Mexico	0.00	0.00	-0.01	-0.10	-743
Chile	0.10	0.10	0.18	0.00	99
Peru	0.27	0.23	0.44	0.20	264
India	-0.13	-0.17	-0.83	-0.50	-8,521
China	-0.11	-0.15	-0.84	-0.50	-29,780
Taiwan	-0.08	-0.10	-0.34	-0.20	-920
Korea	0.11	0.16	0.33	0.20	1,720
Indonesia	-0.08	-0.11	-0.40	-0.30	-2,427
Philippines	-0.09	-0.10	-0.49	-0.30	-575
Thailand	-0.06	-0.09	-0.38	-0.20	-552
Rest of ASEAN	0.18	0.48	0.70	0.10	94
Russia	0.02	0.04	0.28	0.00	-31
ROW	-0.04	-0.06	-0.14	-0.10	-18,088

Table B2: TTIP tariff shock Impacts (% change unless otherwise specified): 2030

	Unskilled Employment	Skilled Employment	Investment	GDP	GDP (change in $ Millions)
EU28	0.14	0.20	0.52	0.20	28,465
USA	0.18	0.22	0.42	0.22	29,981
Japan	0.16	0.22	0.46	0.23	10,035
Singapore	-0.02	-0.03	-0.09	-0.04	-74
Malaysia	0.00	0.01	-0.12	-0.08	-215
Vietnam	0.04	0.07	0.04	-0.01	-8
Australia	0.01	0.01	-0.05	0.01	86
New Zealand	0.09	0.10	0.12	0.11	193
Canada	0.09	0.10	0.13	0.11	1,906
Mexico	-0.03	-0.03	-0.05	-0.08	-1,060
Chile	0.07	0.06	0.11	0.01	21
Peru	0.06	0.05	0.00	0.05	80
India	-0.11	-0.15	-0.76	-0.46	-8,015
China	-0.11	-0.14	-0.80	-0.46	-28,595
Taiwan	-0.07	-0.09	-0.29	-0.19	-851
Korea	0.13	0.18	0.38	0.17	1,875
Indonesia	-0.05	-0.08	-0.31	-0.31	-2,237
Philippines	-0.09	-0.10	-0.49	-0.30	-571
Thailand	-0.03	-0.04	-0.25	-0.13	-403
Rest of ASEAN	0.02	0.12	0.01	-0.07	-61
Russia	0.03	0.04	0.32	0.00	21
ROW	-0.04	-0.05	-0.12	-0.11	-17,064

Table B3: Services NTB reduction (% change unless otherwise specified): 2030

	Unskilled Employment	Skilled Employment	Investment	GDP	GDP (change in $ Millions)
EU28	0.56	0.78	1.95	0.75	106,910
USA	0.21	0.27	0.28	0.27	35,867
Japan	0.12	0.15	0.05	0.17	7,249
Singapore	0.02	0.07	-0.15	0.00	-9
Malaysia	0.04	0.16	-0.19	-0.05	-134
Vietnam	0.14	0.34	0.42	0.08	85
Australia	0.23	0.29	0.16	0.26	3,028
New Zealand	0.22	0.28	0.23	0.26	437
Canada	0.12	0.14	0.04	0.14	2,378
Mexico	0.03	0.02	-0.19	-0.02	-323
Chile	0.08	0.10	-0.01	0.04	97
Peru	0.11	0.09	-0.03	0.11	159
India	-0.09	-0.10	-0.93	-0.41	-7,096
China	-0.13	-0.17	-1.18	-0.54	-33,444
Taiwan	-0.10	-0.11	-0.55	-0.24	-1,061
Korea	0.08	0.13	0.03	0.11	1,217
Indonesia	-0.11	-0.15	-0.70	-0.39	-2,778
Philippines	-0.11	-0.10	-0.76	-0.35	-652
Thailand	-0.02	0.00	-0.47	-0.15	-461
Rest of ASEAN	0.04	0.21	-0.08	-0.06	-54
Russia	0.05	0.08	0.21	0.07	1,082
ROW	0.02	0.03	-0.20	-0.05	-6,874

Table B4: Rise in Labour Standards (% change unless otherwise specified): 2030

	Unskilled Employment	Skilled Employment	Investment	GDP	GDP (change in $ Millions)
EU28	0.56	0.78	1.95	0.75	106,910
USA	0.21	0.27	0.28	0.27	35,867
Japan	0.12	0.15	0.05	0.17	7,249
Singapore	0.02	0.07	-0.15	0.00	-9
Malaysia	0.04	0.16	-0.19	-0.05	-134
Vietnam	0.14	0.34	0.42	0.08	85
Australia	0.23	0.29	0.16	0.26	3,028
New Zealand	0.22	0.28	0.23	0.26	437
Canada	0.12	0.14	0.04	0.14	2,378
Mexico	0.03	0.02	-0.19	-0.02	-323
Chile	0.08	0.10	-0.01	0.04	97
Peru	0.11	0.09	-0.03	0.11	159
India	-0.09	-0.10	-0.93	-0.41	-7,096
China	-0.13	-0.17	-1.18	-0.54	-33,444
Taiwan	-0.10	-0.11	-0.55	-0.24	-1,061
Korea	0.08	0.13	0.03	0.11	1,217
Indonesia	-0.11	-0.15	-0.70	-0.39	-2,778
Philippines	-0.11	-0.10	-0.76	-0.35	-652
Thailand	-0.02	0.00	-0.47	-0.15	-461
Rest of ASEAN	0.04	0.21	-0.08	-0.06	-54
Russia	0.05	0.08	0.21	0.07	1,082
ROW	0.02	0.03	-0.20	-0.05	-6,874

Table B5: Increased Environmental Standards (% change unless otherwise specified): 2030

	Unskilled Employment	Skilled Employment	Investment	GDP	GDP (change in $ Millions)
EU28	0.13	0.18	0.49	0.19	26,990
USA	0.15	0.18	0.33	0.19	25,298
Japan	0.17	0.23	0.49	0.24	10,252
Singapore	-0.01	-0.02	-0.06	-0.03	-58
Malaysia	0.00	0.01	-0.11	-0.08	-211
Vietnam	0.04	0.07	0.07	0.00	-4
Australia	0.02	0.02	-0.03	0.01	157
New Zealand	0.09	0.11	0.15	0.12	209
Canada	0.11	0.11	0.17	0.12	2,170
Mexico	-0.02	-0.03	-0.03	-0.08	-999
Chile	0.08	0.08	0.13	0.02	43
Peru	0.07	0.06	0.02	0.06	88
India	-0.10	-0.14	-0.72	-0.45	-7,809
China	-0.10	-0.13	-0.78	-0.46	-28,181
Taiwan	-0.07	-0.08	-0.27	-0.19	-821
Korea	0.13	0.19	0.41	0.18	1,954
Indonesia	-0.05	-0.07	-0.29	-0.31	-2,195
Philippines	-0.08	-0.10	-0.47	-0.30	-563
Thailand	-0.02	-0.03	-0.22	-0.12	-381
Rest of ASEAN	0.02	0.13	0.03	-0.06	-59
Russia	0.03	0.04	0.34	0.00	62
ROW	-0.03	-0.04	-0.10	-0.10	-15,637

Table B6: Increased IPR Protection (% change unless otherwise specified): 2030

	Unskilled Employment	Skilled Employment	Investment	GDP	GDP (change in $ Millions)
EU28	0.09	0.13	0.30	0.15	21,175
USA	0.08	0.11	0.15	0.12	16,185
Japan	0.12	0.16	0.28	0.18	7,851
Singapore	0.02	0.04	0.04	0.01	19
Malaysia	0.22	0.41	0.53	0.42	1,094
Vietnam	0.15	0.29	0.85	0.39	399
Australia	0.01	0.02	0.01	0.02	234
New Zealand	0.05	0.06	0.07	0.09	151
Canada	0.06	0.07	0.08	0.09	1,505
Mexico	0.25	0.38	0.51	0.36	4,744
Chile	0.34	0.45	0.54	0.43	1,140
Peru	0.61	0.59	1.15	0.55	808
India	0.1	0.21	0.16	0.26	4,524
China	0.1	0.18	0.07	0.37	22,584
Taiwan	-0.12	-0.16	-0.43	-0.27	-1,189
Korea	0.05	0.08	0.14	0.10	1,081
Indonesia	0.15	0.27	0.48	0.26	1,825
Philippines	0.18	0.28	0.25	0.22	413
Thailand	0.18	0.32	0.52	0.44	1,368
Rest of ASEAN	0.15	0.44	0.59	0.36	330
Russia	0.18	0.27	1.11	0.37	5,756
ROW	-0.09	-0.10	-0.18	-0.14	-21,733

Table B7: Productivity Effects of Vintage Capital Replacement (% change unless otherwise specified): 2030

	Unskilled Employment	Skilled Employment	Investment	GDP	GDP (change in $ Millions)
EU28	0.05	0.07	0.20	0.07	10,208
USA	0.04	0.05	0.08	0.05	6,650
Japan	0.04	0.06	0.11	0.06	2,436
Singapore	0.00	-0.01	0.07	0.02	35
Malaysia	-0.05	-0.12	-0.04	0.02	43
Vietnam	-0.24	-0.41	-1.11	0.04	41
Australia	0.02	0.02	0.01	0.02	228
New Zealand	0.03	0.04	0.05	0.04	68
Canada	0.03	0.03	0.04	0.03	584
Mexico	0.00	0.01	0.06	0.06	745
Chile	0.02	0.02	0.02	0.01	14
Peru	0.03	0.02	0.02	0.02	32
India	0.10	0.13	0.66	0.42	7,225
China	0.10	0.13	0.72	0.44	27,382
Taiwan	0.07	0.08	0.31	0.19	829
Korea	0.03	0.04	0.07	0.04	397
Indonesia	0.06	0.09	0.35	0.31	2,191
Philippines	0.08	0.09	0.46	0.29	540
Thailand	0.03	0.04	0.28	0.13	405
Rest of ASEAN	-0.06	-0.21	-0.14	0.03	23
Russia	0.01	0.01	0.07	0.00	59
ROW	0.02	0.03	0.12	0.09	13,409

Table B8: All Policy Measures Impacts (% change unless otherwise specified): 2030

	Unskilled Employment	Skilled Employment	Investment	GDP	GDP (change in $ Millions)
EU28	1.4	1.96	4.92	1.97	276,922
USA	1.22	1.51	2.45	1.52	203,740
Japan	1.29	1.75	3.41	1.72	75,888
Singapore	0.02	0.07	-0.35	-0.09	-179
Malaysia	0.32	1.01	0.48	0.24	545
Vietnam	-0.49	1.94	3.17	0.51	540
Australia	0.46	0.54	0.2	0.46	5,330
New Zealand	0.9	1.08	1.32	1.07	1,870
Canada	0.9	0.93	1.1	0.96	17,300
Mexico	0.1	0.35	0.26	-0.02	325
Chile	0.89	1.15	1.48	0.63	1,733
Peru	0.69	0.86	0.77	0.79	1,131
India	-2.04	-0.79	-5.39	-3.44	-59,436
China	-0.88	-0.57	-4.47	-2.47	-151,125
Taiwan	-0.43	-0.4	-1.68	-1.07	-4,724
Korea	0.88	1.37	2.5	1.26	13,256
Indonesia	-0.86	-0.15	-1.76	-1.68	-12,327
Philippines	-1.34	-0.32	-2.72	-1.68	-3,190
Thailand	-0.23	0.22	-0.94	-0.38	-1,119
Rest of ASEAN	0.39	1.41	0.91	0.16	143
Russia	0.34	0.59	3.12	0.43	6,841
ROW	-0.86	-0.54	-1.26	-0.96	-148,928