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**Trading Down:  
Unemployment, Inequality and Other Risks of the  
Trans-Pacific Partnership Agreement**

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## **Abstract**

Proponents of the Trans-Pacific Partnership agreement (TPP) emphasize its prospective economic benefits, with economic growth increasing due to rising trade volumes and investment. Widely cited projections suggest modest GDP gains after ten years, varying from less than half a percentage point in the United States to 13 percent in Vietnam. However, these projections assume full employment and constant income distribution in all countries excluding some of the major risks of trade liberalization.

In this paper, we provide alternative projections of the TPP's economic effects using the United Nations Global Policy Model. Allowing for changes in employment and income distribution, we obtain very different results. We find that the benefits to economic growth are even smaller than those projected with full-employment models, and are negative for Japan and the United States. More important, we find that the TPP will likely lead to losses in employment and increases in inequality.

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## **Disclaimer**

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# Trading Down: Unemployment, Inequality and Other Risks of the Trans-Pacific Partnership Agreement

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## 1. Introduction

The Trans-Pacific Partnership (TPP) is an agreement on trade and investment recently negotiated among a diverse group of twelve Pacific rim countries: Australia, Brunei, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, Vietnam and the United States.

According to its proponents, the TPP will generate higher economic growth throughout the area by eliminating tariffs and other obstacles to international trade and investment.

With its coverage of a large share of the world economy, potential implications for several policy areas and a fairly large membership, the TPP bears a close resemblance with the Trans-Atlantic Trade and Investment Partnership (TTIP) discussed by the European Union and the United States. As with its trans-Atlantic homologue, much political emphasis has been placed on the TPP's prospective economic effects.

Several analyses have highlighted potential advantages and risks of the TPP for trade flows, industrial output, wages, international investment and financial stability. Calculating the net effects of these factors on economic growth, employment and income distribution requires making assumptions about how economies adjust to external shocks. Different theories exist to explain these processes. The standard model assumes full employment and invariant income distribution, ruling out the main risks of trade and financial liberalization. Subject to these assumptions, it finds positive effects on growth. An important question, therefore, is how this conclusion changes if those assumptions are dropped.

In this paper, we review existing projections of the TPP and propose alternative ones based on more realistic assumptions about economic adjustment and income distribution. We start from the trade projections put forward in the main existing study and explore their macroeconomic consequences using the United Nations Global Policy Model.<sup>4</sup>

We find negative effects on growth in the United States and in Japan. We also find increasing inequality and job losses in all participating economies. Overall, we project the loss of 770,000 jobs, with the largest losses occurring in the United States. Furthermore, we project negative effects on growth and employment in non-TPP countries. This increases the risk of global instability and a race to the bottom, in which labor incomes will be under increasing pressure.

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<sup>4</sup> An alternative would be to assume that TPP will lead to a given increase in the trade deficit and calculate the effects on growth and employment. As a matter of fact, data for US indicate that the trade deficit has increased despite the proliferation of trade agreements (BEA, 2015). However, to facilitate comparisons, we adopt the estimates of TPP's effects on trade of standard trade models.

This paper takes no position on the overall desirability of the TPP, and makes no policy recommendation. Instead, it seeks to provide policymakers with the most realistic projections of how the TPP would impact macroeconomic performance.

## 2. Existing Studies of the TPP

Many commentators have emphasized effects of the TPP that would not be strictly economic, especially those on national legal orders and those on the global geopolitical structure. The former are mainly related to the enforcement of intellectual property rights to the Investor-State Dispute Settlement (ISDS) mechanism. The latter are mainly related with the effects that the TPP would have on current power blocs.

Although such non-economic effects are arguably the most important effects of TPP, they are not the focus of our analysis. In this paper we only consider the main economic effects.

Many studies have analyzed the likely economic effects of the TPP on specific sectors or countries. While advocates anticipate that the agreement will increase exports and export-related employment (Schott, Kotschwar and Muir, 2013), critics have pointed out risks for total employment, labor incomes and inequality. This section summarizes the main findings of previous research.

### 2.1. *Critical Perspectives on the TPP*

According to Rosnick (2013), the TPP will push down median wages in the United States making the vast majority of workers worse off. Also focusing on the US, Beachy (2015) points out that the TPP extends the model of the North American Free Trade Agreement with risks in terms of higher trade deficits, job losses and downward pressure on wages. Analyzing the impact of the Korea-US trade agreement, Scott (2013) has noted that actual gains from the TPP are not likely to meet expectations and that FTAs are not effective instruments of job creation. Focusing on sectoral effects, Bivens (2015) has warned that the TPP risks leading to lower demand for labor-intensive, domestic-oriented production in favor of capital-intensive, export-oriented production. As a result, the TPP may lead to lower employment and higher inequality within countries.

Ffrench-Davis *et al.* (2015) have warned that the TPP provisions to liberalize capital flows eliminate important safeguards against the diffusion of financial crises. Finally, a study published by the US Department of Agriculture (Burfisher *et al.*, 2014) finds that the TPP will lead to expansion of agricultural trade for the US. Interestingly, the study uses a global economic model, although it mainly discusses results for agriculture, and finds lower impact on GDP than other studies that use the same model.<sup>5</sup>

Other studies have focused on aggregate economic impacts in specific countries. Using the GTAP model<sup>6</sup>, Kawasaki (2011) has projected positive effects of the TPP for Japan. Analyzing the impact on Malaysia, Banga (2015) has pointed out that the common emphasis on exports is misleading. In fact, with production processes increasingly involving multiple countries (a

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<sup>5</sup> See section 2.2.

<sup>6</sup> For more details on this type of model, see below the analysis of Petri, Plummer and Zhai (2012).

phenomenon known as globalization of value chains), higher exports cannot be assumed to increase a country's income. Only exports with a relatively high content of domestic value added contribute to national income. Based on this analysis, the TPP's effects on Malaysia are estimated to be negative overall.

Assessments have been also for non-participating countries. For example, Narayanan and Sharma (2014) have estimated a mixed outcome for India, while Thorstensen and Ferraz (2014) have estimated negative effects on Brazil.

Only a few studies have offered projections of the TPP's impact on the global economy. Using a computable general equilibrium model (CGE), Li and Whalley (2012) and Petri, Plummer and Zhai (2012) have found that the TPP will have positive effects on all participating countries. More recently, the World Bank (2016) has also indicated that the TPP will have generally positive effects on participating economies and generally negative effects on non-participating economies.

Petri, Plummer and Zhai (2012) is the most widely cited study on the global effects of the TPP, and it is a complete and transparent application of the standard CGE model to this reform proposal. As such, it is useful to analyze it more in detail. Considerations on the latter's methodology also apply to Li and Whalley (2012) and to World Bank (2016), which is based on an updated version of the model used in Petri, Plummer and Zhai (2012). Although the technical details have not been published yet, the World Bank projections apparently differ from Petri, Plummer and Zhai (2012) in two ways relying on an updated version of the same dataset and on more optimistic projections of the TPP's effects on trade. However, neither improves the reliability of the results. On the one hand, the 2011 update of the database still excludes critical information, such as the generalized reversal of post-crisis stimulus packages, which only emerged after 2012. On the other hand, the optimistic expectations about the TPP's effects on trade assume an unrealistic functioning of the economy. In particular, they assume that the higher savings generated through the TPP's boost to corporate profits will be immediately invested in productive activities. But in contemporary economies savings do not necessarily generate investment.<sup>7</sup>

## *2.2. Existing Projections of the TPP's Global Effects*

According to Petri, Plummer and Zhai (2012), the TPP will have positive effects on all participating countries, although gains will be mostly small.

As with all exercises in policy projection, the results of Petri, Plummer and Zhai (2012) depend on the economic model used to tie together the various effects that are expected from the TPP, including changes in demand and supply in multiple markets, exports, imports, incomes and more. In order to evaluate whether the model used is appropriate to analyze the TPP, one needs to carefully examine its underlying assumptions and consider what parts of reality the model leaves out. Inevitably, every economic model leaves out important elements, but some limitations are more consequential than others. For example, when we consider the TPP, if the only aspect we care about is its impact on exports and imports of specific commodities (such as cosmetics, poultry, car parts, etc.), it may seem reasonable to use a trade model that estimates

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<sup>7</sup> This is another form of Say's law, whose heritage often biases economic projections in the form of full employment assumption (see more on this in Section 2.5).

demand and supply in all concerned sectors. But the resulting trade projections will only make sense if they are based on sensible estimates of important influencing factors such as, for example, incomes and income distribution. If projections of incomes and income distribution are seriously biased, detailed figures on production, exports and imports of the various sectors are going to be seriously biased too. In this case, we are better off with a model that provides fewer details about trade flows, but offers a better picture of macroeconomic effects.

Petri, Plummer and Zhai (2012) is based on the GTAP model, a standard CGE model that has been used for decades to project the effects of trade liberalization. Although the study provides a lot of interesting detail on many sectors of the economies involved in the TPP, it faces two critical limitations.

First, the CGE model used excludes, *by assumption*, TPP effects on employment and income distribution, thereby ruling out the major risks of trade liberalization.<sup>8</sup> Negative outcomes after several trade liberalization experiences in the 1990s have been associated precisely with failure to appreciate these risks.<sup>9</sup>

Secondly, the projections are based on data available in 2007, prior to the financial and economic crisis that began in 2008. The crisis showed that some long standing patterns of the world economy -- including the persistence of trade deficits in the United States and of trade surpluses in East Asia -- were unsustainable. Projections based on pre-crisis data miss this critical, more recent information.

### 2.3. *Projection Results - Trade and GDP*

The results of Petri, Plummer and Zhai (2012) for the year 2025 are summarized in Table 1. Although exports are projected to increase between 2.5 and 37 percent compared to the no-TPP baseline, net exports (the difference between exports and imports) are projected not to change. This reflects the assumption that the real exchange rate will quickly equilibrate any changes in exports and imports.<sup>10</sup>

In practice, the projected changes in net exports are only approximately zero. Expressed in US dollars, they are under one billion for all countries but Vietnam, where the projected change is \$2.6 billion. Expressed as percentages of baseline values, the changes appear large for some countries, especially Peru (15%), Mexico (19%) and Vietnam (340%). But this does not mean that, thanks to the TPP, net exports will be a viable source of demand in these countries. In fact, in *all* countries, the projected increases in net exports are zero relative to GDP (second column of Table 1).

Since net exports are zero or almost zero, in this model, the TPP is not seen as generating higher net external demand for participating countries. Any gains in GDP, therefore, must be generated by other sources of demand. This could include real investment financed, in each country, by capital inflows from abroad (inward FDI). However, only projections of capital outflows (outward FDI) are reported below. This figure indicates the extent to which the TPP regime of freer capital mobility will facilitate moving assets abroad.

<sup>8</sup> See Ackerman and Gallagher (2005), Taylor and Arnim (2006), Jomo and Arnim (2008), Taylor (2010) and Capaldo (2015).

<sup>9</sup> For reviews and discussions of these experiences, see Akyüz (2003) and Ocampo and Vos (2008).

<sup>10</sup> See Petri, Plummer and Zhai (2012, Appendix A)

As far as GDP is concerned, projections indicate increases of less than 2.5 percent by 2025 for nine of the eleven participating economies. For the US, projections show that GDP growth will be 0.4 percentage points higher by 2025 than it would be without the TPP.<sup>11</sup> Malaysia and Vietnam are outliers, with projected increases of GDP of 6.1 and 13.6 percent respectively by 2025. In dollar terms, projections suggest that Japan would have the most to gain from the TPP with almost \$120 billion. Gains for the US appear negligible with a \$77 billion increase in GDP by 2025 equivalent to 0.4 percent. By contrast, Burfisher *et al.* (2014), also using GTAP, find approximately zero impact on GDP for all countries except for Vietnam, where GDP is projected to increase an additional 0.1 percent by 2025.

The study considers three sources of income gains. In order of importance for the world economy, these are: the opening of new export markets for firms that currently only serve their domestic markets (44 percent of the gains), foreign direct investment (33 percent) and the increase of exports for firms that are already serving foreign markets (23 percent).

In interpreting these figures, it is important to remember that they arise from the comparison to a baseline scenario in which the TPP is not adopted. This is standard practice when reporting modeling simulations, reflecting the fact that the economy would change even without the assumed policy change. The baseline scenario reflects this basic change. Therefore, each value in Table 1 represents an increase that would occur by 2025 compared to the value of the baseline in 2025.

<i>Units</i>	Exports	Net Exports	GDP	
	%	% of GDP (*)	%	2007 \$, bn
Australia	4.5	0.0	0.6	8.6
Brunei	2.8	0.0	1.0	0.2
Canada	2.6	0.0	0.5	9.9
Chile	2.5	0.0	0.9	2.6
Japan	14.0	0.0	2.2	119.4
Malaysia	12.4	0.0	6.1	26.3
Mexico	6.2	0.0	1.0	21.0
New Zealand	7.8	0.0	2.2	4.5
Peru	7.1	0.0	1.4	4.5
Singapore	4.2	0.0	2.0	8.1
USA	4.4	0.0	0.4	77.5
Vietnam	37.3	0.0	13.6	46.1

Source: Petri, Plummer and Zhai (2012)

(\*) Values in this column are differences between net exports' shares of GDP under the TPP and under the baseline.

<sup>11</sup> This difference is hardly a solid basis for expectations, since ten-year macroeconomic projections are not sufficiently accurate. As a matter of fact, in one-year growth projections by the IMF, the average error has been higher than 0.4 for many countries and in many periods.

#### 2.4. *Projection Results - Employment*

Petri, Plummer and Zhai (2012) project no employment gains or losses for any participating economy. The reason, as explained below, is that the model assumes that all economies operate constantly in full employment.<sup>12</sup> In the model, total employment is determined by the available labor force while flexible wages ensure that it is always profitable for firms to keep all workers employed (see the next section). However, the study suggests that countries can choose between income gains and employment gains, implying the existence of a mechanical relationship between the two. In this logic, a given increase in economic activity can be achieved either by asking employed workers for higher productivity, and paying them more, or by hiring workers who are currently unemployed. In other words, a given increase in total income could be distributed to labor in two different ways – as higher pay for the employed, or as new jobs for the unemployed. But this idea of a “menu” of options seems to be in contradiction with the logic of the model itself: if the model assumes full employment, then it is incompatible with any employment creation; if it does not assume full employment, then it is just as compatible with job destruction as it is with job creation. In the latter case, a shortfall of demand could lead to higher unemployment. In other words, assuming full-employment is not a good start for any estimations of job creation.

#### 2.5. *Methodological Issues*

Petri, Plummer and Zhai (2012) employ the GTAP (2008) model, a computable general equilibrium model of the global economy commonly used to analyze the effects of trade liberalization. In the model, the world economy is divided into 24 country blocs -- each further subdivided into 18 sectors.

In this representation of the economy, all commodity and factor markets, including labor, are constantly kept in equilibrium by perfectly flexible prices.<sup>13</sup> If, for example, the demand for cars were to drop below producers’ expectations, the model assumes that car prices will fall, ensuring that all production is sold. Faced with lower-than-expected profits, car producers who want to cut costs may reduce the number of workers employed. However, since labor markets also supposedly enjoy price flexibility, wages will fall, ensuring that all autoworkers remain employed, either in the car industry or in some other sector.

Assuming such market-clearing mechanisms for all markets in the economy is not necessary to the functioning of a CGE model. For example, Storm (1997) and Taylor, Sarkar and Rattso (1984) use CGE models to analyze the effects of trade liberalization in India assuming more realistic adjustment mechanisms. In both cases, the results highlight potentially adverse effects of liberalization that are absent from market-clearing models. However, many CGE models assume market-clearing in all markets, which is equivalent to assuming constant or full employment for

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<sup>12</sup> This assumption is sometimes justified with the belief that full employment is a long-term state of the economy (perhaps assuming that effective demand management policies are in place) while unemployment occurs in the “short term”. However, in Petri, Plummer and Zhai (2012), no assumption is made on such deviations from full employment.

<sup>13</sup> In Petri, Plummer and Zhai (2012), domestic investment is seen as the sum of household, government and foreign saving. However, no mechanism can ensure this equality *ex ante*, especially given the absence in the model of a financial sector. In this way, Petri, Plummer and Zhai assume away a critical component of modern economies (the financial sector) in order to impose full-employment macroeconomic adjustment.



the economy as a whole.<sup>14</sup> The contrast between this abstract mechanism and the reality of fluctuating unemployment in most countries is apparent.

The full-employment assumption is of great consequence for the model's results. Although the authors indicate that the TPP will inevitably force some sectors to contract, the full-employment assumption ensures that any jobs lost in those sectors are immediately replaced by new jobs in another sector. This implies that sector-specific skills do not impede the transfer of the labor force across sectors, an assumption at odds with the reality of persistent unemployment in many countries. In the United States, such transfers partially occurred after the 2008-2009 recession, since many workers took lower-paying jobs than those they held before the crisis.<sup>15</sup> Thus, even where the assumption of inter-sectoral labor mobility does, to some extent, reflect reality, it fails to capture the effects on workers' incomes and aggregate demand.

In the abstract world of models, the full-employment assumption inoculates economic projections against any adverse consequences that trade liberalization might have on economic activity and employment. In the standard CGE model used in Petri, Plummer and Zhai (2012), trade liberalization has no risks.<sup>16</sup>

In specific circumstances, and for limited periods, a form of the full-employment assumption may have made sense in recent times too. One occurrence was the lead-up to the 2008 crisis when US fiscal and monetary policymakers were able to keep the economy on their inflation and employment targets despite several shocks (such as the bust of the dotcom bubble and the terrorist attacks on the World Trade Center). But, those policy successes were based on the unsustainable accumulation of debt that led to the financial meltdown of 2008. Considering the recession and surge in unemployment that followed, the full-employment assumption was not a helpful instrument, even for the policymakers of the mid-2000s.

Today, adverse economic shocks very often lead to higher unemployment, a fact that policy calculations must take into account. Furthermore, in many countries employment remains below full-employment levels for years after the latest recession. Clinging to the constant employment assumption is bound to give biased projections.

In Petri, Plummer and Zhai (2012), full-employment is coupled with assumptions on income distribution that also insulate projections from the risk of a demand shortfall. First, income is assumed to accrue to a single representative household in each country bloc, thereby overlooking any distinction between wage earners and profit earners. The distinction is critical because individuals' spending behavior is closely related to the source and amount of their income. If, on the other hand, we believe that profit earners receive higher incomes than wage earners, we must conclude that they have a higher propensity to save. For the economy as a whole, a higher concentration of income in the hands of profit earners leads to an increase in total savings and a reduction in spending, with adverse consequences for growth and employment. In the United

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<sup>14</sup> To their credit, the authors are transparent about using a "full employment specification" (Petri, Plummer and Zhai, 2012; Ch. 4).

<sup>15</sup> See, for example, NELP (2014).

<sup>16</sup> The full-employment assumption made sense for early-nineteenth-century economies in which most workers were still employed in agriculture, with the advent of industrial production requiring the transfer of labor from fields to workshops. For this reason, full-employment economic adjustment was first introduced in economics over two centuries ago (Say 1802). Hence, in a letter to the US Congress about the TPP, Joseph Stiglitz (2015) remarked that "much of the reasoning in support of the new trade agreement is based on that out-of-date model", which ignores unemployment and, as explained below, any changes in income distribution.

States, the long-term decrease of the labor share of total income facilitated the accumulation of household debt. When debt accumulation eventually became unsustainable, household spending dropped, setting off the recession. Therefore, income distribution matters for total spending and employment. Any impact that trade policy might have on distribution should be carefully considered.

Secondly, the model assumes that income distribution follows the “productivity rule”, according to which real wages increase at the same rate as productivity. If this were really the case, the share of labor incomes in total income would be stable over time.<sup>17</sup> Instead, the labor share has been decreasing in the US since the mid-1970s, and it has been far from stable in other TPP countries.

Besides presuming full employment and abstracting from changes in the distribution of income, two additional assumptions constrain economic adjustment in Petri, Plummer and Zhai (2012): a constant balance for the government budget and a balanced current account. These two assumptions greatly simplify calculations. But they rule out two common phenomena (government and current account deficits) that have large macroeconomic repercussions, including knock-on effects on aggregate demand, global imbalances and, ultimately, employment. If we are interested in the TPP’s macroeconomic effects, we cannot overlook the dynamics of government deficits and current accounts.

In practice, government deficits vary widely, typically growing during recessions and decreasing, at least as a proportion of GDP, in periods of economic expansion. In the United States, after the 2009 fiscal stimulus was withdrawn (to allay worries over increasing federal debt), sustaining aggregate demand was left to heavily indebted households, corporate investment and foreign imports.

Current accounts rarely feature a constant balance over time. In fact, the pre-recession period was characterized by large trade imbalances (deficits in the US and surpluses in East Asia) that have decreased since the crisis. However, contrary to the assumption of Petri, Plummer and Zhai (2012), trade flows have limited influence on the real exchange rate, which is strongly affected by other factors as well, especially international financial flows.

Finally, the results obtained by Petri, Plummer and Zhai (2012) depend strongly on the projected increase in foreign direct investment, estimated to generate, on average, 33 percent of the TPP’s total income gains. This is at odds with the findings in the literature that analyzes the causes and effects of FDI. As Ackerman and Gallagher (2005) note, there is no convincing theory that explains the effects of liberalization or FTAs on FDI, or indeed, any convincing evidence of an FDI-growth nexus.

Given the difficulty of predicting FDI flows, the authors estimate the FDI effect through two series of assumptions. First, the potential increase in FDI stocks is estimated through a parameter that expresses the impact of changes in the World Bank Doing Business rank. The parameter is the same for all participating countries, implying the same increase in stock of FDI for any country that climbs a given number of ranks. Once the parameter is estimated, it is used to calculate the potential change in FDI stocks. It is assumed that signing the TPP will put all countries above the ninetieth percentile of the ranking, and that all FDI stocks will increase by at

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<sup>17</sup> The labor share is the ratio of the real wage to labor productivity. If, for example, both real wages and labor productivity increased at the rate of 2% per year, the labor share would remain unchanged.

least 50 percent of the difference between the predicted level and their current level. Secondly, the “actual” FDI increase is calculated from the potential increase, assuming that the TPP investment provisions eliminate a maximum of two-thirds of investment barriers and that each country achieves this, depending on the number of FDI provisions it accepts. This procedure is used to justify the assumption that FDI will play a major role in making the TPP economically successful; using a similar GTAP model but without this highly moot procedure, Burfisher et al. (2014) came to far less rosy projections on the growth impact of the TPP.<sup>18</sup>

## 2.6. Data

Petri, Plummer and Zhai (2012) is largely based on pre-2007 data. This means that the economic relationships contained in the model assume continuation of pre-crisis trends, which turned out to be unsustainable. However, these estimates are adjusted in order for the model’s GDP projections to fit those of IMF (2012) and CEPII (2012) until 2025. Such adjustment is common. Since different models focus on different issues, they typically have in common a limited set of variables and differ on all others. For example, some models focus on manufacturing trade while others focus on financial flows or wages. On the other hand, most macroeconomic models contain projections of GDP. To facilitate comparisons, models are often adjusted in order to fit “consensus” GDP projections (often by the IMF), while projections on model-specific variables are derived accordingly. Although common, this choice may compromise the validity of a model’s results if consensus projections turn out to be seriously wrong.

The GDP projections used in Petri, Plummer and Zhai (2012) turned out to be over-optimistic in all cases but for Brunei (Table 2). For Mexico, Peru, and Vietnam, average GDP growth rates in the period 2010-2015 were lower than projections by 2.3, 2.0 and 3.4 percentage points respectively. This is a wide margin. Projections for the US overshot actual growth by 0.3 points, which is no small figure given the size of the US economy and its relevance for trans-Pacific and world trade. To clarify, these figures do not represent particularly bad projections, although it is worth noting that consensus projections on GDP growth have a remarkable tendency to be overly optimistic.<sup>19</sup> Rather, the figures call into question the reliability of any projections based on outdated GDP data.

The most consequential data-related choice in the study is probably the use of the 2007 database to estimate the model. Estimating the model means quantifying the relations among the different variables, such as the relationship between GDP growth and imports, debt accumulation, investment and others. The data used determine and inform these relationships using existing empirical trends. Therefore, using pre-crisis data means informing the model’s relationships with trends that prevailed before the crisis. But those trends – especially debt accumulation and the persistence of trade imbalances between surplus and deficit countries – turned out to be unsustainable, and cannot be used for long-term projections without incurring seriously problematic biases.

A 2011 update of database is used in World Bank (2016) although the details of the resulting modeling projections have not been published as of yet. As mentioned in Section 2.1, the 2011

<sup>18</sup> Reflecting on the assessment of a different trade agreement using a similar model, Rodrik (2015) describes such assumptions on investment as introducing growth “through the back door”, a worrisome strategy as these assumptions are responsible for much of the projected increase in GDP.

<sup>19</sup> For a review of these tendencies in official macroeconomic projections, see IEO (2014).

update still excludes critical information about the world economy including the generalized reversal of post-crisis stimulus packages that took place from 2012 onwards.

Table 2: Average 2010-2015 GDP growth rates: actual data and 2007 estimates

	2007 Est.	Actual	Difference
Australia	3.2	2.8	0.4
Brunei	0.0	0.3	-0.3
Canada	2.6	2.3	0.2
Chile	4.4	4.0	0.4
Japan	1.7	0.8	1.0
Malaysia	5.5	5.3	0.2
Mexico	5.2	2.9	2.3
New Zealand	2.9	2.5	0.4
Peru	6.9	4.9	2.0
Singapore	5.7	4.0	1.7
USA	2.7	2.3	0.3
Vietnam	9.2	5.8	3.4

Sources: Petri, Plummer and Zhai (2012) and IMF (2015)

### 3. Alternative Projections

Given the limitations highlighted in section 2, one obvious way to improve on the assessment of the TPP is to use a model based on more realistic assumptions about economic adjustment and income distribution<sup>20</sup> and capable of tracing changes in income distribution, prices and financial flows to the assumed trade expansion. One such model is the United Nations Global Policy Model (GPM).<sup>21</sup>

#### 3.1. Model

The GPM, which has been in development since the 1970s and informs influential publications such as the UN's Trade and Development Report, is a demand-driven, global econometric model that relies on consistent macroeconomic data for every country (as explained in point c below). It has recently been used to project the effects of the Trans-Atlantic Trade and Investment Partnership (TTIP), the other mega-regional trade agreement currently under negotiation (Capaldo 2014).

<sup>20</sup> Another way is to use the CGE model used in Petri, Plummer and Zhai (2012), replacing the full-employment assumption with a more realistic adjustment mechanism.

<sup>21</sup> For an application of the same model to the Trans-Atlantic Trade and Investment Partnership, see Capaldo (2015).

Like the model used in Petri, Plummer and Zhai (2012), the GPM provides projections for every world region. However, the ways in which the projections are obtained in the two models are fundamentally different.

Three main features differentiate the GPM from the model used by Petri, Plummer and Zhai (2012)<sup>22</sup>:

a) *The mechanism of economic adjustment*

In Petri, Plummer and Zhai (2012), economic adjustment is based on the assumption of full employment. In contrast, the GPM recognizes that a demand shortfall can generate unemployment. In this logic, when firms face a reduction of sales, they try to preserve profits by firing workers. Unless they believe that the loss of business is transitory, they do not try to keep workers employed by negotiating lower wages. This is a more realistic assumption for the demand shortfalls associated with trade liberalization, in which relatively uncompetitive sectors inevitably contract -- sometimes forever, or for a long time. When a sector contracts, other sectors may suffer as well. For instance, when there is a loss of labor income in a sector, overall spending in an economy could go down. Unless additional demand from another source comes to the rescue, this process can lead to large job losses and drive the economy into recession. Economic adjustment in the GPM reflects this risk, instead of sidestepping the problem by assuming full-employment.

Furthermore, in the GPM, economic adjustment is influenced by financial flows and stocks. Financial assets and liabilities contribute to determining consumption and investment, reflecting the growing importance of financial dynamics in today's economies.

Finally, we do not make any specific *ex ante* assumptions on current account balances. In fact, we find that the TPP will change these balances *ex post*.

b) *Income distribution*

In Petri, Plummer and Zhai (2012), income distribution is assumed constant. In contrast, the GPM recognizes that the labor share of total income has visibly changed in most TPP countries in the past three decades.<sup>23</sup> In particular, the US labor share has decreased almost every year since the mid-1980s. At the firm level, where unit revenue is the price of the firm's product, the labor share of income is the unit labor cost. Thus, a falling wage share in the economy means that, on average, unit labor costs have been falling. Proceeding backwards, if trade policy provides an incentive for firms to cut unit labor costs further in order to become more competitive on global markets, the labor share of income will continue to fall. This has serious consequences for the economy. With a shrinking share of total income, working households encounter increasing difficulties in purchasing the consumption and investment goods that make up domestic demand. As a result, the economy becomes increasingly dependent on debt, external demand or both. Income concentration may generate economic instability.

Rather than assume a constant labor share, the GPM recognizes the importance of income distribution for macroeconomic performance.

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<sup>22</sup> For more detail on the structure and inner workings of the GPM, see Cripps and Izurieta (2013). For more detail on the appropriateness of using the GPM in this type of analysis, see Capaldo (2015, 2015a). Figure 1 in section 3.3 below partially illustrates this phenomenon. For the years prior to the 2000s, see IMF (2015).

### c) *Data*

The GPM is based on a dataset of consistent macroeconomic data for every country. It includes data on financial flows, trade (of manufactured goods, commodities, energy and services), prices and labor. These follow strict accounting rules and the data is organized so as to ensure stock-flow consistency. The data used in this paper was updated in 2015, with the most recent historical data going back to 2013. Barring sudden shocks in the world economy, model-generated data for 2014 and 2015 are almost as reliable as historical data although undoubtedly still provisional.

The GPM has limitations. A key limitation, common to global models, is that it does not provide individual results for every country in the world. Given the large amount of data processed by the GPM for each country, calculations are simplified by aggregating some countries into blocs. Thus, in order to analyze the TPP, we keep the largest economies (US, Japan, Mexico, Australia, Canada and New Zealand) as stand-alone units, and aggregate others into several sub-regional blocs (for example, Chile and Peru are aggregated into a residual South American bloc that excludes Argentina and Brazil). Overall, we divide up the global economy into 30 blocs, some of them containing only one country, some containing many. Clearly, country aggregation takes a toll in terms of projection precision but it facilitates detecting major macroeconomic trends.

A second limitation is the number of sectors. The GPM only contemplates four broad sectors involved in international trade: energy products, primary commodities, manufacturing and services. However, this limitation is not significant for this analysis, as it focuses on macroeconomic impacts.

### 3.2. *Simulation strategy*

In order to maximize comparability with Petri, Plummer and Zhai (2012), we start with the same export projections and use the GPM to draw their macroeconomic implications. Without challenging these moot projections, we ask what they imply for growth, employment and income distribution if we replace the assumptions of full employment and constant income distribution with more realistic ones.

We assume that macroeconomic adjustment follows the principle of effective demand whereby the TPP may affect a country's level of economic activity by affecting people's disposable incomes.

Our simulation reflects the widely held belief that the TPP will affect two dimensions of international competition. First, it will push countries to increase trade performance. In order to preserve their market shares, producers in each country will have to sell at lower prices, and thereby cut costs. Specifically, we assume that this process will lower nominal unit labor costs, the main factor in total costs, through the combined actions of business managers and policymakers who negotiate lower wages (or limit their growth in the face of growing prices and productivity) and introduce more capital-intensive technologies.

In principle, reducing nominal unit labor costs need not affect the distribution of total income between labor and profits. If prices decrease by the same proportion as unit labor costs the remuneration of labor (per unit of output) will not change in real terms. However, as explained below, the TPP will affect this balance by introducing incentives for countries to tilt income

distribution in favor of profits. With the GPM, we analyze these dynamics by estimating the impact of changes in unit labor costs on international market shares, defined as the share of total exports that each country's exports represent in a given year.<sup>24</sup>

The second dimension of international competition that the TPP will affect is capital flows. By facilitating cross-border capital movements, the TPP will push firms and other borrowers in each country to provide higher returns in order to avoid losing investors to other countries. For a given level of economic activity, a higher profit rate requires a higher profit share of total income and, therefore, a lower labor share. At the same time, it is generally recognized that inflows of foreign capital depend on a country's fiscal policy (as summarized by its government deficit), although the link between investors' preferences and constraints on government expenditure is seldom explored in empirical models.

Higher international competition, in both dimensions, will impact post-TPP macroeconomic adjustment through reduction of the labor share, not just of nominal labor costs, and marginal adjustment of fiscal policy. Furthermore, since all TPP countries will want to preserve their market shares, we assume that they will engage in a race to the bottom, pushing labor shares downward across the whole TPP bloc.<sup>25</sup> At the same time, we recognize that, if these phenomena were to play out freely, they would severely disrupt existing economic and social structures. Therefore, we assume that policymakers will not allow labor costs to go into a free fall. We assume instead that other business costs, including direct taxes, will also be cut in order to preserve competitiveness while there will be some constraints on how far real wages will be allowed to drop.

In terms of its impact on international competition, cutting domestic costs amounts to a devaluation of the real exchange rate (i.e., a real devaluation). It may help a country's exports but will discourage imports, jeopardizing other countries' ability to export. While this process is unlikely to revolutionize relative competitiveness within the TPP bloc, it may cause TPP countries to undercut non-TPP countries, possibly extending the race to the bottom beyond the TPP area.

The consequences of this process for income distribution and aggregate demand, both nationally and globally, are significant. While real devaluation may lead to higher net exports, cutting labor costs (i.e., reducing workers' incomes) harms domestic demand, potentially offsetting this effect. However, even if the increase in net exports succeeds in preserving or increasing aggregate demand, the consequence on employment may be negative. Under strong pressure to cut costs, increasing net exports requires the introduction of ever more capital-intensive production. As highlighted by Bivens (2003, 2008) and Wood (2007), the resulting change in the composition of output in favor of capital-intensive, export-oriented products may lead to job losses and downward pressures on wages.<sup>26</sup>

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<sup>24</sup> Estimates control for other factors such as nominal exchange rates and supply and demand conditions.

<sup>25</sup> For a detailed analysis of this mechanism, see Capaldo and Izurieta (2013).

<sup>26</sup> This phenomenon can also result from a change in the composition of a country's manufacturing output. As labor-intensive activities (e.g. apparel production or assembly electronics) are outsourced to countries with cheaper labor, the outsourcing country's manufacturing sector is increasingly dominated by more capital-intensive activities. With the GPM, in which manufacturing is aggregated in one sector, we cannot properly account for these dynamics.

### 3.3. Baseline and TPP Projections

We compare two sets of projections – baseline (“no-TPP”) projections and projections reflecting a TPP scenario.

	Real Government Expenditure (av. annual growth rate, %)			Direct Taxes (% of GDP)		
	2000-15	2016-20	2021-25	2000-15	2016-20	2021-25
<b>TPP developed economies</b>	1.99	2.80	2.56	9.97	11.34	11.69
		<i>2.57</i>	<i>2.02</i>		<i>11.14</i>	<i>10.76</i>
USA	2.17	3.66	2.89	10.82	12.47	12.84
		<i>3.48</i>	<i>2.41</i>		<i>12.30</i>	<i>11.97</i>
Canada	3.40	1.40	1.97	12.64	11.54	11.05
		<i>1.29</i>	<i>1.63</i>		<i>11.47</i>	<i>10.62</i>
Japan	0.60	-0.12	1.10	6.93	7.92	8.26
		<i>-0.71</i>	<i>0.07</i>		<i>7.53</i>	<i>6.81</i>
Australia	3.86	2.85	3.11	8.92	9.44	9.64
		<i>2.80</i>	<i>2.82</i>		<i>9.44</i>	<i>9.26</i>
New Zealand	3.43	2.29	2.42	12.56	11.80	11.48
		<i>2.03</i>	<i>1.91</i>		<i>11.64</i>	<i>10.56</i>
<b>TPP developing economies</b>	4.14	3.44	3.53	10.28	11.41	12.64
		<i>3.16</i>	<i>2.99</i>		<i>11.14</i>	<i>11.59</i>
East Asia: Brunei, Malaysia, Singapore and Vietnam	4.11	4.23	4.10	14.71	16.23	17.97
		<i>3.85</i>	<i>3.38</i>		<i>15.81</i>	<i>16.36</i>
Latin America: Chile and Peru	4.97	2.71	3.14	8.50	8.91	10.55
		<i>2.62</i>	<i>2.97</i>		<i>8.87</i>	<i>10.16</i>
Mexico	3.23	2.24	2.29	5.37	5.26	4.68
		<i>1.92</i>	<i>1.75</i>		<i>5.06</i>	<i>4.01</i>

Source: authors' calculations

Our baseline projections reflect assumptions on the ten-year growth of government spending and direct taxes (i.e. income taxes), summarized in Table 3. These are based on the current path of



fiscal policy discussions in the major economies. For each country bloc and each time period, there are two numbers. One refers to the baseline and one (in italics in Table 3) to the TPP scenario. For example, government spending in the US is assumed to grow, on average, by 2.89 percent between 2021 and 2025 without the TPP, while it is assumed to grow at the lower rate of 2.41 percent if the TPP is introduced. The values referring to the TPP scenario are dictated by the objective of replicating the trade results of Petri, Plummer and Zhai (2012) with the GPM, given our assumption of economic adjustment. Thus, for Japan, replicating those trade projections while cost cutting implies an average annual reduction of government spending of 0.70 percent between 2016 and 2020.

The changes in labor shares required by the assumed changes in trade flows are depicted in Figure 1 and summarized in Table 4. All TPP countries are projected to undergo a reduction of their labor share, with the largest reductions occurring in Japan (where 2.3 percent of GDP will have been transferred from labor incomes into profits and rents), New Zealand (1.4 percent of GDP) and the US (1.3 percent of GDP), by 2025 at the end of the simulation period. Income distribution will therefore be more unequal in all TPP countries.

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Table 4: Changes in labor share of total income over baseline (% of GDP) by 2025

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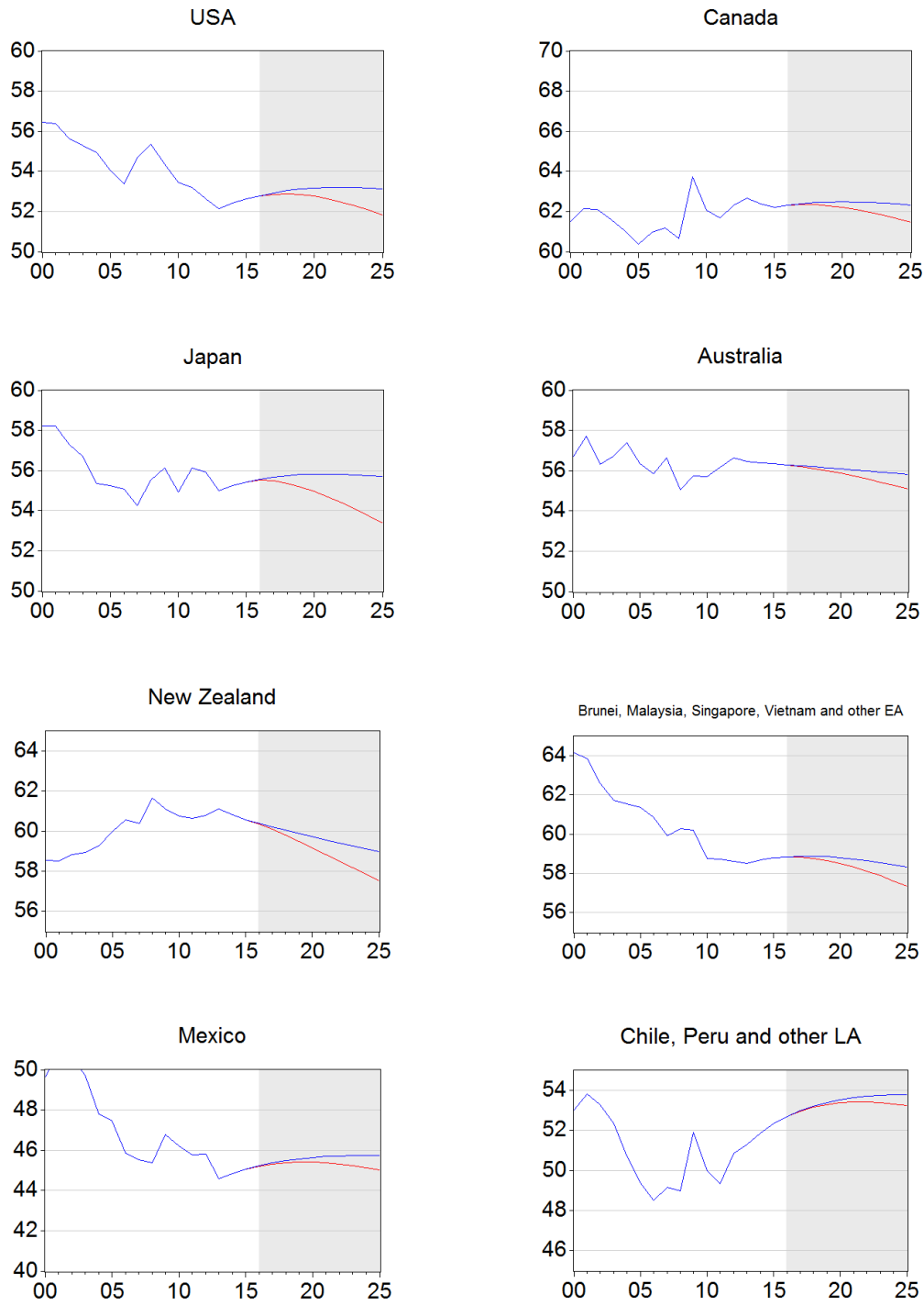
<i>Units</i>	<i>%</i>
USA	-1.31
Canada	-0.86
Japan	-2.32
Australia	-0.72
New Zealand	-1.45
Brunei, Malaysia, Singapore, Vietnam and other EA	-0.99
Mexico	-0.70
Chile, Peru and other LA	-0.54

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Figure 1: Income from employment as percentage of GDP (labor shares) – baseline (blue line) and TPP (red line) scenarios



Source: authors' calculations

As explained in the previous section, changes in labor shares affect macroeconomic adjustment. Projected impacts on net exports, GDP growth, employment and the real exchange rate are summarized in Table 5.

Given the small changes in net exports, the resulting changes in GDP growth are mostly projected to be negligible. We present two sets of growth figures: ten-year totals, which measure the overall effect of the TPP on growth rates compared to the baseline, and annual averages, which measure the average changes in growth rates due to the TPP.

Total ten-year changes in growth rates are projected to be below one percent, by 2025, in all regions but two. In East Asia and Latin America, GDP growth is projected to increase by 2.18 percent and 2.84 percent respectively under the TPP. By comparison, during 2005-2015, GDP in the two regions is estimated to have grown by 50 percent and 47 percent respectively.

The US and Japan are projected to suffer net losses of GDP of 0.54 percent and 0.12 percent respectively compared to the baseline (negative figures in Table 5).

Table 5: TPP scenario (changes compared to baseline projections, 2015-2025)

	Net Exports	GDP Growth		Employment	Real Exchange Rate
	10-year Change	Av. Annual Change	10-year Change	10-year Change	Av. Annual Change
<i>Units</i>	% of GDP	%	%	Thousands	%
<b>TPP, developed economies</b>		-0.04	-0.34	-625	-0.83
United States	0.20	-0.06	-0.54	-448	-0.65
Canada	-0.58	0.03	0.28	-58	-1.09
Japan	1.54	-0.01	-0.12	-74	-1.28
Australia	0.71	0.10	0.87	-39	-1.44
New Zealand	2.13	0.09	0.77	-6	-1.23
<b>TPP, developing economies</b>		0.22	2.03	-147	-1.22
East Asia: Brunei, Malaysia, Singapore and Vietnam	1.69	0.24	2.18	-55	-1.08
Latin America: Chile and Peru	1.18	0.31	2.84	-14	-1.55
Mexico	0.20	0.11	0.98	-78	-1.14
Total TPP				<b>-771</b>	
<b>Non-TPP, Developed economies</b>		-0.43	-3.77	-879	0.55
<b>Non-TPP, Developing</b>		-0.60	-5.24	-4,450	0.44

These results indicate that, when the TPP is analyzed with more realistic assumptions on economic adjustment, an expansion of trade volumes and even of trade's net revenues can be offset by loss of domestic demand caused by the inevitable compression of labor incomes. Therefore, even assuming the same increase in trade volumes in TPP countries as in Petri, Plummer and Zhai (2012), we project negligible or negative impacts on growth.

Following the combined effect of small or negative changes in GDP and changes in the composition of output required by the need to introduce labor-saving technologies, we project employment losses in every TPP country. This may be puzzling if we only focus on net exports. While an increase in net exports drives up incomes and employment, two other forces offset this positive impact: reduction of labor shares, which reduces consumers' purchasing power, and change in the composition of output, with more capital-intensive and export-oriented production.

While projected employment losses are small compared to the labor force, they clearly signal an adverse effect of liberalization not taken into account in full-employment models. In TPP countries, the largest effect will occur in the US, with approximately 450,000 jobs lost by 2025. Japan and Canada follow, with approximately 75,000 and 58,000 jobs lost respectively. The smallest loss – approximately 5,000 jobs – is projected to occur in New Zealand, where the increase in net exports is projected to be the largest. Overall, projected job losses in TPP countries amount to 771,000 jobs.

In non-TPP countries, job losses are projected to be far larger, although still small relative to the size of the labor force. Specifically, employment in the European Union and other developed economies not participating in the TPP is projected to decrease by approximately 880,000 jobs by 2025. China, India, Indonesia and other developing economies not participating in the TPP are projected to lose approximately 4.5 million jobs.

The dynamic processes that the TPP will activate will affect non-participating economies too, giving the TPP a truly global reach. Encouraging cost reductions and compression of labor shares in all member countries, the TPP will affect domestic demand, income distribution and employment in each country, but is unlikely to dramatically change competitiveness among them. Since all countries will reduce costs, no TPP country will gain a large advantage on other TPP members. Competitiveness is a relative feature. TPP countries are more likely to gain competitive advantages over non-TPP countries and increase their market shares at the expense of the latter. The question then becomes how non-TPP countries will react. One possibility is that they will engage in the global race to the bottom.

In our simulation, we do not assume any specific reactions by non-TPP countries. But negotiations on TTIP and the recent proposals of a BRICS trade agreement indicate that an active, global quest for higher competitiveness may already exist. The risk with this prospect is that, with all countries cutting costs, losing jobs and aggravating already high levels of inequality, aggregate demand will suffer. This could compromise the ability of countries to achieve sustainable growth.

Although we make no policy recommendation, our paper affirms the findings of researchers who warn of potential costs from the TPP.

#### **4. Concluding Remarks**

In the main existing assessments, the TPP is projected to generate small gains in GDP in most participating economies. However, these projections are based on an economic model that assumes full employment and invariant income distribution, thereby excluding, from the outset, some of the most serious risks of trade liberalization.

Projecting the effects of the TPP with a different economic model, based on more realistic assumptions about economic adjustment and income distribution, leads to different results. We project that the TPP will lead to a contraction of GDP in the United States and in Japan, and negligible income gains in other countries. We also project job losses and higher inequality in all participating economies. In the face of negligible or negative income gains, the costs of the TPP are projected to fall asymmetrically on labor.

Furthermore, when analyzed with a model that recognizes the risks of trade liberalization, the TPP appears to only marginally change competitiveness among participating countries. Most gains are therefore obtained at the expense of non-TPP countries.

Globally, the TPP favors competition on labor costs and remuneration of capital. Depending on the policy choices in non-TPP countries, this may accelerate the global race to the bottom, increasing downward pressure on labor incomes in a quest for ever more elusive trade gains.

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