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Adjustment and Income Distribution Impacts of the Trans-Pacific Partnership

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Abstract

This paper estimates the adjustment costs of the Trans-Pacific Partnership (TPP) on workers and compares these costs with the agreement's benefits. It also estimates the TPP's impact on the distribution of income across US households. Between 2017 and 2026, when most of the adjustment to the TPP occurs, the costs to workers who will be displaced, both from unemployment and lower future wages, will amount to about 6 percent of the agreement's benefits. For the full adjustment period (2017–30) that Peter Petri and Michael Plummer (2016) consider, the benefits are more than 100 times the costs. The benefits from the agreement will be widely shared. The percentage gains for labor income from the TPP will be slightly greater than the gains to capital income. Households in all quintiles will benefit by similar percentages, but once differences in spending shares are taken into account, the percentage gains to poor and middle-class households will be slightly larger than the gains to households at the top. Thus the agreement will confer net benefits to households at all levels of income and will certainly not worsen income inequality. While the United States as a whole would benefit from the TPP, there is a case for an assistance program that would compensate those who lose.

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Like all free trade agreements, the Trans-Pacific Partnership (TPP) will yield gains to the economy in general but force difficult adjustments on some workers and businesses. Peter A. Petri and Michael G. Plummer (2016) find that the agreement will benefit the United States as a whole, raise real wages of both skilled and unskilled workers, and increase the real return to capital. It will, however, hurt some workers. In particular, some workers will be displaced by imports and lose income from being unemployed or earning less in their new jobs.

This paper complements the work of Petri and Plummer (2016) by estimating the adjustment costs of the TPP on workers and its impact on the distribution of income across US households. While the costs could be substantial for some individual workers, aggregate losses are likely to be a small fraction of the agreement's overall benefits. Although some workers will be displaced by costly involuntary unemployment, much of the adjustment in the labor market will occur through less painful responses—namely, reassigning workers within firms to fill growing demand from other sources, not hiring workers who would otherwise have been hired, and voluntary attrition.

Between 2017 and 2026, when most of the adjustment to the TPP occurs, the costs to workers who will be displaced, both from unemployment and lower future wages will amount to about 6 percent of the benefits estimated by Petri and Plummer. Over this period the TPP will have an average benefit-cost ratio of 18:1. After 2026, when the economy will have almost fully responded to the TPP, the adjustment costs fall to far less than 1 percent of overall benefits, implying that the Petri-Plummer estimates of benefits in 2030 are basically unaffected by adjustment costs. For the full adjustment period Petri and Plummer consider (2017–30), the benefits are more than 100 times the costs.

These findings lend support to the passage of the TPP, but they also point to an increased role for adjustment assistance for those who are hurt by the agreement. A Trade Adjustment Assistance (TAA) program with more generous wage-loss insurance should be part of the legislation implementing the TPP. It would be even more desirable to extend and improve these benefits in a consolidated general worker adjustment program that aids all displaced workers, regardless of the reasons for their displacement (Lawrence 2014a). Although training and other forms of search and relocation assistance should be provided, the centerpiece of this new program should be wage-loss insurance.

The paper also suggests that the fears that the TPP will increase income inequality are misplaced. By 2030, based upon the net value that will be added as a result of the TPP, the percentage gains for labor income will be slightly greater than the gains to capital income. Households in all quintiles will benefit by similar percentages, but once differences in spending shares are taken into account, the percentage gains to poor and middle-class households will be slightly larger than the gains to households at the top. Thus the agreement will confer net benefits to households at all levels of income and will certainly not worsen income inequality.

MODELING THE TPP: WHAT SHOULD WE ASSUME?

This study uses the results of Petri and Plummer (2016) as a starting point. However, some scholars have argued that their simulations are defective because they neglect the impact on the dislocation and wage losses of workers as well as the impact more broadly on income inequality, especially the incomes of middle- and lower-income Americans.[1] In particular, critics suggest that the basic assumption that drives the model—that the economy remains at the same normal employment level—makes it inappropriate for understanding the principal concerns raised by the TPP.[2]

Once ratified, the TPP will be implemented over a decade or more, and its rules will remain in place even longer. Accordingly, it *should* be analyzed using models designed to capture long-run impacts. For analyzing the long-run impact of the TPP, it is reasonable for Petri and Plummer to assume that the agreement is unlikely to permanently affect the level of employment or the trade balance. Assuming normal employment levels is justified not because changes in imports and exports have no impact on employment in the short run—obviously import growth can cause job loss and exports can generate job growth—but rather because the size of the annual impact of the TPP will be smaller than the many other shocks that will occur every year.[3] For example, as we show later, an upper bound estimate for the annual displacement of workers due to the TPP during the adjustment period would be 169,000 per year. By comparison, in the first two months of 2016, a period when the unemployment rate was constant at about 4.9 percent, weekly additions to unemployment averaged 277,000. Moreover, over a longer period macroeconomic policies and wage and price adjustments are likely to restore the economy to the same employment level as the baseline. It would be especially inappropriate to assume, as Capaldo, Izurieta, and Sundaram (2016) do, that displaced workers never find alternative employment over this time horizon.[4]

In the short run, changes in trade flows could change the trade balance, especially if the economy is at less than normal employment, so that trade flows could also affect net national saving by changing

1. For an evaluation of the methodological weaknesses in the model used in this study, see Bauer and Erixon (2015). For a comparison of the papers by Petri and Plummer (2016) and Capaldo, Izurieta, and Sundaram (2016), see Robert Lawrence, "Studies of TPP: Which Is Credible?" Trade and Investment Policy Watch, January 29, 2016, Peterson Institute for International Economics, http://blogs.piie.com/trade/?p=553.

2. Congressman Sander Levin correctly criticized an approach similar to that of Petri-Plummer that was used in a World Bank study (World Bank 2016) as being "incomplete." See "World Bank, Tufts Studies Offer Starkly Different Pictures of TPP's Impact," *Inside U.S. Trade,* January 15, 2016, www.insidetrade.com (accessed on February 5, 2016).

3. It should be stressed that while they assume that employment will follow the same path as the baseline, Petri and Plummer do not assume that that path constitutes full employment.

4. What differentiates the Global Policy Model (GPM) from many other models is that there is no built-in tendency for demand to adjust towards a given level of capacity utilization or to a notion of potential output that effectively determines realized output (Cripps, Izurieta, and Vos 2010).

national income. But over the long run, intertemporal saving and investment decisions of Americans determine the current account. Such decisions are driven by income, demographics, income distribution, price expectations, interest rates, fiscal policy, and other variables, most of which are unlikely to be systematically related to the TPP.[5]

It is also wrong to assert that the Petri-Plummer model fails to capture changes in wages and profits that would result from the TPP. The TPP will create an excess supply of workers and capital in some industries and excess demand for workers and capital in other industries. It is, therefore, likely that wage and profit rates will change in order to restore equilibrium. Precisely because it assumes a given path for employment growth and flexible prices and wages, the model used by Petri and Plummer is able to estimate the changes in wages and profits that will occur when the structure of the economy changes.[6]

The Petri-Plummer model forecasts net changes in employment, but it provides no information on the dislocation and adjustment challenges the TPP is likely to present to American workers. Given the United States' experience over the past decade in dealing with the expansion of Chinese imports in the context of broader declines in US manufacturing employment (Autor, Dorn, and Hanson 2016), this concern is an important one. The long-run analysis, therefore, needs to be supplemented with estimates of adjustment and wage costs of workers who are likely to be displaced by the TPP.[7]

One dimension of this issue is the general impact of the TPP on earnings (and wages in particular) throughout the economy. The model of Petri and Plummer shows the impact of the TPP on value added by industry (i.e., gross profits plus wage compensation). They thus capture the effects on the earnings of workers and capital that are employed. Their model, however, does not provide information about the costs that accrue to displaced workers from spells of unemployment, withdrawal from the workforce, or the erosion in specific human capital when they eventually find new jobs (e.g., earnings reductions as a result of loss of seniority, change in occupation, and loss of payment for skills valued in the previous job).[8] This exercise requires first estimating the magnitude of the displacement and then its costs and comparing these costs with the TPP's benefits. In this paper we carry out this exercise, attempting at each stage to use estimates that are conservative in that they do not understate these costs.

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5. For an explanation and application to US oil self-sufficiency, see Lawrence (2014b). For a comprehensive survey of the current account from an intertemporal view, see Obstfeld and Rogoff (1995).

6. If, for example, as Bivens (2015) claims, import growth caused by the TPP will result on balance in the contraction of industries that employ unskilled labor relatively intensively, the model would detect this change and estimate the decline in the relative wage of nonskilled workers that would occur when these workers are employed in other industries that are less intensive in unskilled labor.

7. As Congressman Sander Levin has pointed out, concerns about wages and unemployment are "the first focus of the debate in the Congress and at the kitchen table." See "World Bank, Tufts Studies Offer Starkly Different Pictures of TPP's Impact," *Inside U.S. Trade,* January 15, 2016, www.insidetrade.com (accessed on February 5, 2016).

8. Petri and Plummer provide evidence that even the largest plausible labor displacement from the TPP is likely to be a very small share of the overall churn in the US labor market.

JOB DISPLACEMENT

We start by providing an upper bound of the job displacement that could occur as a result of the TPP and then provide more realistic projections that allow for domestic demand growth and voluntary attrition.

Upper Bound

Petri and Plummer project that US employment will grow by 16.1 million people between 2015 and 2030 (table 1, column 1). We first assume that the only way to accommodate the increased imports as a result of the TPP is to lay off workers employed in the United States to produce the value added represented by the increase (scenario 1 in table 1). In other words, we assume that all imports lead to the laying off of not only workers who produce the goods and services that are traded (e.g., the impact of increased imports of automobiles on the auto industry) but also workers who produce the intermediate inputs used in producing the import-competing good (e.g., steel, glass, electronics, and banking).

This procedure indicates that the US employment equivalence of the increased import content as a result of the TPP over the full adjustment period amounts to 1.69 million workers (scenario 1 in table 1), or 169,000 a year over a 10-year adjustment period. Note that because we estimate not only the direct impact of the goods and services that are actually traded but also the indirect effects of the intermediate goods and services used to produce them, the effects are spread over a wide range of industries, including several not heavily involved in trade (such as social services and utilities).

These estimates represent an extreme upper bound, for several reasons. First, they ignore the possibilities of adjustment through the other mechanisms considered below. Second, a large share of the adjustment to imports will occur in industries supplying indirect inputs, and the demand displaced by imports for inputs such as utilities, financial services, and transportation will be offset by increased demand within these firms as a result of increased exports. Third, there will be much less job loss than assumed if the same firms involved in wholesale and retail trade and distribution switch from selling domestic products to selling imports. Finally, these estimates are biased upwards, because they are based on input-output tables that assume that all the value added that is displaced by imports as a result of the TPP occurs in the United States. In a world of global value chains, however, the typical US manufactured good already contains some foreign content. Some of the import value added would, therefore, displace other imported value added rather than domestic content.

Employment Growth Repression

In several industries employment in the base (non-TPP) scenario is expected to rise by far more than the displacement estimated by the upper-bound method. In these industries many firms will be able to respond to the rise in imports not by laying off workers but by not hiring as many workers as they would

have in the base case scenario. As demand for their output from other sources will increase, they can also reassign workers no longer producing the goods and services displaced by imports to other activities within their firms. We term this response *employment growth repression*. It shows why structural change is more easily achieved in an economy with growing demand, especially when the required changes are relatively modest. To be sure, compared with the base case, fewer jobs may be created in some industries, but employment repression has the virtue of not involving the costs of layoff and displacement, as workers simply find jobs elsewhere in the economy.[9]

The Petri-Plummer model provides projections at the industry level, but industry growth is unlikely to be spread equally across all firms; some firms may experience slower than average growth. Absent additional information, we could assume that all firms in growing industries are alike, but again to be conservative we assume that firms accounting for only two-thirds of the employment growth are able to make their adjustments through employment growth repression. Despite this assumption we obtain markedly reduced estimates of job loss for industries with employment growth. After this adjustment is made, the overall number of workers affected is reduced to 278,000, almost all of whom turn out to be in manufacturing (scenario 2 in table 1).

Voluntary Attrition

It is normal for some workers to voluntarily quit their jobs, presumably to find more attractive employment elsewhere. Workers also regularly exit the labor force through retirement or death. Firms where sales are declining can downsize simply by not replacing these workers.

According to the Job Opening and Labor Turnover Survey (JOLTS), conducted quarterly by the Department of Labor, voluntary separations (resignations, retirements, deaths) typically account for a large share of job separations and a fairly large share of employment. As Petri and Plummer note, in the private sector as a whole, voluntary separations accounted for 25.3 percent of employment in 2014. Employment churning in the manufacturing sector is typically lower than in the rest of the economy. Once we take account of employment growth repression, manufacturing industries provide much of the dislocation. We, therefore, use the smaller share for non-layoff separations in manufacturing rather than the larger numbers for all private industries. Subtracting 14.3 percent (the 2014 share of employment represented by voluntary separations in manufacturing[10]) from the estimate in scenario 2 to account for voluntary attrition yields an estimate of 238,000 workers actually displaced (scenario 3 in table 1). This would imply that displacement from the full adjustment to the TPP over more than a decade is less than the weekly additions to unemployment claims in 2016. Of course, because employment is kept at the

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9. For an application of the concept of repression to US manufacturing employment, see Pierce and Schott (2012).

10. Data from US Bureau of Labor Statistics, www.bls.gov/jlt/data.htm.

baseline level by adjusting wages, an equal number of new hires would be made in other industries. About half would be in manufacturing and the rest mainly in services.

Costs of Lost Jobs

Involuntary unemployment is an extremely painful and costly experience. The displaced worker surveys regularly conducted by the Bureau of Labor Statistics show that although a few workers may quickly find new jobs—with some even earning higher wages—most will suffer.[11] Initial wage losses (including the costs of being unemployed) could average 17 percent of wages (Farber 2005).

The lifetime impact for such workers, however, is much larger. Some workers have difficulty finding jobs and withdraw from the labor force. Others accept jobs that pay lower wages, because they change occupations or lose seniority or union-premiums. The entire future trajectory of their earnings can be lower as a result.

In the most authoritative recent study of this effect, Davis and von Wachter (2011) use a sample of displaced mature male workers who had held their jobs for at least three years and were laid off in mass layoffs. This type of job loss is likely to be the most costly, because the workers often experience a loss of compensation for job-specific skills and because they are likely to be competing with large numbers of similar workers in local labor markets. Using longitudinal data, Davis and von Wachter take account of both the income loss these workers incur when unemployed or out of the labor force and the lower wages they are likely to receive over the next 20 years once they do find work. They estimate that the present value of the income losses of men displaced in normal times (when the unemployment rate is below 6 percent) could be 1.4 times their annual wage earnings.[12] Although this estimate could overstate the earnings loss of less experienced workers (or those with more general human capital), we apply this coefficient to total compensation (wages plus benefits) to estimate the lifetime loss of compensation of workers who might be subject to involuntary job loss as a result of the TPP.[13]

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11. Ebenstein, Harrison, and McMillan (2015) find that losses are borne mostly by workers who are actually displaced and workers in similar occupations. Research on the impact of trade confirms that human capital is partly specific to industries and occupations. See, in particular, Jacobson, LaLonde, and Sullivan (1993) and Kambourov and Manovskii (2009).

12. According to Davis and von Wachter (2011), workers "lose a staggering 2.8 years of pre-displacement earnings if displaced when the unemployment rate exceeds 8 percent. These results reflect discounting at a 5 percent annual rate over 20 years after displacement."

13. In an analogous exercise, Walker (2013) estimates the impact on earnings of workers when employment is reduced by environmental regulation. He finds almost no impact on the earnings of workers who remain in their jobs. In contrast, workers who are forced to separate experience a lifetime reduction in earnings equivalent to 130 percent of their annual income. In total, as with trade, these wage losses are far smaller than the overall social gains from environmental improvements.

BENEFIT-COST RATIOS

To measure the annual benefits from the TPP, we use the projected time-series of income gains provided by Petri and Plummer. To estimate costs over time, we assume that real compensation grows at the baseline rate of 1 percent a year (the rate of productivity growth), so that workers displaced in later years incur higher costs. We compute compensation losses as 1.4 times annual average compensation in the year of displacement. This allows us to estimate the annual displacement costs and benefit-cost ratios implied by each of our three scenarios.[14]

Petri and Plummer estimate that the benefits from the TPP in 2030 will be equal to 0.5 percent of baseline US GDP or $131 billion. They also provide annual estimates of the benefits as the economy adjusts (row 1 in table 2). Using these benefit estimates and the annual costs of job displacement, we estimate the annual ratio of benefits to costs for each of the displacement scenarios in table 2.

In all three scenarios the benefit-cost ratio is far above 1 and increases markedly after 2026. This increase occurs because Petri and Plummer assume that the nontariff measures under the TPP are phased in over a decade in 10 equal increments.

It is informative to consider the average annual benefit-cost ratio in the adjustment phase (2017–26) and the postadjustment period (2027–30). In all three scenarios the ratio is well above 1 during the adjustment phase. In the most realistic scenario (scenario 3), the benefits are 17.7 times greater than the costs. After 2026, adjustment is almost complete, and the annual benefit-cost ratios rise to the point where the ratio in 2027–30 averages 36 even in scenario 1. For the entire period (2017–30), even scenario 1 indicates that benefits are 12.3 times the costs. In the most realistic estimate, which allows for repression and attrition (scenario 3), the average benefit-cost ratio is 114.5.[15]

In sum, the TPP yields a high return in terms of future income for the United States as a whole. Even in the unrealistic scenario that all imports displace US workers, the adjustment and wage loss costs amount to just 8 percent of the benefits between 2017 and 2030. Under the more plausible scenarios, which account for employment growth repression and voluntary attrition, the costs are much less than 1 percent of the benefits. There is thus a strong national economic welfare case for the TPP, and beneficiaries could easily compensate those who lose.

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14. To simplify the calculation, we assume the full present value of the lifetime earnings reduction of each displaced worker occurs in the year in which the worker is displaced rather than allocating these costs across time. The actual costs are thus larger in the initial year and smaller in later years than they actually would be.

15. Our estimates in scenarios 2 and 3 do not take account of the fact that some new labor market entrants might have to find jobs in different industries perhaps at lower wages. But the benefit-cost ratios in these scenarios are so large that even taking this into account is unlikely to change the qualitative results we have estimated.

INCOME DISTRIBUTION OF TPP BENEFITS

Trade economists have long been aware that even when trade creates aggregate benefits, it can create losers. The most widely used model of this process assumes perfect competition and factors of production (inputs such as land, labor, and capital) that are perfectly mobile and perfect substitutes (Stolper and Samuelson 1941). Combined with the Heckscher-Ohlin theory—which predicts that if the United States is more intensively endowed with capital than labor, it will specialize in capital-intensive products—it implies that trade will raise the return to capital and lower the return to labor.[16]

Invoking this theory, Bivens (2015) asserts that the TPP will reduce the wages of most US workers and raise US profits because the United States is "among the most capital abundant countries in the global economy, while many of our trading partners are among the most labor abundant." But an extensive debate has raised questions about how well US trade patterns actually conform to the Heckscher-Ohlin theory (Edwards and Lawrence 2010), and Bivens provides no evidence to support his claim that the TPP will increase the demand for capital relative to labor in the United States. Moreover, although the Petri-Plummer model assumes that US factors of production are mobile and factor markets competitive, it uses a realistic model of the product market, in which products are differentiated, competition is imperfect, and firms are heterogeneous. Unlike in the competitive Stolper-Samuelson framework, in markets with these characteristics, all factors of production can benefit from trade (Bernard, Redding, and Schott 2007).

In this section we develop measures of the factor intensities of US industries and use them to infer how the increase in value added as a result of the TPP will affect demand for factors. Because we are interested in factor incomes, we use net value added to measure the income of capital, in order to account for depreciation. In addition, we divide occupations based on whether the majority of the workers in them are college educated or not college educated.[17]

Using a different methodology, we confirm the Petri-Plummer finding that the TPP would raise demand for labor (both college-educated and non-college-educated) relative to capital. We then use the projections of how the TPP will affect factor incomes to infer how it will affect the earnings of US households in each quintile of the income distribution. To pin down changes in real consumption by quintile, we incorporate the degree to which different household quintiles consume the goods and services that are traded in the TPP. We conclude that the TPP would have a mildly progressive impact on US income distribution.

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16. This theory has been applied widely to explore the role trade may have played in growing US income inequality. For a survey, see chapter 9 in Edwards and Lawrence (2013).

17. Occupations in which workers with at least a bachelor's degree were the most numerous were classified as college-educated labor; all others were considered non-college-educated labor. Petri-Plummer report that some 60 percent of labor compensation went to "high-skill" workers. We estimate that 57 percent of earnings went to college-educated labor.

Factor Incomes

In the baseline projections, we estimate the share of value added in 2030 as 32 percent for net capital, 29 percent for non-college-educated labor, and 39 percent for college-educated labor. The first column in table 3 reports Petri-Plummer's estimated changes in industry factor payments that would result from the TPP in 2030. Assuming that each factor of production would have the same share in industry value added as it had in 2013, and taking depreciation into account, we infer shares of factor income as a result of the TPP of 24 percent for net capital income, 27 percent for non-college-educated labor, and 36 percent for college-educated labor.[18] As shown in the bottom row of table 3, measured in 2015 US dollars, these changes total $28 billion for capital, $32 billion for non-college-educated labor, and $42 billion for college-educated labor. Relative to 2030 factor incomes in the base case, the gains amount to increases of 0.44 percent for capital, 0.55 percent for non-college-educated labor, and 0.56 percent for college-educated labor.[19] These figures suggest that as a result of the TPP there would be a small increase in the demand for labor relative to capital.[20] Although we use a different database, our results are very similar to those of Petri and Plummer.[21]

Translating Factor Incomes into Household Incomes

In the national income accounts, the Bureau of Economic Analysis reports industry gross value added and its components, indirect taxes, gross operating surplus (profits), and labor compensation. We use 2013 data, in order to be consistent with our other data. Using household survey micro-data from the Census Bureau and the Bureau of Labor Statistics, one of us (Tyler Moran) developed a social accounting matrix that tracks household incomes in each quintile category using these national income data.[22] We use the data on factor incomes to infer household income growth in each quintile as a result of the TPP. To distribute these gains, we estimate the 2030 factor income of US household quintiles based on the distribution of income in 2013 (these values are given in appendix table A.1). The 1st quintile (i.e., the top

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18. We are measuring aggregate output and our total of $118 billion is lower than the $131 billion increase in income obtained by Petri-Plummer because of changes in relative prices.

19. We projected factor value added for 2030 from 2013 based on the GDP growth rates reported in Petri-Plummer.

20. In addition to using a different database in order to link factor and household incomes, these projections are slightly different from those of Petri-Plummer because here we are projecting factor demands at constant factor prices, whereas their model allows factor prices to respond. Since the demands are basically proportional, however, the factor price adjustments required to reequilibrate the factor markets are very small.

21. We confirm the Petri-Plummer estimates that the TPP would increase the income of labor relative to income of capital. The two estimates differ on the performance of what Petri-Plummer call unskilled labor and we call non-college-educated labor, however. Part of this discrepancy may be driven by the fact that our categorization is based on worker-level data from the Census Bureau and theirs on the International Labor Organization's definition of unskilled labor. We also use different base years and industry data, which could imply different shares of value added as well as differences in the relative sectoral importance.

22. These data are on file with author.

20 percent of US households) earned slightly more income than all other households combined; it also received the most earnings from each of the three factors. Groups with higher incomes tend to rely more on college-educated labor. The top quintile also draws far more on capital income than the others.

The first three columns of table 4 show the share of total additional factor income each household would receive as a result of the TPP (the shares do not sum to 100, because not all factor income would be distributed directly to households).[23] The next three columns distribute the changes in value added of labor (college and noncollege) and capital to households based on those shares. The last column reports the cumulative change relative to their 2030 market income (i.e., excluding direct taxes and transfers).

As might be expected given the similarity in the percentage gains of all factors, households at different quintiles see similar relative gains, with the middle three quintiles benefiting very slightly more than the highest and lowest. Judged by their factor intensities, and the degree to which they contribute to earnings, the mix of growth in value added as a result of the TPP is extremely similar to the mix in the economy in 2013. The top quintile benefits the least from the agreement, gaining about 0.01 percent of income less than the second quintile, which derives the greatest benefits. The bottom two quintiles boost their income by about 0.53 percent compared with 0.52 percent for the top two. All told, the agreement appears to have very little impact on the overall distribution of income.

Household Consumption

The TPP affects household incomes at all quintiles in roughly the same way. But because households in different quintiles purchase imports in different proportions, the TPP could affect the distribution of real consumption if its impact differs on the goods and services that different quintiles consume.[24] Indeed, as reported in appendix table A.2, poorer households allocate a larger share of their consumption spending to products such as food and beverages (and, indirectly, their intermediate inputs), whereas wealthier households allocate larger shares of their consumption spending to services, especially finance.

Table 5 explores these effects in greater detail. For each commodity it divides the increase in imports predicted by Petri-Plummer among US households, based on their 2013 levels of direct and indirect consumption.[25] The last two rows report total changes in dollar terms, and as a share of total 2013 consumption, relative to the middle quintile. In absolute terms, higher-income quintiles consume more imports. However, as a share of their initial incomes, the result is unambiguously progressive: The relative benefit to households strictly declines as income increases, with households in the lowest quintile

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23. About 13 percent of labor compensation was absorbed by government social insurance, and 20 percent of net capital income was retained by corporate business or paid in taxes on corporate income.

24. For evidence that the poor consume a relatively higher share of traded products, see Fajgelbaum and Khandelwal (2014).

25. In theory, increased trade could also raise the US prices of domestic substitutes for exports. But for the most part US domestic and export prices both mirror domestic unit labor costs (Lawrence and Rangan 1993).

spending 2 percent more on TPP imported products than households in the median quintile, while households in the top quintile spend 6 percent less than the median. The share of consumption spending on TPP imports by the poorest households (both directly and indirectly) is thus 8 percent higher than the share of spending by the top quintile. In sum, the TPP will improve the consumption possibilities of poorer relative to wealthier households. Claims that the TPP would worsen income inequality in the United States are thus not borne out.

EXPANDING ADJUSTMENT ASSISTANCE FOR DISPLACED WORKERS

The TPP raises overall US incomes even when the adjustment costs and wage losses of displaced workers are taken into account. Indeed, once the adjustment has been made, the TPP is the gift that keeps on giving, since few adjustment costs are required to offset the annual benefits. Nonetheless, as we have seen, there are displaced workers who lose.

Currently, US policies distinguish unemployed workers according to the reasons for their displacement. Workers who can successfully make the case they were laid off due to increased trade receive Trade Adjustment Assistance (Rosen 2008, Lawrence 2014a). TAA is a special program that provides training and some health benefits as well as wage-loss insurance for older workers. This wage-loss insurance program supplements the earnings of displaced workers who accept new jobs that pay less than they previously earned. In 2015 Congress renewed TAA.

Given the overwhelming net benefits to the nation as a whole there is a case to compensate those who lose. A TAA program with a more generous wage-loss insurance program should, therefore, be part of the legislation implementing the TPP. It would be even better if Congress took this opportunity to pass a similar program for all workers, regardless of the reasons for their displacement.

Wage-loss insurance has a strong rationale as a way to help all workers, not only those displaced by trade. When economic risks are high, either at work or in investments, a common strategy is diversification. But most workers have only one job at a time, and so diversification is not easily achieved. Public unemployment insurance is one mechanism to partly insure against the risk of job loss, but its coverage is incomplete because it does not deal with the erosion in specific human capital that leads to lower wages in the future—a loss that is especially severe for older workers with low educational levels. Public investment in training is another response that can in principle allow workers to develop new skills and thus increase their earning opportunities. But training is not appropriate for all. As an additional mechanism, wage-loss insurance compensates workers for reduced pay as a result of the erosion in their specific human capital— precisely the type of loss that is likely to be the result of the TPP. A wage-loss insurance program would not only provide insurance benefits but also speed up adjustment and save on unemployment benefits, by encouraging workers to accept jobs earlier and at lower wages than they might otherwise (Lawrence and

Litan 1986). Indeed it could offset some of the disincentives that are created by unemployment insurance. The costs of such a program will depend on the age of the workers to be covered, the job tenure required for eligibility, the proportion of the wage that would be replaced, and the duration of the benefits.[26]

The issue of safeguards should also be given more attention. One of the more controversial aspects of the estimates of the impact of the TPP relates to the general state of employment that is assumed. Involuntary dislocation is likely to be much smaller in industries that are growing than in industries that are contracting, and the costs of dislocation for workers are likely to be much higher when unemployment rates are higher. As noted, Davis and von Wachter (2011) find that if the unemployment rate is above 8 percent, adjustment costs can be twice as high. Safeguards could slow the pace of liberalization when economic conditions are unfavorable. It would be desirable to include a special safeguards provision that would not permit additional protection but allow the pace of implementation to be slowed in the face of serious macroeconomic difficulties, such as a recession. One way to do so would be to make the conventional safeguards provision, which can be invoked at the discretion of the president to offset injury caused by imports, a faster administrative proceeding.

CONCLUDING COMMENTS

The TPP raises overall US incomes even when the adjustment costs and wage losses of displaced workers are taken into account. Once the adjustment has been made, the TPP is the gift that keeps on giving. Some workers will lose out, however. Yet it would be relatively easy to assist these workers with wage-loss insurance, using some of the gains that the TPP generates.

Some observers have claimed that the Petri-Plummer estimates that the TPP would raise real US incomes by 0.5 percent of baseline GDP in 2030 imply that its benefits are small. Indeed, their estimate implies the benefits would grow between 2017 and 2030 at an annual average of 0.029 percent of GDP. But compared with GDP, most policy measures are small. The relevant question is whether on balance the TPP would benefit the nation. If the Petri-Plummer estimates are correct, the answer is a resounding yes: Assuming a net 5 percent annual return, passing the TPP today is the equivalent of permanently adding $2.62 trillion to the US capital stock in 2030. And as this paper has shown, these benefits vastly outweigh the agreement's costs.

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26. In his 2016 State of the Union address, President Barack Obama proposed a wage-loss insurance program for all US workers. Brainard, Litan, and Warren (2005) estimated that a national wage insurance program that replaces 50 percent of earnings losses for workers over 45 (upto a maximum of $10,000 a year) for upto two years would cost roughly $3.5 billion annually and require an insurance premium of roughly $25 per worker a year. See also Kletzer and Litan (2001) and LaLonde (2007).

Table 1   Cumulative import displacement of US workers due to the TPP, by industry (thousands)

Industry	Petri-Plummer base growth of US employment, 2015–30	Displacement scenarios		
		1: US direct and indirect employment equivalence of TPP imports	2: Scenario 1– employment growth repression	3: Scenario 2 – voluntary attrition
Manufacturing				
Apparel	5	−28	−24	−21
Chemicals	128	−91	−30	−25
Electrical equipment	−80	−16	−16	−14
Food and beverages	−5	−11	−11	−9
Machinery	−21	−98	−98	−84
Metals	107	−91	−36	−31
Other manufacturing	281	−91	−10	−8
Textiles	−8	−35	−35	−30
Transportation equipment	160	−32	0	0
Subtotal	568	−493	−259	−222
Other industries				
Communications	187	−26	0	0
Construction	2,545	−36	0	0
Financial services	1,318	−270	0	0
Mining	333	−37	0	0
Agriculture	−11	−19	−19	−16
Business services	1,271	−272	0	0
Social services	6,196	−55	0	0
Trade and transportation	3,644	−469	0	0
Utilities	21	−12	0	0
Subtotal	15,504	−1,196	−19	−16
Total	16,072	−1,689	−278	−238

Sources: Authors' calculations and Petri and Plummer (2016).

Table 2   Adjustment costs and benefits of the TPP

	2017	2021	2026	2030	Average		
					2017–30 (full period)	2017–26 (adjustment period)	2027–30 (postadjustment period)
Annual increase in US real income (billions of dollars)	8	42	122	131			
Benefit-cost ratio							
Scenario 1: US direct and indirect employment equivalence of TPP imports	0.7	3.0	3.6	37.4	12.3	2.9	36.0
Scenario 2: Scenario 1 – employment growth repression	3.9	17.1	14.2	355.0	98.1	15.2	305.5
Scenario 3: Scenario 2 – voluntary attrition	4.6	19.9	16.6	414.3	114.5	17.7	356.5

Sources: Authors' calculations and background data for Petri and Plummer (2016), supplied by authors.

Table 3　Factor income shares and gains from the TPP

Industry	Petri-Plummer changes in factor payments, 2030 (billions of 2015 US dollars)	Shares of factor income (percent)				Gains (billions of 2015 US dollars)		
		Depreciation	Net capital	Noncollege labor	College labor	Net capital	Noncollege labor	College labor
Goods								
Agriculture	11	21	57	20	2	6	2	0
Mining	3	35	42	15	9	1	0	0
Food and beverages	8	13	41	31	15	3	2	1
Textiles	−18	18	11	44	27	−2	−8	−5
Apparel	−4	12	7	38	43	0	−2	−2
Chemicals	−3	20	54	12	14	−2	0	0
Metals	−5	10	28	42	20	−1	−2	−1
Electrical equipment	2	39	9	11	41	0	0	1
Machinery	−12	16	21	31	32	−3	−4	−4
Transportation equipment	3	22	26	26	26	1	1	1
Other manufacturing	−1	20	16	36	28	0	0	0
Services								
Utilities	2	36	31	19	15	1	0	0
Construction	16	6	31	49	15	5	8	2
Trade and transportation	27	11	26	40	23	7	11	6
Communications	4	14	46	9	30	2	0	1
Finance	9	14	30	12	44	3	1	4
Business services	24	11	15	18	56	4	4	13
Social services	51	15	8	32	45	4	17	23
Total	118	14	24	27	37	28	32	42

Sources: Authors' calculations and Petri and Plummer (2016).

Table 4   US household income gains from the TPP, by income quintile

| | Shares of additional factor income (percent) | | | Gains from TPP, 2030 | | | | |
| | | | | Billions of 2015 dollars | | | | Gains relative to 2030 factor income (percent) |
Quintile	Net capital	Noncollege labor	College labor	Net capital	Noncollege labor	College labor	Total	
5th quintile	1	4	0	0	1	0	2	0.528
4th quintile	5	12	2	1	4	1	6	0.530
3rd quintile	10	21	7	3	7	3	13	0.529
2nd quintile	16	27	19	5	9	8	21	0.531
1st quintile	49	28	60	14	9	25	48	0.521

Note: 1st quintile refers to top 20 percent of the income distribution; 5th quintile refers to the bottom 20 percent.

Source: Authors' calculations.

Table 5   Household consumption of increased imports as a result of the TPP, by commodity and income quintile

Industry	1st quintile	2nd quintile	3rd quintile	4th quintile	5th quintile
Goods					
Agriculture	1	1	1	0	0
Mining	1	1	1	1	0
Food and beverages	1	1	1	1	1
Textiles	11	8	6	5	4
Apparel	8	5	4	4	3
Chemicals	14	11	9	8	6
Metals	6	4	3	2	2
Electrical equipment	5	3	2	2	1
Machinery	17	14	12	11	8
Transportation equipment	8	4	3	2	2
Other manufacturing	11	7	6	5	4
Services					
Utilities	0	0	0	0	0
Construction	1	1	1	1	0
Trade and transportation	15	9	7	6	5
Communications	1	1	0	0	0
Finance	11	6	4	3	2
Business services	11	7	5	4	3
Social services	0	0	0	0	0
Total	123	80	64	55	42
Impact relative to median	0.94	0.98	1.00	1.02	1.02

Source: Authors' calculations.

Table A.1 Composition of US household factor income, by quintile, in 2030 based on distribution of income in 2013

	Billions of 2015 dollars			Percent share of total		
Quintile	Capital	Noncollege labor	College labor	Capital	Noncollege labor	College labor
1st quintile	3,139	1,565	4,508	34	17	49
2nd quintile	1,019	1,551	1,402	26	39	35
3rd quintile	633	1,193	538	27	50	23
4th quintile	304	707	150	26	61	13
5th quintile	93	221	27	27	65	8

Note: 1st quintile refers to top 20 percent of the income distribution; 5th quintile refers to the bottom 20 percent.

Source: Authors' calculations.

Table A.2 Direct and indirect household consumption by quintile (percent share of total)

Sector	1st quintile	2nd quintile	3rd quintile	4th quintile	5th quintile
Agriculture	2.1	2.6	2.9	3.0	3.2
Mining	2.6	3.2	3.6	3.5	3.5
Food and beverages	4.0	5.0	5.5	5.8	6.2
Textiles	0.8	0.9	0.8	0.9	1.0
Apparel	1.0	1.0	1.0	1.1	1.2
Chemicals	7.2	9.0	10.0	9.9	9.9
Metals	2.3	2.3	2.3	2.3	2.4
Electrical equipment	1.8	1.7	1.6	1.6	1.6
Machinery	0.5	0.6	0.7	0.7	0.7
Transportation equipment	2.4	1.8	1.9	1.6	1.5
Other manufacturing	4.2	4.3	4.3	4.3	4.5
Utilities	1.6	1.9	2.1	2.1	2.2
Construction	1.0	1.0	1.0	1.0	1.0
Trade and transportation	5.5	5.1	5.2	5.2	5.3
Communications	4.5	5.1	5.1	5.1	4.7
Finance	9.7	8.0	7.5	6.8	5.4
Business services	10.2	10.0	9.8	9.7	9.5
Social services	38.8	36.5	35.0	35.4	36.2
Total	100.0	100.0	100.0	100.0	100.0

Source: Authors' calculations.

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