ECONOMICS WORKING PAPER SERIES

THE IMPACT OF U.S. TRADE AGREEMENTS ON GROWTH IN OUTPUT AND LABOR PRODUCTIVITY OF FTA PARTNER COUNTRIES

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Working Paper 2016-10-A

U.S. INTERNATIONAL TRADE COMMISSION

500 E Street SW

Washington, DC 20436

October 2016

Special thanks to Cindy Payne for assistance with this working paper.

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ABSTRACT

U.S. bilateral and regional trade agreements contain many provisions that may affect the economies of partner countries. Through the transfer of technology and increases in capital expenditure, the trade agreements can be growth enhancing. In this paper, we report a series of econometric models that estimate the effects of U.S. bilateral and regional trade agreements on real gross domestic product per capita growth in the partner countries. Since there is conflicting evidence in the literature about the timing of these effects, we consider several versions of the econometric model that vary in their assumptions about the immediacy and persistence of these effects. We find that the U.S. trade agreements have had a positive and significant impact on partner countries' growth rates, though the increases in growth rates occur with a delay and appear to be only temporary.

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1. Introduction

The United States has signed bilateral or regional trade agreements with 16 countries since 2001. U.S. International Trade Commission (2016) discusses several ways that these trade agreements have benefited the U.S. economy. For example, the agreements have increased aggregate output and employment and reduced prices to U.S. households and U.S. companies that rely on imported inputs.

There have also been economic benefits to the partner countries, though these are not quantified in the Commission's report. Examples of these benefits include increased productivity due to increased imports of intermediate goods and increased technology transfer and capital expenditures due to the investment provisions in the agreements.

This paper reports a series of econometric models that quantify the impact of U.S. bilateral and regional trade agreements on the annual growth rate of real GDP per capita in the partner countries. Using a panel of countries over the period 2001-15, we estimate the average effect of the agreements on annual growth rates in the years after the agreements entered into force. The econometric models indicate that entering into a trade agreement with the United States had a positive and statistically significant effect on the growth rate in the partner country, though the effect occurs with a delay and appears to be only temporary. According to the econometric analysis, the agreements increased the growth rate of the partner countries' real GDP per capita in the seventh year and through the tenth year of the agreement by 1.338 percentage points (on average) above the growth rate that would have prevailed absent the trade agreements with the United States.

The rest of this paper is organized into seven sections. Section 2 reviews the relevant literature on the effect of international trade and trade agreements on economic growth. Section 3 discusses the provisions of the U.S. trade agreements that are most likely to affect growth rates. Section 4 presents the modeling framework. Section 5 describes the sources of the data and provides summary statistics for the growth rates in the economies that we analyze. Section 6 reports our econometric estimates of growth in GDP per capita and as a sensitivity analysis, section 7 presents additional estimates of growth in labor productivity. Section 8 provides concluding remarks.

2. Literature on the Effects of Trade Liberalization and Openness on Economic Growth

There is a large literature on the effects of trade liberalization and openness on the growth of a country's income per capita. Dollar (1992), Sachs and Warner (1995), and Frankel and Romer (1999) are widely cited early contributions to this literature. Sachs and Warner (1995) use econometric analysis and case studies to examine whether post-war trade liberalization episodes are reflected in countries' growth rates, recognizing that trade liberalization is not pursued in isolation but is typically part of a broader economic reform program. They conclude that trade policy is an important determinant of cross-country variation in growth rates.

Frankel and Romer (1999) use econometric models to estimate the effects of trade on income levels, rather than growth rates, using a cross-section of countries in 1985.[1] The authors estimate that there is a permanent effect on income levels or, equivalently, a temporary effect on growth rates. They construct an instrumental variable for the country's volume of trade that is based on geographic factors. They find that trade has a large and positive effect on income, though they are not able to estimate the effect precisely. They discuss many ways that trade can affect income, including specialization in production, increasing returns to scale, and international diffusion of technologies.

There have been several critical reviews of this literature. Rodriguez and Rodrik (2001) challenge the professional consensus about the growth-promoting effects of trade openness. They critiqued the data and econometric methodologies of the earlier studies, including Sachs and Warner (1995) and Frankel and Romer (1999), and conclude that the link between trade policy and economic growth is "far from settled on empirical grounds." Another review in Winters (2004) concludes that trade liberalization leads to a temporary increase in growth rates, and that the effects are due to increases in investment, imports of intermediate goods, and productivity. Winters cautions that it is difficult to empirically distinguish between transitory and permanent effects on growth rates. Like many of the studies in the literature, Winters notes that the main challenge when estimating the effects of trade liberalization is that there are often coinciding reforms in other economic policies.

Wacziarg and Welch (2008) update the data and methodologies in the earlier studies. They use an econometric model with country and year fixed effects to estimate the part of historical changes in

[1] As Frankel and Romer point out in their conclusions, the effects *of trade* are not the necessarily the same as the effects of changes in trade policy: "The second limitation of the results is that they cannot be applied without qualification to the effects of trade policies. There are too many ways that trade affects income, and variations in trade that are due to geography and variations that are due to policy may not involve exactly the same mix of the various mechanisms."

growth and investment rates that is attributable to changes in trade policy, assuming that the effects of trade liberalization on growth rates are permanent.[2] They find that the effects are positive, economically large, and statistically significant: "Over the 1950-98 period, countries that liberalized their trade regimes experienced average annual growth rates that were about 1.5 percentage points higher than before liberalization. Post-liberalization investment rates rose 1.5-2.0 percentage points, confirming past findings that liberalization fosters growth in part through its effect on physical capital accumulations."

In addition to these empirical studies of the issue, there is also a theoretical literature that examines the economic mechanisms through which trade liberalization can affect economic growth. The theoretical literature extends from early contributions in Grossman and Helpman (1992) to recent research in Sampson (2016). For example, in Sampson's model trade leads to a selection-induced reallocation of resources toward the most productive firms, as in a Melitz model of international trade, and knowledge spillovers depend on the total distribution of productivities across firms. Based on these assumptions, Sampson's model predicts that trade integration results in a persistent increase in the growth rate of the economy.[3]

3. Provisions of the Agreements that Can Affect Growth Rates

U.S. trade agreements are not simply tariff reductions. They are complex packages of policy reforms, and many of the provisions of the agreements can affect the growth of GDP per capita in the partner countries.[4] Some provisions may increase income levels but are likely to only have a temporary effect on growth rates, while others that facilitate innovation may permanently increase growth rates.

For example, the rules of origin in the agreements can permanently increase the volume of trade and incomes but probably only temporarily increase the growth rate of partner countries.[5] For example, the textiles and apparel rules of origin in the CAFTA-DR agreement are often cited for their role in strengthening the regional supply chain with the United States, increasing U.S. exports of textiles and imports of finished apparel.

[2] Wacziarg and Welch (2008) do not test this assumption.
[3] Sampson (2016) models trade integration. He does not specifically model changes in trade policy.
[4] The discussion in this paragraph and the next is based on chapter 2 in USITC (2016).
[5] The criteria set out in rules of origin provisions are used to determine duties or restrictions on bilateral trade flows.

Similarly, sanitary and phytosanitary (SPS) provisions in the agreements probably have only a temporary effect on growth rates. Through SPS provisions, U.S. trade agreements have established bilateral forums that promote technical cooperation and help resolve barriers to trade. In certain cases, the resolution of SPS issues has opened U.S. markets to producers in the partner countries (for example, Chilean fruit and Mexican avocado exporters).

In contrast, the investment, intellectual property, and services provisions in the trade agreements not only increase trade and income levels but may also have a long-lasting effect on the growth rates of the partner countries. The investment chapters contain most favored nation and national treatment protections, as well as provisions related to investor state dispute settlement. By facilitating investment, these provisions can have a positive impact on growth in the partner country through technology transfer as well as increased capital expenditure.

The intellectual property chapters of the bilateral and regional agreements have built on the requirements for the protection of intellectual property rights established in the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights. The strengthening of intellectual property rights in partner countries may increase technology transfer through increased licensing, foreign direct investment, and cross-border trade, and this can have a positive impact on growth.[6]

As a final example, the provisions on trade in services can also have a long-lasting impact on the growth rates of the partner countries. For example, most trade in services is carried out through affiliates established abroad. The trade agreements generally enable increased presence or activity of foreign affiliates, and the presence of U.S. multinational companies can increase productivity growth in host countries. The national treatment provisions, competition related provisions, transparency benefits of negative list agreements, and a general increase in certainty with the trade agreements in place all foster investment and trade in services.

4. Modeling Framework

There are many ways that U.S. trade agreements can benefit the economies of the partner countries – including technology transfer, increased capital expenditures, increased availability of imported intermediate goods, and better access to important export markets. Our econometric models do not try to separately estimate the individual contributions of these factors to the growth of real GDP per

[6] Quantitative estimates USITC (2016) suggest that increases in patent protections associated with the U.S. trade agreements have had a positive and significant impact on U.S. international receipts for the use of intellectual property. The literature on this issue is reviewed in Maxwell and Riker (2014).

capita in the partner countries; instead, the models estimate the combined impact of all of the provisions of the trade agreements.

We estimate the impact of the agreements on growth rates based on the econometric specification in equation (1).

$$g_{ct} = \alpha_c + \beta_t + \gamma I\left(T_0 \le Y_{ct} < T_1\right) + \epsilon_{ct} \quad (1)$$

In this model, g_{ct} represents the annual growth rate of real GDP per capita of partner country c in year t, Y_{ct} represents the number of years that country c has been in a bilateral or regional trade agreement with the United States as of year t.[7] The indicator variable $I\left(T_0 \le Y_{ct} < T_1\right)$ is equal to one if there is an agreement that has been in force for at least T_0 years but for less than T_1 years, and is equal to zero otherwise. This specification is flexible with respect to the timing of the effects of the agreements on growth: the lag in the effect is reflected in the assumption about T_0 and the persistence of the effect is reflected in the assumption about T_1. We estimate models with different values of T_0 and T_1 in order to determine which assumptions about the timing and persistence of the effects are the best fit for the data. For example, if the trade agreements have an immediate effect that is permanent rather than temporary, then T_0 is equal to zero and T_1 is very large. If the agreements have a delayed effect and the effect is short-lived, then T_0 is greater than zero and T_1 is close to T_0.[8]

The coefficient on the indicator variable, γ, is the estimated increase in growth rates, measured in percentage points, starting in year T_0 and ending before year T_1. We pool together all of the U.S. bilateral and regional trade agreements that entered into force since 2001 to estimate the magnitude of this average treatment effect. If the trade agreements increased growth rates in the partner countries, then $\gamma > 0$.

[7] For example, the U.S.-Chile FTA entered into force in 2004. For Chile, the number of years is equal to zero before 2004 and is greater than zero for every year starting in 2004.

[8] If the agreement has an impact after 6 years from entry into force that persists through 10 years after entry into force, then the two boundaries are 6 and 10. In the Chilean case, the indicator would equal 1 in the year 2010 through 2014 and zero every other year.

The variable α_c is a country fixed effect, β_t is a year fixed effect, and ϵ_{ct} is the error term of the model.[9] The year fixed effect controls for global factors that vary over time, like the financial crisis at the end of the 2000s. The country fixed effect controls for persistent differences in the countries' growth rates, for example reflecting their stage of economic development. The country fixed effect also addresses the potential endogeneity of the trade agreements, following the approach in Baier and Bergstrand (2007).

5. Data Sources and Descriptive Statistics

The dependent variable in the econometric analysis is the annual growth rate of the partner country's constant dollar GDP per capita. We use annual data for 2001-2015 from the World Bank's *World Development Indicators*.[10] The estimation sample includes all countries and territories that reported this measure for the entire 15-year period. The summary statistics in table 1 demonstrate that there is a lot of variation in the annual growth rates across years and across countries within each year.

The main explanatory variable in the econometric analysis is based on the number of years since the partner country entered into a bilateral or regional trade agreement with the United States. This indicator varies across countries and within each country over time. Table 2 lists the 16 countries that signed a bilateral or regional agreement with the United States that entered into force since 2001, along with the date of entry into force of each agreement. Various provisions of agreements, however, are implemented after the agreement enters into force. The most familiar instance of "phasing-in" of agreement provisions are tariffs, which are typically eliminated pursuant to staging schedules that vary by product. In the U.S.-Korea agreement (KORUS), for example, duties on certain products entering Korea will be phased out over a twenty-year period from entry into force of the agreement.[11] Beyond tariff elimination, other aspects of trade liberalization can occur in stages after an agreement's implementation. For example, though Korea has maintained restrictions on affiliations between foreign and Korean law firms, U.S. law firms are allowed to establish joint ventures with Korean law firms under KORUS five years after the agreement's entry

[9] Wacziarg and Welch (2008) also include country and year fixed effects.
[10] In contrast, Wacziarg and Welch (2008) analyze data on growth rates in the 1990s and earlier studies like Sachs and Warner (1995) focus on even earlier periods.
[11] U.S.-Korea Free Trade Agreement, Annex 2-B, 1, paragraph 3 (e).

into force.[12] The gradual phase-in of the provisions of the agreements is one reason that we expect that the agreements will have a delayed impact on the partner countries.

Table 3 reports the average annual growth rates for the 16 partner countries, before and after the agreements entered into force. The first two columns of numbers are within-country comparisons of the average annual growth rates before and after the agreements enters into force. The two periods reflected in these averages vary across the agreements. According to this comparison, average growth rates were higher for 8 of the 16 partner countries (50 percent). The last two columns of numbers take into account changes in global conditions: they are averages of the difference in the country's growth rate and the global average growth rate in the same year. In this second comparison, the average relative growth rates are higher for 12 of the 16 partner countries (75 percent). The four exceptions are Australia, El Salvador, Oman, and Korea. This second set of comparisons – which more clearly indicate a link between the agreements and growth rates – is closer to our econometric analysis in the next section, which also controls for global effects.

6. Econometric Model of Growth in GDP per Capita

The econometric analysis is based on the specification in equation (1). We estimate the model for alternative assumptions about the delay and persistence of the impact on partner growth rates, and we use conventional measures of goodness of fit to select among the alternative assumptions.

The estimates in table 4 indicate that entering into a trade agreement had a positive and statistically significant effect on the growth rate of real GDP per capita in the partner country, though with several years' delay. We consider seven alternative specifications with different assumptions about T_0. In all of the specifications in table 4, T_1 is effectively infinite: we assume that the agreements had a permanent impact on growth rates. Of the specifications in table 4, the version with an impact that starts in the seventh year of the agreement is the best fit for the data. It has the lowest value for the Akaike Information Criterion and the highest value for the adjusted R^2 statistic. According to this model, the agreements increased annual growth rates of real GDP per capita in the partner countries by 1.179 percentage points above the growth rate that would have prevailed absent the agreements. In contrast, if we assume that the impact is immediate, rather than delayed, then we estimate that the agreements increased the annual growth rates by only 0.559 percentage points. In this lower estimate, the average treatment effect is lower because it

[12] U.S.-Korea Free Trade Agreement, Annex 2, 44-45, paragraph 2 (c).

includes the earlier years when the impact was smaller and close to zero. F tests indicate that the country and year fixed effects are statistically significant in all of the specifications.

Table 5 reports regressions that examine the persistence of the impact on growth rates, assuming that the impact begins in the seventh year of the agreement (the delay that best fit the data in table 4). The four specifications in table 5 vary in their assumptions about T_1. The final specification matches the assumption in table 4 that the impact lasted indefinitely. Of the four alternatives, the specification with the impact that lasts through the tenth year is the best fit for the data, with the lowest value for the Akaike Information Criterion and the highest value for the adjusted R^2 statistic. According to this model, the agreement increased the growth rate of real GDP per capita during the impact years by 1.338 percentage points on average. In this estimate, the average treatment effect does not include the later years when the impact on growth rates is close to zero.

One way to illustrate the model is to apply it to a specific partner country. In the case of Chile, the model estimates an increase in growth rates due to its trade agreement of 1.388 percent points between 2010 and 2014. In total, including global demand factors unrelated to the trade agreement, the average annual growth rate in that period (3.458 percentage points) was actually 1.138 percentage points higher than the average during the rest of the 2001-2015 period. The smaller actual change in the average growth rate includes the negative effect of the slowdown in the global economy during this period.

There are only a small number of years in the dataset after the agreements entered into force, and this limits the strength of our conclusions about the persistence of the effects on growth rates. As we noted in Section 2, the literature recognizes that it is difficult to empirically resolve whether the effects of trade liberalization on growth rates are temporary or permanent, because the time series are relatively short, and so most studies either adopt one assumption or the other. Though we cannot draw definite conclusions about the persistence of the effects on growth rates, our comparison of alternative specifications in tables 4 and 5 suggests that the effects on growth rates are not permanent.

7. Econometric Models of Growth in Labor Productivity

To investigate the sensitivity of the estimates to the measure of growth, we estimated the econometric models again using the growth rate of labor productivity from the International Labour Organization's (ILO) *Key Indicators of Labour Market* (KILM) dataset. The data measure GDP

per worker, in constant 2005 U.S. dollars, so they should be similar to the growth of GDP per capita in Tables 1, 3, 4, and 5.[13] Labor productivity (like GDP per capita), should reflect available technology and physical capital, as well as the human capital of the workers; neither measure isolates the efficiency of physical or human capital.

The estimates using the growth of labor productivity are similar to the estimates using the growth in GDP per capita, though the timing of the impacts on labor productivity is delayed a year and the estimated magnitude of the impacts is larger. The estimates in table 6 indicate that entering into a trade agreement had a positive and statistically significant effect on the growth rate of labor productivity in the partner country with several years' delay. We again consider several alternative specifications with different assumptions about T_0. In all of the specifications in table 6, T_1 is effectively infinite: we assume that the agreements had a permanent impact on growth rates. Of the specifications in table 6, the version with an impact that starts in the eighth year of the agreement is the best fit for the data. (This is one year later than in the best fitting model of the impact on the growth rates of GDP per capita.) It has the lowest value for the Akaike Information Criterion and the highest value for the adjusted R^2 statistic. According to this model, the agreements increased annual growth rates of labor productivity in the partner countries by 1.715 percentage points above the growth rates that would have prevailed absent the agreements.[14]

Table 7 reports regressions that examine the persistence of the impact on growth in labor productivity, assuming that the impact starts in the eighth year of the agreement. The four specifications in table 7 vary in their assumptions about T_1. The final specification matches the assumption in table 6 that the impact lasted indefinitely. Of the four alternatives, the specification with the impact that lasts through the eleventh year is the best fit for the data, with the lowest value for the Akaike Information Criterion and the highest value for the adjusted R^2 statistic. (Again, this is one year later than in the best fitting model of the impact on the growth rates of GDP per capita.) According to this model, the agreement increased the growth rate of labor productivity during the impact years by 1.773 percentage points on average.

[13] The difference is that the ILO data incorporate estimates of labor force participation rates.
[14] Again, F tests indicate that the country and year fixed effects included are statistically significant in all of the specifications.

8. Conclusions

The econometric analysis indicates that the U.S. trade agreements had positive and significant effects on the growth rates of the partner countries, though the effects are most apparent several years after the agreements entered into force. The econometric models control for country characteristics and year effects that are reflected in the growth rates.

As we noted above, the estimated impact averages over the effects of the 16 different trade agreements. There is probably significant heterogeneity in the effects that is not conveyed in the averages, and this is potentially an important direction for future research. This might be investigated by adding information about the differences in the provisions of the individual agreements.

A second direction for future research is to try to disentangle *how* the agreements affected the growth rates. This might be investigated by using a more disaggregated economic measure as the dependent variable.

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Table 1: Quartiles of the Annual Growth Rates of GDP per Capita, in Percentages

Year	25th Percentile	50th Percentile	75th Percentile
2001	0.045	1.664	3.522
2002	-0.127	1.729	4.279
2003	0.793	2.730	5.542
2004	2.071	3.910	6.194
2005	1.548	3.481	5.685
2006	1.980	3.998	6.588
2007	2.075	4.439	6.466
2008	0.187	2.242	5.125
2009	-4.700	-1.510	1.548
2010	0.666	2.522	4.693
2011	0.664	2.678	4.950
2012	0.186	1.653	4.215
2013	0.147	1.952	3.917
2014	0.700	1.826	3.452
2015	0.332	1.682	3.271

Source: World Bank, *World Development Indicators* database.

Table 2: U.S. Bilateral and Regional Trade Agreements since 2001

Partner Country	Entry into Force of the Agreement
Singapore	1/1/2004
Chile	1/1/2004
Australia	1/1/2005
Morocco	1/1/2006
Bahrain	1/11/2006
El Salvador	3/1/2006
Honduras	4/1/2006
Nicaragua	4/1/2006
Guatemala	7/1/2006
Dominican Republic	3/1/2007
Costa Rica	1/1/2009
Oman	1/1/2009
Peru	2/1/2009
Korea	3/5/2012
Colombia	5/12/2012
Panama	10/31/2012

Source: U.S. International Trade Commission (2016), Figure 1.1.

Table 3: Growth Rates Before and After the Trade Agreements

Partner Country	Average Growth Rate before Entry into Force	Average Growth Rate after Entry into Force	Average Relative Growth Rate before Entry into Force	Average Relative Growth Rate after Entry into Force
Singapore	1.888	3.368	-0.358	0.766
Chile	1.921	2.895	-0.325	0.293
Australia	1.979	1.245	-0.910	-1.155
Morocco	3.816	3.182	0.722	0.932
Bahrain	-0.213	-0.076	-3.306	-2.325
El Salvador	1.883	1.406	-1.211	-0.843
Honduras	2.648	1.930	-0.445	-0.319
Nicaragua	1.777	2.591	-1.316	0.341
Guatemala	0.578	1.546	-2.515	-0.704
Dominican Republic	3.202	3.692	-0.102	1.677
Costa Rica	3.426	2.129	0.073	0.538
Oman	0.671	-3.612	-2.681	-5.203
Peru	4.519	3.415	1.166	1.824
Korea	3.828	2.358	1.061	0.479
Colombia	3.013	3.099	0.246	1.220
Panama	4.793	5.198	2.025	3.319

Source: Calculations based on World Bank, *World Development Indicators* database.

Table 4: Econometric Models of the Annual Growth Rate of GDP per Capita

Assumption about Delay of Impact of the Trade Agreement	Estimate of γ	Akaike Information Criterion	Adjust R^2
Immediate permanent impact	0.559 (0.371)	15,159.16	0.1802
Permanent impact that starts in the fourth year	0.541 (0.348)	15,159.21	0.1802
Permanent impact that starts in the fifth year	0.499 (0.364)	15,159.35	0.1802
Permanent impact that starts in the sixth year	0.825 (0.382)**	15,158.61	0.1804
Permanent impact that starts in the seventh year	1.179 (0.399)***	15,157.67	0.1807
Permanent impact that starts in the eighth year	1.045 (0.410)**	15,158.46	0.1804
Permanent impact that starts in the ninth year	0.640 (0.450)	15,159.41	0.1801

Note: Standard errors are reported in parentheses, and p-values are reported in square brackets. The dependent variable in all of the models is the annual growth rate of GDP per capita, measured in constant dollars. All of the specifications include country and year fixed effects that are statistically significant. All of the estimates include 2,490 country-year observations. Statistical significance at the 5 percent level is indicated by two asterisks, and statistical significance at the 1 percent level is indicated by three asterisks.

Table 5: Estimated Persistence of the Impact on the Growth Rate of GDP per Capita

Assumption about Persistence of Impact of the Trade Agreement	Estimate of γ	Akaike Information Criterion	Adjust R^2
Impact starts in the seventh year and lasts through the ninth year	1.258 (0.448)***	15,157.69	0.1807
Impact starts in the seventh year and lasts through the tenth year	1.338 (0.392)***	15,156.97	0.1809
Impact starts in the seventh year and lasts through the eleventh year	1.167 (0.373)***	15,157.53	0.1808
Impact starts in the seventh year and lasts indefinitely	1.179 (0.399)***	15,157.67	0.1807

Note: Standard errors are reported in parentheses, and p-values are reported in square brackets. The dependent variable in all of the models is the annual growth rate of GDP per capita, measured in constant dollars. All of the specifications include country and year fixed effects that are statistically significant. All of the estimates include 2,490 country-year observations. Statistical significance at the 1 percent level is indicated by three asterisks.

Table 6: Econometric Models of the Annual Growth Rate of Labor Productivity

Assumption about Delay of Impact of the Trade Agreement	Estimate of γ	Akaike Information Criterion	Adjust R^2
Immediate permanent impact	0.095 (0.452)	17,307.87	0.1377
Permanent impact that starts in the fourth year	0.303 (0.454)	17,307.14	0.1378
Permanent impact that starts in the fifth year	0.467 (0.478)	17,307.74	0.1378
Permanent impact that starts in the sixth year	0.588 (0.514)	17,307.17	0.1379
Permanent impact that starts in the seventh year	0.782 (0.573)	17,307.17	0.1379
Permanent impact that starts in the eighth year	1.715 (0.528)***	17,305.11	0.1386
Permanent impact that starts in the ninth year	1.172 (0.491)**	17,306.81	0.1380

Note: Standard errors are reported in parentheses, and p-values are reported in square brackets. The dependent variable in all of the models is the annual growth rate of GDP per capita, measured in constant dollars. All of the specifications include country and year fixed effects that are statistically significant. All of the estimates include 2,490 country-year observations. Statistical significance at the 5 percent level is indicated by two asterisks, and statistical significance at the 1 percent level is indicated by three asterisks.

Table 7: Estimated Persistence of the Impact on Growth Rate of Labor Productivity

Assumption about Persistence of Impact of the Trade Agreement	Estimate of γ	Akaike Information Criterion	Adjust R^2
Impact starts in the eighth year and lasts through the tenth year	1.675 (0.647)***	17,305.96	0.1383
Impact starts in the eighth year and lasts through the eleventh year	1.773 (0.518)***	17,304.99	0.1386
Impact starts in the eighth year and lasts through the twelfth year	1.591 (0.485)***	17,305.34	0.1385
Impact that starts in the eighth year and lasts indefinitely	1.715 (0.528)***	17,305.11	0.1386

Note: Standard errors are reported in parentheses, and p-values are reported in square brackets. The dependent variable in all of the models is the annual growth rate of GDP per capita, measured in constant dollars. All of the specifications include country and year fixed effects that are statistically significant. All of the estimates include 2,490 country-year observations. Statistical significance at the 1 percent level is indicated by three asterisks.