



# Have the free trade agreements reduced inflation rates?<sup>☆</sup>

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## ABSTRACT

Most previous studies have examined extensively the economic effects of free trade agreements (FTAs) such as their effects on economic growth, income distribution across industries, price competitiveness for international trade, trade volume, and the price of a commodity, but not very much on inflation rates. This study empirically estimates how much FTAs affect domestic inflation rates. From the cross-country panel data analysis of 34 OECD countries over the period 1980–2014, the expansion of FTAs shows a significant negative effect on the Consumer Price Index inflation, which is more apparent than the traditionally used openness measure. The inflation reduction effect is more significant in countries with a low level of openness than those with a high level of openness.

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## 1. Introduction

In recent decades, the inflation rates have been low in the OECD countries. In the 1980s, the average inflation rate of OECD countries was 10.6 percent, but it declined to 7.3 percent in the 1990s, 3.1 percent in the 2000s, and 1.8 percent in the 2010s.<sup>1</sup> The reasons for this decline in consumer price inflation are likely to include various country-specific structural factors and external factors such as international commodity prices, crude oil prices, and low inflationary pressure from the slowdown of the world economy after the global financial crisis. Some argue that the expansion of low-priced Chinese exports produced with cheap

labor may have contributed to the stabilization of global prices.<sup>2</sup> Expansion of foreign trade means relatively low-priced imports of overseas goods, which stabilize domestic prices. The institutional change that has made a decisive contribution to the expansion of such trade is the proliferation of free trade agreements (FTAs). The main contents of bilateral or multilateral FTAs include the reduction of tariff rates and the easing or elimination of trade barriers, which could directly reduce the price of imported goods and contribute to the stabilization of consumer prices if imports were expanded. This study attempts to estimate quantitatively how much the expansion of FTAs, separately from the effect of international trade on inflation rates, affected the domestic consumer price inflation rate. The objective of this study is to analyze how much the expansion of FTAs affects the inflation rate of each country based on the panel data analysis of 34 OECD countries for 1980–2014. We examine how much additional FTAs have affected the inflation rate in addition to the effect of international trade on domestic inflation, which has traditionally been focused. This study will not only be an empirical study of one aspect of the benefits of the FTA, but it will also have an implication for predicting the future trend of inflation rate by examining quantitatively how much the inflation rate stabilizes down due to the FTA expansion. This paper is organized as follows. Section 2 examines the previous studies on the economic effects or the price stabilization effects of FTAs. Section 3 discusses the data

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<sup>1</sup> The averages are calculated based on the member countries during each decade: 24 OECD countries in the 1980s, 29 in the 1990s, 32 in the 2000s, and 34 in the 2010s.

<sup>2</sup> Côté and De Resende (2008) and Kamin et al. (2004) find a negative effect of trade with China on domestic CPI inflation rates, but the size of the effects varies.

and empirical methodology to estimate the effect of FTAs on CPI, through the panel data models with 34 OECD countries and summarizes the estimation results. Section 4 concludes.

## 2. Price effects of FTAs

Most previous studies related to FTAs have examined extensively their economic effects on economic growth, income distribution across industries, export and import competitiveness, and foreign trade expansion. The literature on FTAs has been widely accumulated as a policy document for estimating and predicting the economic effects of FTA long before the negotiation process of FTA started. However, only a few studies examine how FTAs have affected the prices of specific industries or products, but they are sometimes only a descriptive analysis or deal with specific regions or differentiated effects across industries (Ha et al., 2015; Hayakawa and Yang, 2013; Hayakawa et al., 2015; Nakajima, 2004). The empirical analysis on the effect of FTAs on individual industries is valuable to micro-level researchers, but conducting the macro-level (price index level) analysis on the FTA effect on inflation would also be interesting. However, it is difficult to find a relevant study with an estimate of the effect on inflation, in particular, the effect of FTA, separately from the effect of international trade on inflation.

The effect of trade expansion and a consequent increase in the availability of cheaper imported goods due to a removal of trade barriers and more competitions directly drive down prices or force domestic producers to lower their prices, reducing the current inflation, as summarized in Wynne and Kersting (2007). Globalization in the form of an increase in openness may also create an indirect effect on inflation by improving efficiency and fostering productivity growth through several channels such as the transfer of technical knowledge, innovations, economies of scale, and specialization suggested by Grossman and Helpman (1991) and Edwards (1998). As a theoretical approach regarding the effect of openness on inflation, Watson (2016) suggests an explanation of the negative relationship between openness and inflation in a New Keynesian DSGE model that opening markets raises strategic complementarity in firms' pricing decisions and the degree of real price rigidities, which makes inflation less responsive to changes in real marginal cost, anchoring inflation expectations. We also think that FTAs as a qualitative measure of trade liberalization promotes more competition, making inflation less responsive to inflationary factors. There has been extensive empirical literature examining various channels through which trade affects the economy, in particular, inflation, using international data. Romer (1993) examines the relationship between trade openness and inflation theoretically and empirically. He uses the ratio of imports to GDP for trade openness as an explanatory variable of interest and per capita GDP, regional dummy variables (OECD, South America, Central America, etc.), central bank independence index, and central bank governor replacement cycle as additional control variables and finds a strong negative link between openness and inflation. Meanwhile, Samimi et al. (2012) examine the effect of openness expansion on the inflation rate by using various indexes reflecting foreign direct investment, tariff rate, etc. instead of the GDP-based import index by Romer (1993). They find that a traditional openness measure does not show a significant effect on inflation, but their new measure of economic globalization, namely the KOF index, shows a negative relationship with inflation. Binici et al. (2012) also analyze the effect of trade openness on market competition and productivity growth by industry and show that inflation decreases with greater market competitiveness, whereas trade openness is insignificant. Kamin et al. (2004) focus on the importance of the China factor to the domestic inflation rate and analyze the

impact of China's export growth, that is, the effect of the of imports from China on the inflation rate of US prices, but find the effect of the imports from China on US import prices to be small though significant. Alfaro (2005) also analyzes the effect of trade openness measured by the ratio of imports or exports to GDP and exchange rate on the inflation rate and uses the ratio of fiscal deficit to GDP as a control variable. Meanwhile, Auer and Mehrotra (2014) use the share of imports used in intermediate inputs as a key explanatory variable to estimate the impact of global factors of international interconnection through international trade on domestic prices. Borio and Filardo (2007) construct an estimation model to explain the inflation gap with an output gap, based on the Phillips curve model. They explicitly include the domestic GDP gap and the foreign output gap weighted with import shares for each of the trading partner countries in the estimation equation. The additional control variables include import prices, oil prices, and unit labor costs. Moreover, Ihrig et al. (2007) analyze an empirical estimation model in explaining inflation in the context of the Phillips curve model, considering trade openness, import prices, grain prices, and energy prices. This study is differentiated from the previous works in the sense that it tries to find an effect of FTAs on inflation separately from the expansion of international trade and estimate both the contemporaneous effect and the long-run effect of FTAs on inflation.

## 3. The estimation results

### 3.1. Data and methodology

This study conducts an empirical analysis focusing on the relationship between trade openness or FTAs and inflation rate using the annual panel data of 34 OECD countries from 1980 to 2014. The data used consist of the inflation rate calculated with the growth rate of the consumer price index and the variables that are considered to affect the inflation rate. The CPI growth rates are the dependent variable, and openness, FTA variables, M2 growth rate, GDP growth rate, and unit labor cost are the explanatory variables. The data used in the analysis are collected from IMF's International Financial Statistics (IFS), Direction of Trade Statistics (DOTS), OECD's Main Economic Indicators and Economic Outlook, and World Bank database. Table 1 shows the descriptive statistics of the data including the sources, definitions, and basic statistics.

Unlike the previous literature focusing on the relationship between openness and inflation, we consider FTA-related variables in addition to openness to separate the effects of international trade on domestic inflation in two ways. We interpret the traditionally used openness measure and the FTA-related measures as measures of trade liberalization in quantitative dimension and qualitative dimension, respectively, because the FTAs typically involve many extensive institutional changes by eliminating various trade barriers such as tariffs and quotas. Following Romer (1993), we first include the conventional measure of openness to test the hypothesis that the inflation rate is lower in countries with higher openness and then see any change of significance of the coefficients after the FTA-related variables are added. We also try to estimate the interaction effects between openness and FTA variables in determining inflation. In addition to trade openness and FTA variables, which are the key variables, the panel data estimation equations also include M2 money supply growth rate, GDP growth rate, and the growth rate of unit labor costs as control variables to reflect the concepts of the neutrality of money, the Phillips curve, and the cost-push inflation shocks. To analyze the effects of the FTA, we need a measure of FTAs. FTA is defined as the share of trade with the countries that have signed the FTA among trade, and FTA variables for export and import

**Table 1**  
Descriptive statistics for OECD panel data.

Variable	Source	Mean	Overall standard deviation	Between standard deviation	Within standard deviation	Min	Max	Obs.
$\Delta \ln CPI$	IFS	0.07	0.14	0.07	0.12	-0.05	1.88	1,106
$\Delta \ln M2$	World Bank	0.12	0.18	0.09	0.15	-0.33	2.22	1,025
<i>OPEN</i>	IMF, DOTS	0.58	0.33	0.34	0.13	0.11	1.80	1,076
<i>FTA</i>	IMF, DOTS	0.45	0.33	0.23	0.24	0.00	0.89	1,068
<i>OPENIM</i>	IMF, DOTS	0.30	0.16	0.17	0.06	0.05	0.93	1,076
<i>FTAIM</i>	IMF, DOTS	0.43	0.32	0.23	0.23	0.00	0.94	1,069
$\Delta \ln ULC$	OECD	0.04	0.06	0.03	0.06	-0.09	0.58	881
$\Delta \ln GDP$	OECD	0.03	0.03	0.01	0.03	-0.15	0.13	1,111

List of countries Australia, Austria, Belgium, Canada, Czech Republic, Chile, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Luxembourg, Iceland, Japan, Korea, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Spain, Sweden, Switzerland, Slovakia, Slovenia, Turkey, UK, US  
(N = 34)

Note: *CPI*, *M2*, *OPEN*, *FTA*, *OPENIM*, *FTAIM*, *ULC*, and *GDP* indicate Consumer Price Index, M2 money supply, the total amount of trade relative to GDP (openness), the share of trade with countries with FTAs in total trade, the ratio of total imports to GDP, the ratio of total imports to FTA countries, unit labor cost, and gross domestic product.

can be defined similarly. *FTAIM* is the share of imports from the countries that have signed the FTA among total imports. We report the estimation results with *FTA* and *FTAIM* only because we think the import price plays a higher role in determining domestic inflation than the export price, even though *FTAEX*, defined as the share of exports to the countries that have signed the FTA among total exports, shows qualitatively similar results. The econometric models are in two forms: a static panel data model and a dynamic panel data model.

#### Static panel data model:

$$\Delta \ln CPI_{i,t} = \beta_0 + \beta_1 OPEN_{i,t} + \beta_2 FTA_{i,t} + \beta_3 (OPEN_{i,t} \times FTA_{i,t}) + \alpha' X_{i,t} + \mu_i + \epsilon_t + v_{i,t}. \quad (1)$$

#### Dynamic panel data model:

$$\Delta \ln CPI_{i,t} = \beta_0 + \gamma_0 L(\Delta \ln CPI_{i,t}) + \beta_1 OPEN_{i,t} + \beta_2 FTA_{i,t} + \beta_3 (OPEN_{i,t} \times FTA_{i,t}) + \alpha' X_{i,t} + \mu_i + \epsilon_t + v_{i,t}. \quad (2)$$

*OPEN* denotes the conventional openness measure defined as the ratio of total trade to GDP and may sometimes be substituted as *OPENIM* or *OPENEX*, which is defined as the share of imports or exports of GDP. *FTA* can also be substituted as *FTAIM* or *FTAEX*.  $OPEN_{i,t} \times FTA_{i,t}$  is an interaction term.  $X_{i,t}$  is a vector of control variables such as M2 growth rate, GDP growth rate, the growth rate of the unit labor cost of country *i* at time *t*. The individual country-specific factor in inflation is captured by country dummies  $\mu_i$  and time dummies  $\epsilon_t$  as well as a dummy variable for the global financial crisis taking the value 1 for the years after 2007 and 0 for the years up to 2007 are sometimes included. In the static panel data model set out above, the selection between the Fixed Effects model and the Random Effects model is determined by the Hausman test. The static panel data model does not consider the possibility that the explanatory variables show an endogeneity problem generated with a time lag. We thus set up a dynamic panel data model that includes the past lagged variables of the dependent variable into the model, following the generalized method of moments (GMM) model of Arellano and Bond (1991). The significance of the coefficients can be employed to test the hypothesis that the higher openness of trade causes a lower inflation rate and the hypothesis that the inflation rate decreases as the trade share with the FTA countries increases.

$$\frac{\partial \Delta \ln CPI_{i,t}}{\partial OPEN_{i,t}} = \beta_1 + \beta_3 (FTA_{i,t}) \quad (3)$$

$$\frac{\partial \Delta \ln CPI_{i,t}}{\partial FTA_{i,t}} = \beta_2 + \beta_3 (OPEN_{i,t}) \quad (4)$$

Eqs. (3) and (4) calculate the direct or contemporaneous marginal effects of trade openness and FTAs on inflation, respectively. From Eq. (2), a long-run steady state effect on inflation of a permanent change in FTA can also be derived as  $1/(1 - \gamma_0)\beta_2 + 1/(1 - \gamma_0)\beta_3(OPEN_{i,t})$ . If openness and the FTAs lower inflation rate, then the coefficients,  $\beta_1$  and  $\beta_2$  will have a negative sign, and  $\beta_3$  measures the interaction effect between openness and FTAs, which may be negative too.

#### 3.2. Estimation results

The static panel data estimation results in Table 2 show that the FTA variables have a more powerful and significant effect on the CPI inflation rate than openness in most of the estimation equations. Estimation equations (I)–(IV) use *OPEN* and *FTA*, whereas equations (V)–(VIII) use *OPENIM* and *FTAIM* for openness and FTA variables, respectively, to investigate the effects of international trade on inflation. The coefficients on FTA variables are consistently significant regardless of whether time dummies or unit labor costs are included, whereas the openness variable loses its significance when time dummies are included. The estimated coefficients of *FTA* are around -0.15 to -0.02 implying that a 10-percentage point increase in *FTA* lowers CPI inflation rates by 1.5–0.2 percent points with an additional effect from the interaction between *FTA* and *OPEN*. The openness measures, *OPEN* or *OPENIM*, also tend to have a negative effect on inflation; however, the coefficients are smaller than those of *FTA* and sometimes insignificant when time dummies or unit labor costs are included. Therefore, it can be interpreted that the expansion of the international trade with the countries with FTAs contributes to the recent low inflation. The interaction term between FTA variables and openness turns out to be positive, which is different from the initial conjecture. The positive coefficients imply that the effect of FTA-related trade expansion on inflation rates is more pronounced in countries with lower openness than those with already higher openness. Other control variables also show reasonable signs, showing that the growth rates of money and unit labor costs have a positive effect on the inflation rate as expected. In most of the specifications, the global financial crisis influenced the inflation rate in a significantly negative way. The coefficient of GDP growth rate is negative but sometimes insignificant, which is different from what the Phillips curve relation predicts. The negative relationship between the growth rate of real GDP and the inflation rate can be interpreted as evidence of supply factors driving economic fluctuations.<sup>3</sup>

<sup>3</sup> In the existing literature, the sign of the relationship between real GDP and prices is not consistently estimated. A negative relationship is found in the

**Table 2**  
Effect of FTAs on CPI inflation in a static panel data model (dependent variable:  $\Delta \ln \text{CPI}$ ).

	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
<i>FTA</i>	-0.148*** (0.022)	-0.077*** (0.025)	-0.052*** (0.009)	-0.021** (0.009)				
<i>OPEN</i>	-0.084*** (0.027)	-0.043 (0.030)	-0.020** (0.010)	0.000 (0.010)				
<i>FTA</i> $\times$ <i>OPEN</i>	0.104*** (0.030)	0.055* (0.032)	0.034*** (0.011)	0.006 (0.011)				
<i>FTAIM</i>					-0.135*** (0.022)	-0.059** (0.025)	-0.049*** (0.008)	-0.019** (0.008)
<i>OPENIM</i>					-0.132*** (0.048)	-0.059 (0.052)	-0.029 (0.018)	-0.002 (0.018)
<i>FTAIM</i> $\times$ <i>OPENIM</i>					0.159*** (0.056)	0.059 (0.060)	0.056*** (0.020)	0.005 (0.020)
$\Delta \ln M2$	0.452*** (0.017)	0.446*** (0.017)	0.036*** (0.010)	0.043*** (0.010)	0.458*** (0.017)	0.449*** (0.017)	0.036*** (0.012)	0.043*** (0.010)
$\Delta \ln ULC$			0.631*** (0.018)	0.600*** (0.018)			0.635*** (0.018)	0.601*** (0.017)
$\Delta \ln GDP$	-0.680*** (0.094)	-0.865*** (0.106)	0.010 (0.035)	-0.142*** (0.038)	-0.686*** (0.095)	-0.871*** (0.106)	0.009 (0.036)	-0.140*** (0.038)
GFC dummy	-0.012* (0.007)	-0.089*** (0.023)	0.001 (0.003)	-0.057*** (0.007)	-0.014** (0.007)	-0.122*** (0.023)	0.001 (0.003)	-0.057*** (0.007)
Constant	0.122*** (0.015)	0.113*** (0.023)	0.039*** (0.006)	0.049*** (0.008)	0.112*** (0.014)	0.135*** (0.022)	0.036*** (0.006)	0.050*** (0.008)
Time dummies	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	965	965	745	745	966	966	746	746
Countries	34	34	31	31	34	34	31	31
R <sup>2</sup>	0.577	0.617	0.768	0.825	0.580	0.619	0.773	0.823
Hausman	395.63	605.37	32.39	123.27	361.62	573.58	28.20	122.61
[p-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Fixed/Random	FE							

Note: Refer to the Notes in Table 1 for variables and GFC dummy indicates a dummy variable for the global financial crisis taking 1 for the years after 2007. A static panel model the period of 1980–2014 was estimated with 34 OECD countries using Fixed Effects and Random Effects method. The selection of model estimation method is based on Hausman (1978) test results. The values in parentheses are the standard errors. \*\*\*, \*\*, and \* indicate significance at the 1%, 5% and 10% level, respectively.

Considering the possible endogeneity of variables, the dynamic panel data model may be more appropriate than the static panel data model. The dynamic model using the system GMM method is shown in Table 3. Openness variables lose significance consistently throughout all of the dynamic panel data models, whereas FTA variables show high significance in most of the specifications. This is the same when the FTA variables and openness variables are constructed by imports only. From the estimation equations (I)–(VIII), the coefficients on FTA variables are significant except in the specifications (II) and (VI) with time dummies. The magnitude of the coefficients on FTA variables is smaller than the static panel data model, having the estimated coefficients of *FTA* around  $-0.03$  to  $-0.01$ . For example, for the estimation equation (IV) in Table 3, the contemporaneous effect of a 10-percentage point increase in *FTA* with *OPEN* of 0.44, the average of OECD openness measure for the 1980s, is calculated as  $-0.6$  percent while the long-run effect on inflation of the 10-percentage point permanent increase in *FTA* is estimated as  $-0.97$  percent. The behavior of CPI inflation is strongly persistent in that a significant coefficient on the lagged inflation and the interaction term between FTA variables and openness shows a negative sign, implying that the inflation-stabilizing effect of FTAs is larger in countries with less openness. As in the static panel data model, other control variables such as money growth rate and growth rate of unit labor cost maintain their positive signs and significance of the coefficients but the global financial crisis dummy loses its significance in most of the cases. Moreover, the coefficient of GDP growth rate is still negative in most of the specifications.

studies of Lane (1997) and Samimi et al. (2012), whereas a positive relationship in that of Binici et al. (2012). Alfaro (2005), Ihrig et al. (2007), and Romer (1993) show different signs across countries, but Auer and Mehrotra (2014) and Borio and Filardo (2007) find no significance in the relationship.

Table 4 provides a counterfactual experiment to show how much the FTAs reduced inflation rates by calculating the marginal effect of the FTAs with the average OECD country. The figures in the first two upper rows indicate the averages of *FTA* and *OPEN* of OECD countries for each decade. By applying the estimation results from Tables 2 and 3 and calculating the contribution of FTAs shown in Eq. (4), we obtain the size of the marginal effect of FTAs for the average *FTA* and *OPEN* across OECD countries. For example, for model (III) in Table 2, FTAs changed the CPI inflation rate by  $-0.77$ ,  $-1.38$ ,  $-1.72$ , and  $-1.71$  percent during the 1980s, 1990s, 2000s, and 2010s, respectively, comparing with the hypothetical case without the FTAs. As for the dynamic panel data model (III) in Table 3, the corresponding numbers of the contemporaneous effects of FTAs are  $-0.14$ ,  $-0.22$ ,  $-0.26$ , and  $-0.25$  percent, during the 1980s, 1990s, 2000s, and 2010s, respectively, while the long-run effects of the permanent change in FTAs on inflation are estimated as  $-0.23$ ,  $-0.40$ ,  $-0.49$ , and  $-0.47$  percent, during each of the same periods, respectively.

#### 4. Conclusion

FTAs typically include a reduction of the tariff rate or removing the barriers to trade, thereby lowering the price of imports. The expansion of trade also leads to a change in domestic prices by exporting products based on the comparative advantage. From this point of view, the low inflation rate during the recent several decades is likely to have something to do with the expansion of FTAs. In this study, we examined quantitatively how much FTAs have contributed to the change in the domestic inflation rate. From the cross-country panel data analysis of 34 OECD countries over the period of 1980 through 2014, the expansion of FTAs shows a significant negative effect on the CPI inflation, which is more apparent than the traditionally used openness measure. The FTA effect of lowering inflation rate is higher for countries with

**Table 3**  
Effect of FTAs on CPI inflation in a dynamic panel data model (dependent variable:  $\Delta \ln \text{CPI}$ ).

	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
<i>FTA</i>	-0.032** (0.017)	-0.016 (0.019)	-0.010** (0.004)	-0.009** (0.004)				
<i>OPEN</i>	-0.022 (0.021)	-0.013 (0.023)						
<i>FTA</i> $\times$ <i>OPEN</i>	0.028 (0.025)	0.017 (0.028)	0.007** (0.003)	0.007** (0.004)				
<i>FTAIM</i>					-0.029* (0.017)	-0.013 (0.019)	-0.011*** (0.004)	-0.010** (0.004)
<i>OPENIM</i>					-0.025 (0.036)	-0.008 (0.041)		
<i>FTAIM</i> $\times$ <i>OPENIM</i>					0.037 (0.046)	0.018 (0.052)	0.016*** (0.006)	0.016** (0.008)
$\Delta \ln \text{CPI}_{-1}$	0.413*** (0.082)	0.407*** (0.081)	0.388*** (0.070)	0.376*** (0.092)	0.413*** (0.082)	0.405*** (0.081)	0.388*** (0.070)	0.376*** (0.091)
$\Delta \ln M2$	0.317*** (0.102)	0.323*** (0.098)	0.029* (0.016)	0.036** (0.016)	0.317*** (0.102)	0.323*** (0.098)	0.029* (0.016)	0.036** (0.016)
$\Delta \ln \text{ULC}$			0.375*** (0.074)	0.385*** (0.075)			0.373*** (0.074)	0.383*** (0.075)
$\Delta \ln \text{GDP}$	-0.318*** (0.124)	-0.438*** (0.161)	0.051 (0.063)	-0.077 (0.052)	-0.324*** (0.124)	-0.445*** (0.160)	0.050 (0.063)	-0.077 (0.053)
GFC dummy	-0.007 (0.005)	-0.027 (0.023)		-0.005 (0.005)	-0.008 (0.005)	-0.055*** (0.018)		-0.005 (0.005)
Constant	0.027* (0.015)	0.054** (0.022)	0.008*** (0.003)	0.012** (0.006)	0.025 (0.016)	0.035* (0.020)	0.008*** (0.003)	0.013** (0.006)
Time dummies	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	942	942	728	728	943	943	729	729
Countries	34	34	31	31	34	34	31	31
AR(1)	-2.33 [p-value] [0.02]	-2.48 [0.01]	-2.58 [0.01]	-2.61 [0.01]	-2.32 [0.02]	-2.47 [0.01]	-2.57 [0.01]	-2.60 [0.01]
AR(2)	-0.87 [p-value] [0.38]	-1.14 [0.25]	0.13 [0.90]	-0.36 [0.72]	-0.85 [0.39]	-1.13 [0.26]	0.13 [0.89]	-0.36 [0.72]
Hansen	32.89	0.00	29.38	0.00	30.41	0.00	30.20	0.00
[p-value]	[1.00]	[1.00]	[1.00]	[1.00]	[1.00]	[1.00]	[1.00]	[1.00]

Note: Refer to the Notes in Table 1 for variables.  $\Delta \ln \text{CPI}_{-1}$  is CPI inflation rate in the previous period. A dynamic panel model for the period of 1980–2014 was estimated with OECD countries using the system GMM method. The values in parentheses are the standard errors. \*\*\*, \*\*, and \* indicate significance at the 1%, 5% and 10% level, respectively.

**Table 4**  
Counterfactual analysis: marginal effects of FTAs.

	1980s	1990s	2000s	2010s
<i>FTA</i>	0.207	0.423	0.604	0.649
<i>OPEN</i>	0.439	0.563	0.684	0.749
Contemporaneous effect of FTAs on inflation				
Table 2 (III)	-0.0077	-0.0138	-0.0172	-0.0171
(IV)	-0.0038	-0.0075	-0.0102	-0.0107
Table 3 (III)	-0.0014	-0.0025	-0.0030	-0.0029
(IV)	-0.0013	-0.0022	-0.0026	-0.0025
Long-run effect of a permanent change in <i>FTA</i> on inflation				
Table 3 (III)	-0.0023	-0.0040	-0.0049	-0.0047
(IV)	-0.0020	-0.0035	-0.0042	-0.0040

Note: *FTA* and *OPEN* are the averages of *FTA* and *OPEN* of OECD countries for each decade, respectively. The middle four rows indicate the contemporaneous marginal effect of FTAs on CPI inflation shown in Eq. (4) based on the coefficients of the estimation specifications (III) and (IV) in Tables 2 and 3, respectively. The bottom two rows are the long-run effect of a permanent change in *FTA* on CPI inflation based on the coefficients of the estimation specifications (III) and (IV) in Table 3, respectively.

low level of openness. The contemporaneous marginal effect of the 10-percentage point increase in *FTA* on CPI inflation rates is estimated to be around  $-0.13$  to  $-1.7$  percent for the average OECD country over the recent decades and the long-run effect of a permanent change in FTAs are estimated to be greater than the contemporaneous effect.

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