

Effects of Service Industry Liberalization on Exports

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Abstract. The service industry opening can bring about a large welfare effect. However, the Chinese government basically adheres to a more or less conservative service industry opening strategy. Therefore, we try to find out the potential effects of service industry opening from a policy perspective. This paper quantifies the information from “foreign investment industry guidance catalogue” as a FDI liberalization index, used to measure the Chinese government’s attitude towards foreign investment. Furthermore, we construct the upstream and the downstream foreign restriction index, and examine the impact of foreign investment liberalization on China’s export and value-added exports through empirical analysis. The results show that: reduction of the restrictions on foreign investment can promote China’s the export of total industry and services, and enhance the competitiveness of exports. Whether the services industry played as an upstream or downstream one, service industry opening can effectively promote its upstream and downstream industry export. Service industry liberalization has strong externality, which means its export effects on upstream and downstream industries are significantly higher than on itself.

Introduction

In view of the imperfect development of the service industry, China has been worried that the opening up of the service industry may have a huge impact on the development of domestic services. Therefore since 2001, the opening of the service industry is relatively slow, which can be seen from the policy documents published by the Chinese government. In general, the policy focus of China’s service trade is the service “going out”. The main objective of the service industry opening up is to attract foreign investment, knowledge and regime in order to improve the quality and international competitiveness of the domestic service industry. In fact, by observing the process of opening up the manufacturing industry, we find that foreign investment have brought positive changes on China’s industrial structure, market structure and technical level. Does the service industry have the same characteristics?

Surprisingly little is known about policies that affect international trade in services. Previous analyses have focused on policy commitments made by countries in international agreements but these commitments do not in many cases reflect actual policy (Borchert et al., 2012). OECD has constructed a Services Trade Restrictiveness Index to characterize policy restrictions from perspectives of barriers to competition and public ownership, restrictions on foreign ownership and other market entry conditions, restrictions on the movement of people and other discriminatory measure and international standards (OECD, 2013). The STRI are found to be a statistically significant determinant of manufactured exports performance, for restrictions on FDI impede the spread of service technology between countries (Hoekman and Shepherd, 2017). Harding and Javorcik(2011)found that foreign direct investment could effectively promote the export quality of the host country. In fact, domestic service content contributes a significant amount of the share of manufacturing exports (OECD, 2014). Du et al. (2014) used the data of China’s manufacturing enterprises to examine the technology spillover of foreign investment in China from horizontal and vertical spillovers effect. Other studies pay attention to the service industry. Clemes et al. (2016) used the data from 1994 to 2011 to construct a single structural growth equation and a simultaneous equation to measure the spillover effects study. The service sector not only had a positive spillover effect on manufacturing growth, but also positive for per capita GDP growth enhancement.

Researches on are the most abundant, and the main conclusion is that FDI has a positive effect on the growth of Indian services exports (N.J. Saleena, 2013), there is a bidirectional causal relationship between service exports and economic output, and at least a unidirectional causality from FDI and services exports to both manufacturing and services outputs (Kumar, 2013). Moreover, FDI can obviously promote modern trade in services but cannot have evident effects on traditional trade (Sahoo and Dash, 2017). The existing literature is basically studied from the FDI data directly, rather than the policy point of view. Furthermore, while most of the literature observes the technical spillovers of the service industry openness to manufacturing, it does not study the possible paths. In fact, researches on technology spillover effect of FDI are mainly focused on the research of manufacturing industry itself.

The contribution of this chapter is mainly embodied in two aspects: First, using the FDI liberalization index to study the openness of service industry from the view of the government policy. Second, this article uses the input-output table, upstream and downstream index to analyze the positive externalities and possible path of the service industry in opening process. In order to examine the external role of the service industry as an upstream and downstream to promote the development of other industries and to verify whether the Chinese government should expand the service industry opening, this paper first analyzes the restricted status according to China's "foreign investment industry guidance catalogue" and quantifies foreign capital restrictions situation, and then build an empirical model from the industry level to explore the opening effects of the service industry on domestic exports and industry competitiveness.

Measurement

We construct the degree of foreign restriction index to quantify the restriction measures according to the "foreign investment industry guidance catalog" and study the opening issue of the service industry.

Since the opening of service trade cannot be quantified directly as tariffs and quotas as in the case of trade in goods, it is important to measure the openness level of service trade either as an independent variable or a dependent variable. The OECD database measures the Service Trade Restriction Index (STRI), and many studies are based on the index or simply manipulate it as a key indicator. However, although the index takes into account the overall effect of trade restrictions, STRI's classification of trade in services is quite different from that of China's service industry, and the index does not provide three-digit industry level data to ensure the accuracy of the data matching. There are some other studies to examine the openness of service business under the commercial presence, but most of them use the FDI data as the indicators. Because China's statistical industry data is incomplete, the overall FDI data cannot reflect the industry characteristics. There are also many studies using the proportion of foreign investment in the overall industry to measure the degree of foreign investment liberalization, but this index reflects the results of foreign liberalization. Additionally, the results are also affected by the domestic market. Therefore it might not be consistent with government policy measures. For example, when the government implements the foreign capital liberalization policy, foreign investment may not enter the country because of natural monopoly or market competition in the industry and other non-policy factors. In this case, the calculation of the indicators will be serious errors. To better reflect China's opening attitude towards foreign investment, this paper quantifies the information from "foreign investment industry guidance catalogue" as a FDI liberalization index.

In summary, the quantification process is to reorganize the manufacturing and service industries information of the 1995 to 2015 "foreign investment industry guidance catalogue" according to the three-digit industries classification in the 2002¹ "Standard Industrial Classification". As each item of the "foreign investment industry guidance catalogue" does not correspond to the standard classification and might be defined under sectors or sub-sectors. In view of this, based on the

¹China's "Standard Industrial Classification" has three versions of 1994, 2002 and 2011. Using the data in 2002 version can better match the WIOD input-output table and correspond to the most years of micro-data.

industry and product connotation, this article matches the data manually.

This paper establishes three indexes, $DFRI1$, $DFRI2$ and $DFRI3$ to reflect the actual results of prohibited, prohibited and restricted and encouraged categories in the “foreign investment industry guidance catalogue”. If the industry is prohibited, we code the three-digit industry as 1 and 0 otherwise, indicated by $DFRI1$; if the industry is prohibited or restricted, we code the three-digit industry as 1 and 0 otherwise, indicated by $DFRI2$; if the industry is prohibited, we code the three-digit industry as 2, code the prohibited as 1 and the encouraged as -1, indicated by $DFRI3$.

Upstream Degree of Foreign Restriction Index (Upstream_DFRI)

Follow Broulès et al. (2013)’s method of measuring the degree of trade liberalization of intermediate products and upstream market control, this paper constructs the proxy variables of the liberalization of the upper industries. The specific indicators are as follows:

$$Upstream_DFRI_{xit} = \sum_j DFRI_{xijt} \times \mu_{ij}, \quad (1)$$

where $DFRI$ represents the foreign restriction index in the upstream industry of the industry on the left side of the equation. The value of x is 1, 2, and 3 μ_{ij} is the proportion of the j industry as the intermediate input in all i industry’s intermediate inputs. Similar to the $DFRI$ index, we can calculate three kinds of upstream foreign liberalization indicators such as $Upstream_DFRI1$, $Upstream_DFRI2$ and $Upstream_DFRI3$.

This paper uses the 2001 to 2014 China’s inter-departmental input-output data, and the concept of upstream and downstream is the one commonly used in input-output. Specifically, upstream and downstream is corresponds to the sample’s upstream and downstream industry of its own, to different samples, the upstream and downstream industries are different.

Downstream Degree of Foreign Restriction Index (Downstream_DFRI)

Similarly, we calculate $Downstream_DFRI$:

$$Downstream_DFRI_{xit} = \sum_j DFRI_{xijt} \times \varphi_{ij}, \quad (2)$$

where φ_{ij} the is the proportion of the i industry as the intermediate input in all j industry’s intermediate inputs. Similar to the $DFRI$ index, we can calculate three kinds of upstream foreign liberalization indicators such as $Downstream_DFRI1$, $Downstream_DFRI2$ and $Downstream_DFRI3$.

This paper uses the latest version of the World Input-Output Database (WIOD) (2000-2014) to calculate the indicator of export trade and value, which includes 56 new industries in 43 countries. WIOD uses a non-competitive input-output table that distinguishes between intermediate inputs and foreign inputs with a large input-output matrix of $(56 * 43) * (56 * 43)$ dimensions.

Industry data from the WIOD and the “Standard Industrial Classification” is different, so before the regression, we need to re-match the WIOD industries’ latest 56 sub-sectors industry data and the standard industrial data first to ensure the data consistency.

Estimation Model

We use industrial exports and value-added exports as the dependent variables to explore the role of service industry opening, especially the opening effects of upstream and downstream service industry on domestic export and industry competitiveness. Therefore we construct the following econometric model:

$$In\ exp_{idt} = \alpha_d + \alpha_i + \alpha_t + \beta_1 DFRI2_{it} + X_{it} + \varepsilon_{idt}, \quad (3)$$

$$In_value_add_{idt} = \alpha_d + \alpha_i + \alpha_i + \beta_1 DFRI2_{it} + X_{it} + \varepsilon_{idt}, \quad (4)$$

where $Inexp_{idt}$ represents exports from China's i industry to d country, $In_value_add_{idt}$ means value-added exports (Wang, 2014). X_{it} are control variables.

In order to observe the influence of the service industry as an upstream and downstream opening process, this paper further increases the independent variables and gets the models as follows:

$$\begin{aligned} Inexp_{idt} = & \alpha_d + \alpha_i + \alpha_i + \beta_1 DFRI2_{it} + \beta_2 Upstream_DFRI2_service_{it} + \\ & \beta_3 Downstream_DFRI2_service_{it} + \beta_4 Upstream_DFRI2_manu_{it} + \quad , \quad (5) \\ & \beta_5 Downstream_DFRI2_manu_{it} + X_{it} + \varepsilon_{idt} \end{aligned}$$

and

$$\begin{aligned} In_value_add_{idt} = & \alpha_d + \alpha_i + \alpha_i + \beta_1 DFRI2_{it} + \beta_2 Upstream_DFRI2_service_{it} + \\ & \beta_3 Downstream_DFRI2_service_{it} + \beta_4 Upstream_DFRI2_manu_{it} + \quad , \quad (6) \\ & \beta_5 Downstream_DFRI2_manu_{it} + X_{it} + \varepsilon_{idt} \end{aligned}$$

where the $Upstream_DFRI2_service_{it}$ shows the foreign capital liberalization (or restriction index) of upstream service industry, $Upstream_DFRI2_manu_{it}$ means foreign capital liberalization(or restriction index) of upstream manufacturing industry, $Downstream_DFRI2_service_{it}$ and $Upstream_DFRI2_manu_{it}$ can be obtained similarly.

In addition to the above mentioned core explanatory variables, in order to prevent the occurrence of biased estimates due to lack of important explanatory variables, this paper adds some control variables to control the relevant characteristics of the samples both at the industry and the national level. Among them, variables (1) -(3) are used to control industry factors, variables (4)-(7) are controlling national factors:

(1)Output at basic prices (ln_total_output). The output at basic prices represents the output that an industry estimates during the accounting period, which is different from the estimated output in the production process. This variable is used to control the industry size.

(2)International Transport Margins ($ln_total_int_trans$). The international transport margins represent the difference between the FOB (Free on Board) and CIF (Cost, Freight and Freight) , which is the sum of the freight. This variable is used to control the tradability of the industry.

(3)Value added at basic prices (ln_ind_va). This value added at basic prices is the industry-level control variable, not the trade value added, but the value added in the GDP budget at the base price. The United Nations recommends the use of basic prices rather than producer prices to prevent the distorting of the true value of industrial added value caused by the difference in total industrial output taxes and product subsidies among different industry sectors. This variable is used to control the industry structure.

(4)Gross domestic product (ln_wdi_GDP). This world's annual GDP, one of the World Bank World Development Indicators (WDI) and measured by 2010 unchanged dollars, is for controlling the level of national development.

(5)Gross domestic product per capita ($ln_wdi_GDP_PCAP$). This is the world's annual GDP per capita from the World Bank World Development Indicators (WDI), which is measured by unchanged 2010 dollar pricing.

(6)Bilateral regional agreement (FTA). This data is a variable of 0, 1 from the WDI database. It is used as country level control variable. If this country has signed bilateral free trade agreement with China, we code it as 1, and 0 otherwise.

(7)General agreement on tariffs and trade ($GATT_d$). This data is a variable of 0, 1 from WDI database. It is used as country level control variable. If this country is a GATT member, we code it as 1, and 0 otherwise.

Results and Analysis

The regression results are showed in Table 1, Columns (1) to (3) shows the effect of changes in the foreign investment restrictions on exports and Columns (4) to (6) shows the effect of changes in the foreign investment restrictions on value added exports, and Columns (3) and Columns (6) are results of service industry samples, while the rest are using the whole sample.

From the results, we can find that: First, there are negative relationships between the restrictions and China's exports or value-added exports. Which indicates that reduction of restrictions on foreign investment may increase exports and competitiveness; second, the opening of the service industry cannot only increase upstream exports or value-added exports, but promotes downstream exports also. Additionally, services can have stronger promoting effects on exports when played as the downstream industry; third, the opening of the service industry has strong externality. The manufacturing industry's promoting effects on exports are not as significant as that of the service sector. It might because that the manufacturing industry has a higher degree of openness. The service sector has shown a clear externality, that is, the opening of the service industry not only affects the export of the service industry itself, but also promotes the export of other industries.

In order to study the effect of the service industry on its own, we run the regression with service samples, the results are shown in Column (3) and (6). Similar to the results of the full sample, the openness of the service sector can facilitate the opening of the service sector through upstream and downstream, and the liberalization of services can lead to an increase in service exports. By comparing the results of different samples, we find that when played as a downstream industry, openness of service industry may have more obvious positive effects on manufacturing industry.

Table 1. Multivariate OLS Regression Results with Control Fixed Effects

	(1)	(2)	(3)	(4)	(5)	(6)
	lnexp	lnexp	lnexp(service only)	ln_value_add	ln_value_add	ln_value_add (service only)
DFRI2	-0.609*** (-14.57)	-0.549*** (-11.90)	-0.323*** (-6.03)	-0.602*** (-14.58)	-0.538*** (-11.81)	-0.304*** (-5.75)
Upstream_DFRI2_service		-1.712*** (-12.67)	-1.101*** (-6.30)		-1.703*** (-13.00)	-1.070*** (-6.26)
Downstream_DFRI2_service		-5.584*** (-13.17)	-1.816*** (-3.12)		-5.456*** (-12.92)	-1.591*** (-2.78)
Upstream_DFRI2_manu		0.146* (1.93)	0.097 (0.86)		0.113 (1.52)	0.085 (0.77)
Downstream_DFRI2_manu		0.321*** (3.19)	0.941*** (3.77)		0.293*** (2.94)	0.897*** (3.71)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R ²	0.793	0.794	0.578	0.786	0.787	0.572
F	437.128	363.017	63.749	411.900	344.661	62.628
N	32945	32346	17970	32945	32346	17970

Note: Cluster-robust T statistic in parentheses, *p < 0.1, ** p < 0.05, ***p < 0.01.

The models in Table 2 are slightly different from the previous equations. In order to study the effect of service and manufacturing liberalization on its own export and added value, we divide *DFRI2* into *DFRI2_service* and *DFRI2_manu*.

The new models are as follows:

$$\begin{aligned} \ln \exp_{idt} = & \alpha_d + \alpha_i + \alpha_t + \beta_1 \text{Upstream_DFRI2_service}_{it} + \beta_2 \text{Upstream_DFRI2_manu}_{it} \\ & + \beta_3 \text{DFRI2_service}_{it} + \beta_4 \text{DFRI2_manu}_{it} + \beta_5 \text{Downstream_DFRI2_service}_{it} + \\ & \beta_6 \text{Downstream_DFRI2_manu}_{it} + X_{it} + \varepsilon_{idt} \end{aligned} \quad (7)$$

$$\begin{aligned} \ln_value_add_{idt} = & \alpha_d + \alpha_i + \alpha_t + \beta_1 \text{Upstream_DFRI2_service}_{it} + \\ & \beta_2 \text{Upstream_DFRI2_manu}_{it} + \beta_3 \text{DFRI2_service}_{it} + \beta_4 \text{DFRI2_manu}_{it} + \\ & \beta_5 \text{Downstream_DFRI2_service}_{it} + \beta_6 \text{Downstream_DFRI2_manu}_{it} + X_{it} + \varepsilon_{idt} \end{aligned} \quad (8)$$

In Table 2, coefficients of *DFRI2_service* in Column (1), (3) are positive while coefficients of *DFRI2_service* in Column (2), (4) are negative. This seemed contradictory result is actually reasonable. In Column (1) and (3), we do not have the industry fixed effect, the results therefore show the overall cross-sectional correlation, which means the service industry with higher exports and value-added exports is mostly the industry of higher restrictions. In fact, industry with higher export may be the more monopolistic industry with stronger domestic enterprises. After fixing the industry effect, the results are consistent with the above conclusions.

Table 2. Multivariate OLS Regression Results with Control Fixed Effects

	(1)	(2)	(3)	(4)
	lnexp	lnexp	ln_value_add	ln_value_add
Upstream_DFRI2_service	-0.933*** (-9.07)	-1.662*** (-12.29)	-0.916*** (-9.00)	-1.653*** (-12.60)
Upstream_DFRI2_manu	-0.430*** (-3.49)	0.300*** (4.00)	-0.387*** (-3.22)	0.268*** (3.61)
DFRI2_service	0.682*** (8.52)	-0.196*** (-3.76)	0.651*** (8.27)	-0.184*** (-3.59)
DFRI2_manu	2.315*** (12.43)	-1.674*** (-17.30)	2.265*** (12.25)	-1.667*** (-17.77)
Downstream_DFRI2_manu	-1.871*** (-12.45)	0.611*** (6.52)	-1.865*** (-12.60)	0.583*** (6.27)
Downstream_DFRI2_service	-1.580*** (-3.98)	-5.942*** (-13.66)	-1.629*** (-4.20)	-5.813*** (-13.42)
Industry FE	No	Yes	No	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
R ²	0.615	0.794	0.605	0.787
F	113.588	396.315	103.931	383.049
N	32346	32346	32346	32346

Note: Cluster-robust T statistic in parentheses, *p < 0.1, ** p < 0.05, ***p < 0.01.

Considering that there might be a reverse causality relationship between the foreign investment liberalization in services and the growth of trade which might bring about an endogenous problem, we use the lagged terms of the explanatory variable to test whether the results are robust or not. The results are consistent with those of the previous analysis, indicating that the main results of this paper are less affected by the reverse causality (See Table 3). In fact, this article focuses on the upstream and downstream effects. One industry's trade activities might not be easy to have impact on the upstream or downstream service industry openness.

Table 3. Endogeneity test results

	(1)	(2)	(3)	(4)
	lnexp	lnexp	ln_value_add	ln_value_add
L1.Upstream_DFRI2_service	-1.336*** (-11.23)	-0.718*** (-4.83)	-1.365*** (-11.87)	-0.717*** (-4.94)
L1.Upstream_DFRI2_manu	0.202** (2.70)	0.136 (1.27)	0.173** (2.34)	0.123 (1.17)
L1.DFRI2	-0.535*** (-13.32)	-0.388*** (-7.50)	-0.521*** (-13.09)	-0.367*** (-7.17)
L1.Downstream_DFRI2_manu	0.375*** (3.99)	0.770*** (2.89)	0.360*** (3.87)	0.739*** (2.86)
L1.Downstream_DFRI2_service	-5.122*** (-13.01)	-1.760*** (-3.06)	-5.018*** (-12.83)	-1.539*** (-2.72)
Industry FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
R ²	0.800	0.583	0.793	0.577
F	883.269	182.167	894.056	181.273
N	30186	16770	30186	16770

Note: Cluster-robust T statistic in parentheses, *p < 0.1, ** p < 0.05, ***p < 0.01.

Conclusions

Overall, the increase in the opening level of foreign investment in the service industry has a significant positive effect on the export and value-added exports of China's entire industry and services. As a result, the openness of the services sector is consistent with the "export-oriented" objectives of the Chinese government's policy towards the service industry. Moreover, the export effect of the service industry on the whole industry is very significant through the way of upstream and downstream, indicating that the service industry liberalization has strong externalities, the opening benefits flow into the manufacturing and other industries. In terms of data values, this promoting effect might be stronger when the service industry is played as a downstream industry.

Therefore, even without considering the increase in the welfare of consumers under the condition of open service, the opening of the service industry has a positive effect on the domestic service industry and the whole industry export and competitiveness promotion. The Chinese government should pay more attention to the opening of the service industry, and further improve the opening level of the service industry by reducing the access restrictions of foreign investment.

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