Exploring the Effects of FTAs on Chilean Exports: Heterogeneous responses and Financial Constraints*

Explorando los Efectos de loa ALCs en las Exportaciones Chilenas: Respuestas Heterogéneas y Restricciones Financieras

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Abstract

In this paper, we examine the influence of Free Trade Agreements (FTAs) on Chilean exports during the past thirty years. Over the last three decades, Chile has entered into 31 FTAs with 65 countries, encompassing nearly 90% of global GDP. Despite this, there's a notable absence of empirical evidence regarding the extent and nature of the impact of these agreements on export volumes and product diversification. With a rich dataset encompassing bilateral trade flows at the product-level and key financial indicators, we employ a difference-in-differences approach to provide robust evidence of the positive impact of these FTAs on export levels and the variety of products exported. Our analysis also reveals variations in these effects based on the industries' initial export share and trading partners' income levels. Furthermore, we investigate how FTAs interacted with the financial development and capital control policies of trading partners, demonstrating their role in mitigating financial constraints on trade.

Key words: *International trade, Free trade arrangements, Heterogeneous effects, financial frictions.*

JEL Classification: *F1, F13, F14, F63*

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Resumen

En este trabajo se examina la influencia de los Acuerdos de Libre Comercio (ALCs) en las exportaciones chilenas durante los últimos treinta años. A lo largo de las últimas tres décadas, Chile ha suscrito 31 ALC con 65 países, que representan cerca del 90% del PIB mundial. A pesar de esto, existe poca evidencia empírica respecto al alcance y naturaleza del impacto de estos acuerdos en volúmenes exportados y diversificación de las exportaciones. Usando una base de datos de flujos bilaterales de comercio a nivel de producto complementada con información de variables claves de desarrollo financiero, se emplea un análisis de diferencias en diferencias para proporcionar evidencia robusta del impacto positivo de estos ALCs en los niveles de exportación y el número de productos exportados. Nuestro análisis revela diferencias en estos efectos dependiendo de la importancia inicial del sector y de los niveles de ingreso del socio comercial. Además, se investiga el efecto interactivo de ALCs con desarrollo financiero y controles de capitales en el socio comercial, mostrando que los acuerdos son útiles para mitigar el impacto de las restricciones financieras en el comercio internacional.

Palabras clave: *Comercio internacional, acuerdos de libre comercio, efectos heterogéneos, fricciones financieras*

Clasificación JEL: *F1, F13, F14, F63*

1. Introduction

Chile, as an early adopter of progressive economic reforms in Latin America, has been a pioneer in pursuing Free Trade Agreements (FTAs) as a strategic trade policy. Since the restoration of democracy in 1990, successive democratic governments have pursued this strategy with the primary objective of expanding access to foreign markets and bolstering export diversification. This approach builds upon Chile's earlier experiment with unilateral trade liberalization in the 1970s and 1980s, rendering Chile an interesting setting for studying the effects of selective trade policies. While some studies have explored the effects of certain agreements, a comprehensive evaluation of their overall impact is still missing.

The existing literature has identified large and positive effects of FTAs on international trade (Rose, 2004; Baier and Bergstrand, 2007, 2009; Eicher and Henn, 2011). This is in contrast to unilateral trade liberalization, where the increase in exports may not be as pronounced, except for potential second-round or indirect effects of tariff reductions on inputs (Eicher and Henn, 2011). Ad-

ditionally, the literature has found that the magnitude of the increase in exports triggered by FTAs depends on various factors, such as the price elasticity of export demand and the presence of fixed costs in exporting. Baier et al. (2019) show evidence of heterogeneous effects of the FTAs depending on distance, ex-ante trade frictions and the ability to influence the trading partners' terms of trade.

For the case of Chile, several papers have studied specific FTAs, finding overall positive effects in terms of volume of exports but with heterogenous findings with regards to product differentiation (Chumacero et al., 2004; Jean et al., 2014a; Malhotra and Stoyanov, 2008; Wehner, 2011). However, a comprehensive evaluation capturing the heterogeneous impacts of these agreements is still missing. In light of the varied and sometimes contradictory findings in the literature, this paper aims to provide a comprehensive evaluation of the effects of FTAs on Chilean exports and product differentiation, examining not only the overall effects but also the substantial heterogeneity within.

Our central investigation focuses on whether FTAs have indeed led to a significant increase in the value of Chilean exports and a broader range of exported products. Furthermore, we aim to uncover which industries have benefitted the most from these agreements and whether the effects of FTAs are moderated or accentuated by specific characteristics of our trading partners, such as their income levels and financial development. We also explore whether FTAs can act as a counterbalance, mitigating the adverse consequences of low levels of financial development and capital account restrictions.

One of the key debates regarding the effectiveness of FTAs in Chile revolves around the issue of export diversification and sophistication. Some argue that these agreements have not succeeded in diversifying the Chilean economy, which remains heavily dependent on commodities like copper (Peres-Cajías et al. (2021); Dingemans and Ross (2012)). However, others contend that, after decades of varying emphasis on trade policy, Chile's performance has exceeded expectations based on its fundamentals. Lebdioui (2019) indicates that: "Chile has managed to diversify and develop new competitive sectors by being proactive". A similar view is shared by Salinas (2021), highlighting the increase in export diversification and sophistication in spite of the distance to world markets. Our paper contributes to this debate by providing evidence of positive effects of FTAs not only on the value of exports but also on the number of exported products.

To explore these issues, we make use of a rich dataset that encompasses bilateral trade flows at the product level, supplemented by standard gravity indicators and financial data. We apply a robust difference-in-differences approach, capitalizing on the timing differences in the implementation of FTAs with various countries. Our primary aim is to uncover the diverse impacts of

these agreements across different industries and characteristics of our trading partners, thus enriching our comprehension of Chile's overarching trade policy.

Our findings provide valuable insights into the varied effects of FTAs across different industries and attributes of trading partners. We demonstrate that the impact of FTAs varies significantly at the industry level, depending on the initial export share of each industry. Interestingly, this effect follows a non-linear pattern, with a more substantial positive impact observed for industries with lower and intermediate initial export shares. In contrast, industries with export shares in the higher range of the distribution experienced a negative impact, both in terms of the value of exports and the number of exported products. This pattern aligns with the notion that high initial export shares were associated with traditional exports, where Chile (supposedly) possessed significant comparative advantages. It suggests that these sectors, with well-established comparative advantages, had already experienced growth before the FTAs, while the FTAs played a crucial role in facilitating the expansion for new products/sectors.

Furthermore, we delved into the role of financial development and the presence of capital control restrictions in shaping the repercussions of FTAs on exports. This analysis is related to the literature exploring the relationship between exports and financial constraints. In these theories, limited access to financing can prevent the entry of firms into international markets (Chaney (2016); Manova (2013) and Feenstra et al. (2014)). Our findings unveiled that FTAs tend to exert a more pronounced positive impact when linked with countries with relatively lower levels of financial development. Moreover, the existence of capital control restrictions appeared to amplify the positive effects of FTAs.

All in all, our study contributes to the literature by providing a comprehensive analysis of the multifaceted impacts of FTAs on Chilean exports. Our findings highlight the substantial positive effects of FTAs on Chilean exports, reinforcing the rationale behind Chile's strategic pursuit of these agreements. By shedding light on industry-specific impacts and elucidating the roles of financial development and capital controls, our findings enrich the broader comprehension of the implications of trade liberalization. This research can provide valuable guidance to policymakers as they design and implement effective trade policies to stimulate export growth and economic development.

The paper is structured as follows: Section 2 presents the related literature. Section 3 presents the data and describes the identification strategy used in this study. In Section 4, we present the main findings of our analysis. Section 5 explores the role of additional margins of heterogeneity in shaping the effects of the FTAs. Section 6 provides several robustness checks and extensions to validate the robustness of our results. Finally, Section 7 concludes the paper, summarizing the key insights and discussing their implications.

2. Related Literature

Within the context of Chilean trade policy, a multitude of studies have examined the influence of Free Trade Agreements (FTAs) on the country's export dynamics. For instance, Malhotra and Stoyanov (2008) found that the FTA between Chile and Canada led to a significant 35 percent increase in Chilean agricultural exports to Canada, a result consistent with the observations of Wehner (2011), who conducted a descriptive analysis demonstrating export expansion in several sectors following the Chile-Canada FTA. Wehner (2011) also extended this analysis to other FTAs, revealing that Chile's exports similarly increased in the wake of agreements with countries such as the U.S., Mexico, Panama, South Korea, Japan, and China.

In the Chilean context, several ex-ante evaluations have been conducted (Chumacero et al., 2004; Nowak-Lehmann D. et al., 2007). For instance, Chumacero et al. (2004) postulate that the FTA with the U.S. would not only elevate trade flows and welfare but also diminish risk premiums for the Chilean economy. Examining the FTA with the European Union, Nowak-Lehmann D. et al. (2007) predict positive effects, especially in the fruit industry. However, López Giral et al. (2022) conclude that the FTA with Korea did not significantly contribute to diversifying Chile's export portfolio.

Turning to computable general equilibrium models, Jean et al. (2014b) employ this methodology to estimate the impact of the FTA with the European Union, revealing a positive influence on Chilean exports. Employing a similar approach but with a focus on environmental effects, O'Ryan et al. (2010) also document an expansion of Chilean exports resulting from agreements with the European Union and the United States. Furthermore, Heine (2016) delve into the repercussions of the FTA with China, uncovering a substantial surge in Chilean exports.

Our paper is more related to the literature of heterogeneous effects of FTAs. Several works have looked at differences on impact depending on variables such as trade elasticities, distance, the existence of previous agreements, the ex-ante trade barriers. and the ability of affecting terms of trade (Jung (2023); Baier et al. (2018); Baier et al. (2019))

While existing research provides valuable insights into the impacts of specific FTAs, this paper contributes to the literature by offering a comprehensive evaluation of the effects of FTAs on Chilean exports, encompassing diverse industries and trading partner attributes. It extends beyond a single FTA to provide a broader understanding of Chile's overall trade policy strategy and its implications for export growth and diversification.

3. Data and Empirical Strategy

For the purpose of this paper, we merge two data sets. The first data set contains information on bilateral trade flows at the 6-digit product level obtained from the "International Trade Database at the Product-Level (BACI)" provided by the Centre for Prospective Studies and International Information (CEPII). This comprehensive database encompasses trade information for more than 200 countries and 5,000 products spanning the period from 1994 to 2007. Using this dataset, we construct our variables of interest, including the total value of Chilean exports in dollars and the number of exported products, categorized by two-digit industry for each trading partner.

We merge the BACI database with the "Gravity" database, also sourced from CEPII, which includes standard gravity indicators such as income per capita and population. Additionally, we incorporate data on the ratio of credit to the private sector to GDP from the Global Financial Database and the bilateral exchange rate with Chile from the WEO database, both provided by the World Bank.

Finally, we incorporate to the export database, information on the FTAs signed by Chile from the Subsecretaría de Relaciones Económicas Internacionales de Chile. Since the return of democracy, Chile has signed 31 FTAs, covering 65 countries that together represent almost 90% of the world GDP. Using this information, we construct a dummy that takes the value of 1 from the year after the agreement has been signed onwards.

Table 1 presents a summary of the FTAs signed by Chile by country and specifying the year in which it was implemented. Table 2 presents the summary statistics of the main variables at the industry/country level. Our final sample has 112,867 observations.

TABLE 1

FTAS SIGNED BY CHILE SINCE 1995

Year	Countries
1997	Urnguay, Paraguay, Brazil. Argentina
1998	Canada
2000	Mexico
2002	Slovenia, Crimea
2003	Sweeden, Portugal. Netherlands, Luxemburg, Italy, Ireland. Greece, Great Britain,France. Finland, Spain. Denmark Deutschland, Belgium, Austria
2004	USA, Slovenia, Slovakia, Poland, Malta, Latvia, Lithuania, Korea, Hungary, Estonia, Chezc Republic, Cyprus
2005	Norway, Iceland, Switzerland
2006	Singapur, New Zealand, Brunci Darussalam
2007	China, Bulgaria
2008	Panama, Japan
2009	Peru, Honduras, Colombia, Australia
2010	Guatemala
2011	Turchia
2012	Malaysia
2013	Nicaragua, Croatia
2014	Vietnam
2013	Hong Kong
2020	Indonesia

TABLE 2

SUMMARY STATISTICS

Variables	(1) N	(2) Mean	(3) SD	(4) Min	(5) Max
FTA	112,867	0.440	0.496	0	1
Products	112,867	1.212	1.146	0	5.919
Exports	112,867	4.154	3.633	-6.908	16.27
Population	112,867	9.591	1.813	1.506	14.16
Income p.c.	112,867	9.715	1.018	5.455	11.70
Share_1996	112,867	0.015	0.038	0.000	0.269
High Income(Dummy)	112,867	0.481	0.500	0	1
Low Fin. Dev. (Dummy)	112,867	0.701	0.458	0	1
Cap.Control (Dummy)	112,867	0.786	0.410	0	1

Note: Exports and products are expressed in logs. The original unit of the variable is thousands of dollars for exports and units for products.

3.1 Empirical Strategy

The primary objective of this study is to explore the effects of FTAs on the value of exports and the number of exported products. Then our baseline regression considers a difference in differences approach for bilateral exports:

$$(1) \qquad Y_{s,c,t} = \alpha + \beta FTA_{c,t} + \gamma X_{c,t} + \omega_s + \omega_c + \omega_t + \mu_{s,c,t}$$

where s,c,t stands for industry, country (trade counterpart) and time respectively. Ys,c,t are the specific dependent variables of interest: value of exports and number of products in logs, FTAc,t is a dummy that takes the value of one for the period after the agreement was signed. Xc,t is a group of time-varying country control variables based on the gravity model that include income per capita and population.[1] The ω represent fixed effects by industry s, country c and time t. Errors are clustered at the country-time level.

Additionally, we explore whether the ex-ante relative importance of each sectors' exports in total exports-which it is considered as a proxy for comparative advantage- plays a significant role in shaping the industry's response to the FTA. Few papers have explored whether comparative advantage enhances or ameliorates the effects of reduction in trade barriers. Similar to our estimations, Ahmed (2023) finds some weak evidence of this heterogeneous impact in the case of the FTA between China and Pakistan. To this end, we construct the variable Shares which is the average share of exports of the sector with respect to the total in 1996, i.e., before any of the FTAs in our sample was signed.

Traditional industries may potentially experience a differential (lower) impact from the FTAs due to their pre-existing low tariffs in destination markets. However, it is also plausible that the impact could be higher in these industries if there is an opportunity to introduce new products in sectors where the Chilean economy holds a comparative advantage. To discern which of these two channels is more relevant, we also estimate the following regression:

$$(2) \quad Y_{s,c,t} = \alpha + \beta_1 FTA_{c,t} + \beta_2 FTA_{c,t} * Share_s + \beta_3 FTA_{c,t} * Share^2_s + \gamma X_{c,t} + \omega_s + \omega_c + \omega_t + \mu_{s,c,t}$$

Where we include $Share_s$ and $Share^2_s$ to allow for non-linearities on the impact of the interaction. Our baseline regression includes industry, trading partner and year fixed effects.

[1] In Table 7 we show that these results are robust to including also private credit to GDP and the bilateral exchange rate as additional controls. However, since by doing so we lose almost half of the observations of the baseline.

4. Main Results

Columns (1) and (5) of Table 3 present the results of our baseline regression for value of exports and number of products, respectively. Results show that the impact of FTAs is positive and significant, with exports growing about 7,1% and the number of exported products growing by about 4,5%. The gravity control variables show the expected relationship with Chilean exports, i.e., exports increase on the population and income of the trading partner.

Columns (2) and (6) incorporate the interaction of the FTA with the industry level variable Shares and Share2s. Panel (a) of Figure 1 complements the analysis by showing the magnitude of the impact of the FTA on exports across industries with different participation in total exports, by calculating the partial effect of the FTA at different levels of the variable Shares:

$$\frac{\partial Y_{s,c,t}}{\partial FTA} = \beta_1 + \beta_2 Share_s + \beta_3 Share^2_s \tag{3}$$

Both the table and the figure suggest that the effect of the FTAs is heterogeneous on the relative importance of the sector on overall exports. In particular, we find that there is a significant increase in the volume of exports and number of exported products for industries with a positive but relatively low ex-ante share in total exports, while the positive effect shades away and even becomes negative in terms of the number of products for sectors with an ex-ante participation close to 30%. As a result, our findings support the notion that FTAs tend to benefit industries with a pre-existing export presence, but the magnitude of these effects seems to be reduced for industries in the far-right tail of the export share distribution. This pattern is considerably more pronounced is for the value of exports than for the number of exported products.

While the inclusion of income per capita, population of the trading partner, and time fixed effects allows us to control for some aggregate factors other than the FTAs that might influence the response of exports, there is still a possibility of unobservable variables at the aggregate level that could be correlated with the FTA, potentially introducing bias in our estimation (see also Table 7 for a version of the baseline with additional macroeconomic controls). To address concerns about the impact of macro-level variables on the heterogeneous results, we incorporate country-time-fixed effects in columns (3) and (7) of our baseline regression. Notably, the coefficients of the interaction term β2 maintain their sign and significance levels, and their magnitudes remain very similar. This suggests that our baseline regression effectively controls for relevant aggregate confounding factors

TABLE 3

EFFECTS OF FTAS ON VALUE OF EXPORTS AND NUMBER EXPORTED PRODUCTS

Variables	(1) Exports	(2) Exports	(3) Exports Country-year FE	(4) Exports Add. margins	(5) Products Full Sample	(6) Products Full Sample	(7) Products Country-year FE	(8) Products Add. Margins
FTA	0.071**	-0.072**		-0.070	0.045***	0.027*		-0.029
	(0.032)	(0.035)		(0.062)	(0.015)	(0.016)		(0.026)
FTA*Share_1996		17.017***	17.177***	17.096***		3.017***	2.489***	3.008***
		(1.612)	(5.759)	(1.612)		(0.412)	(0.411)	(0.412)
FTA*Share_1996^2		-53.237***	-53.283*	-53.542***		-13.600***	-11.707***	-13.578***
		(6.148)	(20.282)	(6.148)		(1.586)	(1.577)	(1.586)
FTA*High				-0.257***				-0.005
				(0.058)				(0.025)
FTA*Low_FinDev				0.097*				0.074***
				(0.050)				(0.022)
CC				-0.043				0.016
				(0.050)				(0.019)
FTA*CC				0.194***				0.047*
				(0.053)				(0.023)
Population	1.104***	1.102***		1.007***	0.469***	0.469***		0.484***
	(0.148)	(0.148)		(0.155)	(0.076)	(0.076)		(0.079)
Income p.c.	1.115***	1.094***		1.015***	0.362***	0.360***		0.372***
	(0.082)	(0.082)		(0.085)	(0.048)	(0.048)		(0.051)
Observations	112,867	112,867	112,867	112,867	112,867	112,867	112,867	112,867
R-squared	0.530	0.532	0.550	0.532	0.614	0.615	0.642	0.615
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	NO	NO	YES	YES	NO	YES
Year FE	YES	YES	NO	NO	YES	YES	NO	YES
Country-Year FE	NO	NO	YES	YES	NO	NO	YES	NO

Robust standard errors in parentheses ***p<0.01,**p<0.05,*p<0.1

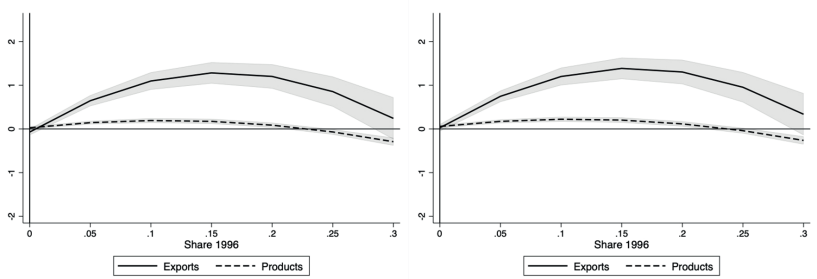
Note: This table examines the effect of F T As and the interaction of F T A with Shares on the value of exports and number of exported products at the industry level. Columns (4) and (8) also include the interaction with additional margins of heterogeneity: trading partner's income and level of financial development and whether capital controls are in place. All regressions include industry-fixed effects, and either country and time-fixed effects or country-time fixed effects. Robust errors clustered at the country-year level are reported in parenthesis. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

5. Additional Margins Of Heterogeneity

In addition to the participation of the industry in total exports, other factors may potentially shape FTAs' impact. The existing literature underscores the significant influence of both income levels and financial development in shaping international trade patterns and consequently the heterogeneous impact of FTAs (Baier et al. (2019) and Yamanouchi (2019)).

Income levels play a pivotal role in shaping the impact of FTAs as they are closely linked to a country's trade patterns and product composition. When signing an FTA with higher-income countries, characterized by diverse and technologically advanced industries, it can be challenging for a country like Chile to shift its exports towards higher-value-added goods and services. In contrast, when engaging in FTAs with lower-income countries, which are often reliant on primary commodities or lower-skilled manufacturing, Chile may gain competitiveness in new industries and develop a comparative advantage in non-traditional sectors. Therefore, we hypothesize that the effects of FTAs on the volume of exports and product differentiation can vary depending on the income level of the trading partner, leading to heterogeneous trade outcomes.

FIGURE 1
HETEROGENEOUS EFFECT OF FTAS SAMPLE



(a) Baseline (b) Additional margins of heterogeneity

Note: Panel (a) depicts graphically the regression results from columns (2) and (6) of Table 3. Panel (b) depicts graphically the regression results from columns (4) and (8), i.e., when including the additional margins of heterogeneity. The vertical axis measures the percentage change in the corresponding dependent variable triggered by the FTA for each level of Share, which is measured on the horizontal axis. The solid and dotted lines show the estimated effect of the FTA for each level of Share for the value of exports and number of products, respectively. The shaded areas are the corresponding 95 percent confidence intervals.

Financial development, a fundamental driver of international trade facilitation, also plays a crucial role in this context. Approximately 40 percent of global trade transactions rely on bank-intermediated trade finance, while the remainder is facilitated by interfirm trade credit (Bank for International Settlements (2014)). As such, it becomes imperative to investigate whether the effects of FTAs on exports are influenced by the trading partner's level of financial development or by its imposition of capital control restrictions. Additionally, exploring whether FTAs can potentially mitigate the negative consequences in terms of trade arising from weaker financial systems or capital account restrictions can provide interesting insights.

To investigate these hypotheses, we adopt two complementary approaches. Firstly, we introduce these additional dimensions of heterogeneity by incorporating interaction terms between the FTA and a set of dummy variables in our baseline regression in Table 3. This enables us to examine the effects of these additional factors while corroborating the robustness of our baseline results when accounting for these considerations. Secondly, we conduct a more detailed exploration of each specific channel in Sections 5.1 and 5.2. Here, we analyze how our findings react across different relevant subsamples, i.e., in terms of income level and financial development.

Columns (4) and (8) of Table 3 and Panel (b) of Figure 1 present the results of the first approach. The interaction with each dummy explores how the effect of FTAs is affected by these additional margins. The High dummy takes the value of one when the trading partner belongs to the High-income group of countries, according to the definition of the World Bank, and zero otherwise. The Low FinDev dummy takes the value of one when the ratio of domestic credit to the private sector to GDP in the trading partner is on the left 75% tail of the distribution in the three years before the signing of the FTA.[2] Finally, the dummy CC takes the value of one when capital controls are in place in the country.[3] The results of this first approach show that FTAs are more beneficial when signed with countries that do not have a high income level that have lower levels of financial development and that have capital controls in place. Additionally, the comparison of the coefficients of the interactions with the

[2] The data on credit is from the Global Financial Database of the World Bank.

[3] For the CCs measures we use the database of Fernandez et al. (2016). This database contains information on a comprehensive set of indicators on capital account restrictions using the information provided in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) from to 1995 to 2021. This database provides information on restrictions on international inflow and outflows of equity, bonds, money market, collective investment, derivatives, commercial credits, financial credits, guarantees, direct investment and real estate. Whenever a restriction is active in any of these categories, the individual indicator takes the value of 1 and zero otherwise.

Share variable shows that this effect remains basically unchanged with the introduction of the additional margins. In the next sections, we explore each of these margins in more detail.

5.1 Terading Partners With Different Income Levels

In this section, we dig deeper on the role of different income levels of the trading partner in shaping the effect of the FTA. To this end, Table 4 presents the results of our baseline regression when dividing the sample of trading partners into three groups: High Income (columns 1 and 4), Upper middle income (columns 2 and 5) and Lower middle income (columns 3 and 6).[4] Additionally, Figure 2 illustrates the magnitude of the FTA's impact on the value of exports and the number of exported products across industries with different export shares for each subsample.

The table and the figure offer interesting insights into our analysis. In terms of the value of exports, the overall impact diminishes when we shift our focus to high-income countries, yet the heterogeneous pattern persists. Conversely, for upper-middle-income countries, the effect loses significance for industries with low shares, and the heterogeneity pattern undergoes a reversal, with industries boasting larger export shares experiencing more positive impacts. Finally, for lower-middle-income countries, the original pattern remains, but the negative effect of the interaction with Share2 becomes significantly larger, neutralizing the positive impact and generating a significant negative effect on industries with larger shares.

In terms of product differentiation, we observe a similar pattern reversal when considering upper-middle-income countries. This implies that the effect on the number of products for industries with relatively larger shares is negative for high and lower-middle-income countries but marginally positive for upper-middle-income countries. These findings provide valuable insights into how FTAs have varying effects on different industries and countries, depending on their income levels and existing export shares.

[4] We have not included regression results for countries with low income due to the limited number of observations (4,000 aprox.), which makes it impractical to estimate the coefficients.

TABLE 4

HETEROGENEOUS EFFECTS OF FTAS: COUNTRIES WITH DIFFERENT INCOME LEVELS

Variables	(1) Exports High inc..	(2) Exports Upper middle inc.	(3) Exports Lower middle inc.	(4) Products High income	(5) Products Upper middle inc	(6) Products Lower middle inc.
FTA	0.020 (0.048)	0.195*** (0.063)	0.023 (0.098)	-0.046* (0.024)	0.071*** (0.025)	0.096** (0.038)
FTA*Share_1996	13.544*** (1.777)	-11.058*** (3.238)	13.636*** (3.580)	0.043 (0.484)	-3.915*** (0.778)	4.491*** (0.958)
FTA*Share_1996^2	-50.969*** (7.303)	61.371*** (11.627)	-104.361*** (14.596)	-4.919*** (1.886)	14.564*** (2.862)	-25.812*** (3.798)
Observations	54,285	36,610	19,854	54,285	36,610	19,854
R-squared	0.568	0.592	0.414	0.611	0.697	0.560
Controls	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

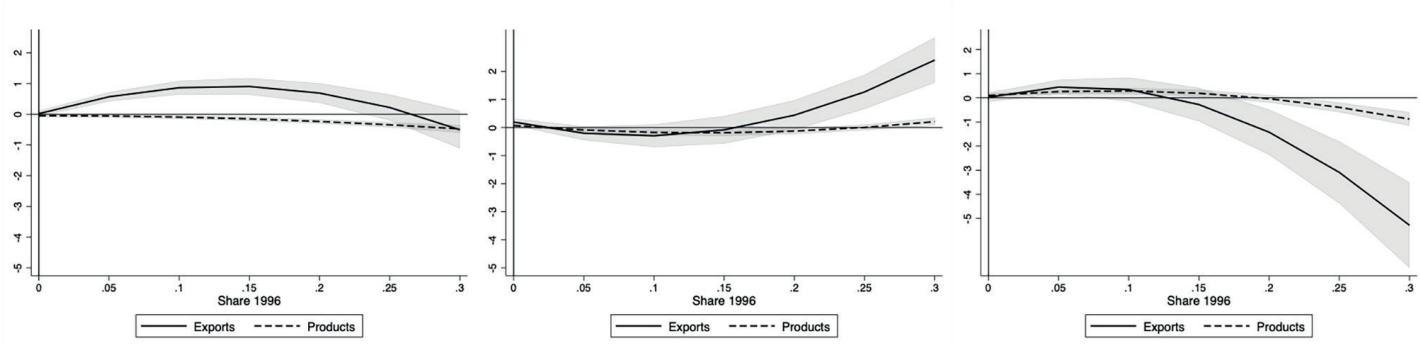
Note: This table examines the effect of F T As and the interaction of F T A with Shares on the value of exports and number of exported products at the industry level while dividing the sample between countries with High- Income level, columns (1) and (4), Upper middle-income level, columns (2) and (5), and Lower middle income level, columns (3) and (6). All regressions include industry country and time-fixed effects. Robust errors clustered at the country-year level are reported in parenthesis. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

5.2 Can FTAs Help Compensate for Low Levels of Financial Development or Capital Account Restrictions?

In this section, we explore in more detail the role of financial development and the presence of capital controls in shaping the effects of the FTA. As argued by Manova (2013), exporting firms face fixed costs related to R&D, product development, marketing, and investment in equipment. Additionally, international trade is subject to export entry costs, fixed export costs, and variable trade costs. Since many of these costs need to be paid upfront, international trade is more financially intensive than domestic sales (Leibovici (2021)). In this context, a pertinent question arises: Can FTAs effectively mitigate the adverse consequences arising from weaker financial systems or capital account restrictions on trade, as discussed by Manova (2008)?

FIGURE 2

HETEROGENEOUS EFFECTS OF FTAS: COUNTRIES WITH DIFFERENT INCOME LEVELS



(a) High income (b) Upper middle income (c) Lower middle income

Note: Panel (a) depicts graphically the regression results from columns (1) and (4) of Table 4 while Panel (b) depicts the regression results from columns (2) and (5) and Panel (c) depicts the regression results from columns (3) and (6) of the same table. The vertical axis measures the percentage change in the corresponding dependent variable triggered by the FTA for each level of Share, which is measured on the horizontal axis. The solid and dotted lines show the estimated effect of the FTA for each level of Share for the value of exports and number of products, respectively. The shaded areas are the corresponding 95 percent confidence intervals.

5.2.1 Financial Development and FTAs

To complement the analysis of Table 3, Table 5 and Figure 3 present the results of our baseline regression when dividing the sample between trading partners with high and low levels of financial development.[5]

In the context of the value of exports, our analysis reveals that the detrimental impact on industries representing a larger share of exports is predominantly associated with FTAs signed with countries with high levels of financial development. Conversely, when FTAs are established with countries having lower levels of financial development, the positive and significant effect on the value of exports persists across the entire range of the Share distribution. Furthermore, this segmentation highlights that the favorable impact of FTAs on the number of products is primarily driven by agreements with trading partners characterized by lower levels of financial development. In contrast, the effect on the number of products turns negative across the entire Share distribution when FTAs are signed with countries possessing high levels of financial development.[6]

TABLE 5

HETEROGENEOUS EFFECTS OF FTAS: FINANCIAL DEVELOPMENT

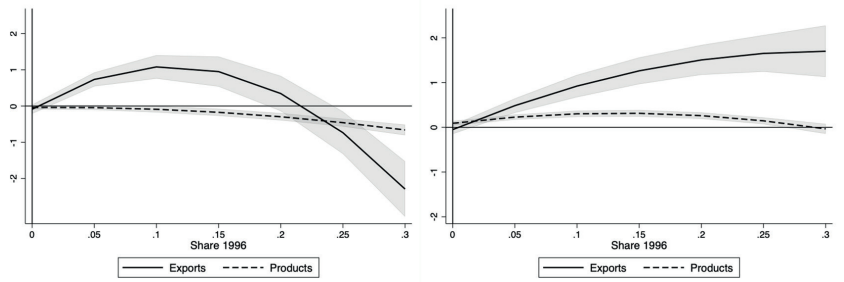
Variables	(1) Exports H. Fin. Dev	(2) Exports L. Fin. Dev	(3) Products H. Fin. Dev	(3) Products L. Fin. Dev
FTA	-0.088 (0.063)	-0.052 (0.050)	-0.039 (0.025)	0.090*** (0.025)
FTA*Share_1996	21.193*** (2.613)	11.684*** (2.000)	0.277 (0.677)	3.389*** (0.520)
FTA*Share_1996^2	-95.137*** (9.407)	-19.483** (7.668)	-7.828*** (2.473)	-12.676*** (2.029)
Observations	33,695	79,172	33,695	79,172
R-squared	0.570	0.519	0.632	0.613
Controls	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Note: This table examines the effect of FTAs and the interaction of FTA with Shares on the value of exports and number of exported products at the industry level while dividing the sample between countries with High-Financial development, columns (1) and (2), and Low-Financial development, columns (3) and (4). All regressions include industry country and time-fixed effects. Robust errors clustered at the country-year level are reported in parenthesis. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

[5] For this purpose, (as in Table 3) we utilize the ratio of domestic credit to the private sector as a percentage of GDP, sourced from the Global Financial Database of the World Bank. We classify countries with high financial development as those falling within the top quartile of the distribution of this indicator at the time the FTA was signed, while the remaining countries form the low financial development group.

[6] It's worth noting that these results remain robust when considering alternative measures of financial development.

FIGURE 3
FTAS AND FINANCIAL DEVELOPMENT



(a) High financial development (b) Low financial development

Note: Panel (a) depicts graphically the regression results from columns (1) and (3) of Table 5 while Panel (b) depicts the regression results from columns (2) and (4) of the same table. The vertical axis measures the percentage change in the corresponding dependent variable triggered by the FTA for each level of Share, which is measured on the horizontal axis. The solid and dotted lines show the estimated effect of the FTA for each level of Share for the value of exports and number of products, respectively. The shaded areas are the corresponding 95 percent confidence intervals.

5.2.2 Capital Controls and FTAs

As pointed out by Tamirisa (1998), capital controls can have a negative influence on international trade by affecting transaction costs, exchange rates, foreign exchange risk hedging, and trade financing. We have already shown in a first approximation in Table 3 that FTAs seem to be more beneficial when signed with trading partners that had CCs in place. Table 6 and Figure 4 further explore this channel by replicating our baseline regression while dividing the sample between those countries with and without capital controls. In line with our findings when considering countries with different levels of financial development, we find that the beneficial effects of CCs are mostly concentrated in those FTAs signed with countries that had CCs in place.

TABLE 6
EFFECTS OF FTAS AND CAPITAL CONTROLS

Variables	**(1) Exports Without CC**	**(2) Exports With CC**	**(3) Products Without CC**	**(4) Products With CC**
FTA	-0.112 (0.076)	0.009 (0.044)	-0.099*** (0.030)	0.059*** (0.018)
FTA*Share_1996	12.734*** (3.754)	17.162*** (1.798)	-1.508 (0.934)	4.085*** (0.464)
FTA*Share_1996^2	-55.406*** (13.062)	-48.029*** (6.975)	3.167 (3.442)	-17.496*** (1.795)
Observations	24,123	88,743	24,123	88,473
R-squared	0.534	0.535	0.652	0.610
Industry FE	YES	YES	YES	YES
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Note: This table examines the effect of F T As and the interaction of F T A with shares on the value of exports and number of exported products at the industry level. All regressions include industry-fixed effects, and either country and time-fixed effects or country-time fixed effects. Robust errors clustered at the country-year level are reported in parenthesis. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Our interpretation of these findings aligns with the notion that international trade, inherently burdened by trade costs and delayed payments, is more susceptible to financial constraints compared to domestic transactions. This insight leads us to anticipate that trade expansion faces limitations imposed by financial frictions. Let's consider a scenario where a Chilean product receives a trade preference. The question arises: In which country should we anticipate a more substantial increase in exports?

We hypothesize that trade preferences disproportionately impact exports destined for countries facing higher financial constraints. This is grounded in the idea that, in countries with better credit access, exporters encounter fewer limitations from financial frictions, resulting in exports being less benefitted by tariff reductions. Our empirical findings align with this rationale. The positive effects of Free Trade Agreements (FTAs) are more pronounced when established with countries experiencing greater financial constraints. This suggests that FTAs, by reducing costs and enhancing financial linkages, play a crucial role in facilitating trade with more constrained economies.

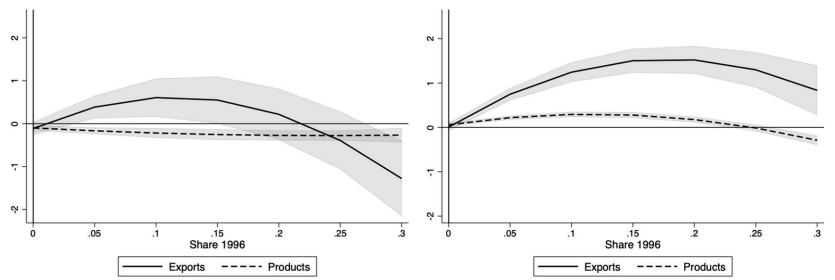
6. Robustness And Extensions

6.1 Excluding Copper and Main Export Destinations

Chile stands as the world's foremost exporter of copper. Given this significant contribution, copper represents a substantial portion of Chilean exports, accounting for approximately 40% to 50% of the country's total export value in recent years. To ensure that our findings are not driven by copper exports, we conduct an additional analysis by excluding copper from our sample. Columns (1) and (2) of Table 7, demonstrate that our baseline results remain qualitatively unchanged when copper is excluded from the industries in the sample. This robustness check validates the reliability of our findings and confirms that copper exports alone do not influence our conclusions.

Following the same logic, columns (3) and (4) of the same table replicate our baseline regressions while leaving out Chile's main trading partners: China and the US, which together represent over 50% of Chile's exports. The estimations show that our results are not driven by these countries either.

FIGURE 4
FTAS AND CAPITAL CONTROLS



(a) Without capital controls (b) With capital controls

Note: Panel (a) depicts graphically the regression results from columns (1) and (3) of Table 5 while Panel (b) depicts the regression results from columns (2) and (4) of the same table. The vertical axis measures the percentage change in the corresponding dependent variable triggered by the FTA for each level of Share, which is measured on the horizontal axis. The solid and dotted lines show the estimated effect of the FTA for each level of Share for the value of exports and number of products, respectively. The shaded areas are the corresponding 95 percent confidence intervals.

6.2 Additional Controls

In our baseline regressions, we incorporated control variables such as income per capita and the trading partner's population. Additionally, we conducted a robustness check by introducing country-time fixed effects into our model, which had no impact on the point estimates of the interaction. However, in Columns (5) and (6) of Table 7, we extend our analysis by including supplementary controls, specifically private credit to GDP and the bilateral exchange rate with the trading partner. Although these controls do not affect the point estimate of the interaction, they result in a significant reduction in the number of observations, with almost half of our data being lost. Consequently, we made the decision to exclude these additional controls from our baseline regression to maintain a larger sample size, ensuring the robustness and reliability of our results.

6.3 Pretrends

One of the essential assumptions for a difference-in-difference estimation is that pre-existing trends are comparable between the treatment and control groups, which, in this context, corresponds to countries with an FTA and those without. We can assess this assumption by incorporating lagged dummy variables for the FTAs. If exports and product trends were evolving similarly for both groups, the coefficients for the lagged variables should not significantly differ from zero. The results in Columns (7) and (8) of Table 7 indicate that previous trends are indeed similar. We find no significant evidence to reject the hypothesis that each parameter for the lagged FTA variable equals zero. Therefore, it appears reasonable to conclude that the identification assumption is satisfied.

TABLE 7

ROBUSTNESS

Variables	(1) No Copper Exports	(2) No Copper Products	(3) No CHN-USA Exports	(4) No CHN-USA Products	(5) Extra Controls Export	(6) Extra Controls Products	(7) Pretend Exports	(8) Pretend Products
FTA	-0.083**	0.016	-0.087**	0.029*	-0.067	-0.000	-0.100*	0.040*
	(0.036)	(0.016)	(0.036)	(0.016)	(0.047)	(0.019)	(0.051)	(0.022)
FTA*Share_1996	27.054***	6.363***	16.475***	3.153***	16.380***	2.331***	17.013***	3.018***
	(2.664)	(0.608)	(1.641)	(0.423)	(2.122)	(0.529)	(1.612)	(0.0412)
FTA*Share_1996^2	-150.793***	-46.037***	-52.210***	-14.209***	-39.122***	-10.825***	-53.223***	-13.608***
	(19.447)	(4.393)	(6.339)	(1.635)	(8.117)	(2.021)	(6.149)	(1.586)
FTA_1							0.008	0.024
							(0.063)	(0.029)
FTA_2							-0.043	-0.015
							(0.061)	(0.028)
FTA_3							-0.095	0.03
							(0.069)	(0.031)
FTA_4							-0.047	0.037
							(0.075)	(0.028)
FTA_5							-0.009	0.046
							(0.065)	(0.029)
Priv. Credit/GDP					-0.001**	-0.001***		
					(0.001)	(0.000)		
Bilateral ExR					0.455***	0.143***		
					(0.107)	(0.039)		
Observations	111,465	111,465	108,928	108,928	68,825	68,825	112,867	112,867
R-squared	0.530	0.615	0.519	0.608	0.512	0.631	0.532	0.615
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES

Note: This table examines the effect of F T As and the interaction of F T A with shares on the value of exports and number of exported products at the industry level. All regressions include industry-fixed effects, and either country and time-fixed effects or country-time fixed effects. Robust errors clustered at the country-year level are reported in parenthesis. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

7. Conclusion

In this paper, we examine the impacts of Free Trade Agreements (FTAs) on Chilean exports. Chile's extensive engagement in FTAs with various nations has been strategically aimed at increasing exports, bolstering product diversification and expanding market access. However, until now, a comprehensive evaluation of the collective impact of these agreements on Chilean exports was largely absent.

To explore these issues, we make use of a rich dataset that encompasses bilateral trade flows at the product level, supplemented by standard gravity indicators and financial data. We apply a robust difference-in-differences approach, capitalizing on the timing differences in the implementation of FTAs with various countries.

Our findings provide valuable insights into the varied effects of FTAs across different industries and attributes of trading partners. We demonstrate that the impact of FTAs varies significantly at the industry level, depending on the initial export share of each industry. Interestingly, this effect follows a non-linear pattern, with a more substantial positive impact observed for industries with lower and intermediate initial export shares.

Furthermore, we delved into the role of financial development and the presence of capital control restrictions in shaping the repercussions of FTAs on exports. The findings unveiled that FTAs tend to exert a more pronounced positive impact when inked with countries possessing relatively lower levels of financial development. Moreover, the existence of capital control restrictions appeared to amplify the positive effects of FTAs.

In conclusion, our study highlights the substantial positive effects of FTAs on Chilean exports, reinforcing the rationale behind Chile's strategic pursuit of these agreements. By shedding light on industry-specific impacts and the roles of financial development and capital controls, our findings contribute to improve our understanding of the implications of trade liberalization. This research can provide valuable guidance to policymakers.

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