The effects of school closures on female entrepreneurship during the COVID-19 crisis: Evidence from Chile

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Abstract

This resarch analyses the effects of school closures on female entrepreneurships during the COVID-19 pandemic in Chile. Building on institutional theories of gender inequalities in entrepreneurship, we argue that schools are an important formal institution affecting the entrepreneurial process. Using a rich database of administrative records, we show that school closures significantly decreased the probability of parents of starting a business. We estimate that, due to the uneven distribution of household responsibilities and cultural expectations regarding childcare, the gender gap in entrepreneurship was widened by 29,6%. This gendered impact persisted even after schools reopened. We observed differential effects based on the age of children. Mothers with children aged between 15 and 18 years experienced less pronounced setbacks during school closures and displayed a quicker recovery in returning to pre-COVID levels of entrepreneurial activity following school reopenings compared to mothers with children aged between 3 and 6 years. We also document that women from poorer backgrounds (quintiles I and II) were the most affected from closures compared with women from richer households. Our findings maintain robustness across various model specifications, reinforcing the validity of a causal interpretation. We contribute to the literature on female entrepreneurship with insights from an emerging economy in times of crisis, showing how school closures are an institutional barrier that amplifies entrenched gender-based disparities in entrepreneurship.

Contents

1. Introduction

The outbreak of COVID-19 created unprecedented challenges across the globe, posing an existential threat to business operations and entrepreneurial activities (Angelov and Waldenström, 2023; Fairlie et al., 2023; Belitski et al., 2022; Brown and Rocha, 2020; Fairlie, 2020; Ratten, 2020). Yet, these challenges have been far from uniform, revealing intricate differences in the experiences of individual businesses and entrepreneurs (Pertuze et al., 2023). This research seeks to uncover one specific and overlooked aspect of this heterogeneity: the differential impact of extended school closures on women's entrepreneurial activities.

Focusing on Chile—an emerging economy that endured one of the lengthiest durations of school closures globally—this study delves into the effects of these interruptions on the registration of businesses owned by both men and women during the pandemic. Recognizing that mothers, often the primary caregivers, might be uniquely impacted by school closures, we employ rich administrative microdata to explore the individual factors that could exacerbate or mitigate these effects. Overall, we predict that school closures may have had a pronounced effect on female entrepreneurship, especially among mothers.

We frame our study through the lens of institutional theory. This theoretical perspective allows us to view school closures as an unexpected institutional barrier that exacerbated already entrenched gender disparities in entrepreneurship. Institutional theory, with its emphasis on understanding how formal rules and informal constraints influence organisational behaviour and outcomes (North, 1990), provides a rich context for analysing the unique challenges faced by female entrepreneurs during the COVID-19 pandemic.

Globally, school closures emerged as a widely adopted non-pharmaceutical intervention to cope with the public health crisis (Hale et al., 2021). This measure affected an estimated 1.6 billion students, originating the largest disruption to education in modern history (Pearson,

2022). Yet the severity and length of these closures differed markedly across and within countries (UNESCO, 2022). For instance, while many nations in Europe came to favour a faster reopening of schools, Latin America and the Caribbean was the region with the highest average number of school days lost (UNESCO, 2022). Chile, in particular, withstood the longest stretch of school closures among the OECD countries, with over 250 days of full closure and 116 days of partial closure (OECD, 2022). That is, most schools were closed for the entire year of 2020 and remained closed for nearly half of 2021, persisting even after vaccines were widely available (Aguilera et al., 2021).

Scholars have emphasised the critical need to evaluate the consequences of school closures during the COVID-19 crisis (Gouëdard et al., 2020; Dasgupta, 2022; Clarke et al.; 2022), particularly on students' development and education (Betthäuser et al., 2023; Agostinelli et al., 2022; Moscoviz and Evans, 2022; Halloran et al., 2021; Kuhfeld et al., 2020). However, while such adverse effects have been extensively documented, the repercussions extend far beyond the classroom. School closures place significant burdens on families, especially in households with working parents. These burdens disproportionately fall on women, who are traditionally tasked with domestic roles and unpaid labour, encompassing activities related to childcare and household management (Fortin, 2005; Gurley-Calvez et al., 2009; Craig et al., 2012; Bertrand, 2018). In Chile, for example, women on average spend 2.9 more hours per day on domestic work than men (World Bank, 2023a). Globally, the COVID-19 crisis exacerbated this unequal distribution of duties (Farré et al., 2020; Del Boca et al., 2020; Sevilla and Smith, 2020; Hipp and Bünning, 2021), with a cross-country study suggesting that women devoted three times as many hours as men to unpaid childcare during the pandemic (Kenny and Yang, 2021).

The objectives and contributions of this paper are manifold. First, developing a novel analytical framework presenting school closures as a distinct institutional barrier within the entrepreneurial process. Second, providing robust empirical evidence on the effects of COVID-19 school closures on entrepreneurial activity in Chile, demonstrating the amplification of entrenched gender inequalities. Third, enriching the literature on female entrepreneurship

with insights from an emerging economy in times of crisis. Finally, influencing future policy responses by underscoring the importance of educational institutions in safeguarding women's entrepreneurial activities and the need for policies that acknowledge gender disparities in entrepreneurship.

The rest of this paper is organised as follows. Section 2 offers a comprehensive literature review, situating our study within existing research on institutional barriers to entrepreneurship and gender disparities. Section 3 explains the different procedures available to start a business in Chile and the responses set by the central government in order to control the pandemic. Section 4 presents the research methodology, outlining the data sources, variables, and econometric techniques used to estimate the effects of school closures on female entrepreneurship. Section 5 details the main empirical results, illustrating how extended school closures have hindered women's entrepreneurial activities. Section 6 discusses the implications of these findings, emphasising the amplification of entrenched gender inequalities and the need for targeted policy responses. Finally, Section 7 concludes by highlighting the study's contributions to the literature on gender and entrepreneurship, suggesting directions for future research, and reflecting on the broader societal implications of school closures to women's business activities.

2. Literature Review

a. Formal and informal institutional barriers to entrepreneurship

Institutional theory (North, 1990) offers an analytical perspective for understanding the complex landscape of entrepreneurship. Through this lens, institutions are seen as stable, predictable patterns guiding human behaviour. Institutions can be divided into two main categories: formal rules, such as laws and regulations, and informal constraints, including cultural norms and social practices (North, 1990).

Institutions act as powerful forces in the market, shaping entrepreneurial activities, strategies, and outcomes (Baumol, 1990; Hwang and Powell, 2005; Bruton et al., 2010; Urbano et al., 2019). Thus, entrepreneurship is an endogenous phenomenon, dynamically influenced by the prevailing institutions within a specific context (Busenitz et al., 2000; Davidsson and Henrekson, 2002; McMullen et al., 2008; Estrin et al., 2013; Urbano and Alvarez, 2014; Boudreaux et al., 2019). The influence of institutions can be multifaceted, either facilitating or hindering entrepreneurial activities, especially in emerging economies or developing countries characterised by capital constraints and high levels of uncertainty (Desai et al., 2003; Welter and Smallbone, 2011). The term 'institutional barrier' denotes any institutional factor that systematically limits certain groups' access to resources, opportunities, or decision-making power.

Institutional barriers may manifest at various levels (Welter, 2011; Thornton et al., 2012). They can shape entrepreneurship on a national scale or affect more localised aspects, such as specific industries, regions, or demographic groups, including women. Understanding how these barriers impact the entrepreneurial process requires a nuanced exploration of both formal and informal barriers, and how these barriers interact with each other.

On the one hand, formal barriers encompass the legal and regulatory frameworks that determine business dynamics (De Soto, 2000; Djankov et al., 2002; Djankov, 2009; Klapper et al., 2006; van Stel et al., 2007; Audretsch and Moog, 2022), from the rules governing market competition (Tirole, 1988; Laffont and Tirole, 2001) to economic and financial policies that can either stimulate or stifle entrepreneurial endeavours (Gompers and Lerner, 1999; Black and Strahan, 2002; Audretsch, 2007; Acs and Szerb, 2007; Minniti, 2008). For instance, burdensome labour regulations can lead to the expansion of the informal economy, where businesses operate outside of legal channels (Botero et al., 2004; Cordier and Bade, 2023).

On the other hand, informal barriers include cultural practices and social norms affecting attitudes towards entrepreneurship (Hayton et al., 2002; Stephan and Uhlaner, 2010; Hayton and Cacciotti, 2013; Autio et al., 2013; Boudreaux et al., 2019). Although less tangible than legal or regulatory hurdles, these factors can influence the entrepreneurial environment by

shaping public perceptions and expectations. From gender roles that may discourage women entrepreneurs to social stigmas against failure that may limit risk-taking, informal barriers operate through subtle cultural mechanisms.

Formal and informal institutional barriers often intertwine. A clear instance of this interplay emerged during the COVID-19 pandemic with school closures. At its core, the directive to close schools stemmed from a formal, legal mandate aimed at curbing the spread of the virus. Yet, it was the deep-seated informal barriers, specifically gender-oriented societal practices and cultural norms, that appear to have disproportionately affected women. Faced with these converging challenges, female entrepreneurs felt compelled to adjust or even sideline their economic activities to assume primary responsibility for their children's immediate needs. Such gender-specific ramifications are not isolated phenomena but rather emanate from a longstanding, systematic arrangement of intersecting institutional barriers that affect women.

b. Gender and institutional barriers to entrepreneurship

Existing literature provides ample evidence of the gendered dimensions of entrepreneurship, often emphasising the role of institutional factors in determining the engagement and performance of women in entrepreneurial ventures (Ahl and Marlow, 2012; Jennings and Brush, 2013; Brush et al., 2019; Foss et al., 2019; Neumeyer et al., 2019; McAdam et al., 2019). Despite international efforts spanning decades, a global disparity persists in business ownership and firm performance, especially in emerging and developing economies (e.g. Hardy and Kagy, 2018; Essers et al., 2020).

Around the globe, only one in three businesses have a woman among the principal owners (World Bank, 2023b). Moreover, women typically earn less in self-employment than both their male counterparts and salaried employees of either gender (Bertrand, 2018). Indeed, women often find themselves pushed into self-employment or small business ownership out

of necessity rather than pulled by the promise of opportunity. Their entrepreneurial ventures frequently gravitate toward customer-oriented services and less productive industries—a trend that might be linked to the more modest growth trajectories and reduced likelihood of survival observed in women-led businesses (Boden Jr. and Nucci, 2000; Coleman, 2007; Coleman and Robb, 2009; Fairlie and Robb, 2009; Kiefer et al., 2022). This lack of representation and performance disparity in entrepreneurship is the outcome of a complex interplay between formal institutions, such as educational systems and labour policies, and informal institutions, including cultural norms and societal expectations. Together, these give rise to differences that further exacerbate the gender gap in entrepreneurial activities, setting the stage for the unique challenges that women encounter in the business sector.

Empirical research has exposed several areas where women face obstacles, such as human, financial, and social capital. In terms of human capital, the evidence indicates that on average women demonstrate lower levels of financial literacy and business acumen than men (Lusardi and Mitchell, 2011; OECD, 2017). This gap is exacerbated by women's self-perceptions, as they often view themselves as less capable of becoming entrepreneurs and hold themselves to higher standards of competence than their male counterparts (Thébaud, 2010). Additionally, societal gender biases consistently undervalue women's leadership qualities (Yang and del Carmen Triana, 2017). Financial capital presents additional challenges, as women tend to experience consistent difficulties in securing funding, an empirical observation that aligns with a broader gender disparity within entrepreneurial finance (Beck et al., 2008; Coleman and Robb, 2009; Agier and Szafarz, 2012; Marlow and McAdam, 2012; Brana, 2013; Eddleston et al., 2016; Lauto et al., 2022). With respect to social capital, not only are women entrepreneurs frequently constrained by limited access to business networks (Allen, 2000; OECD/EU, 2017), but the very quality and character of their connections often exhibit notable differences compared of those of men (Renzulli et al., 2000; Schutjens and Stam, 2003). For instance, finding mentors or sponsors who can guide and support an entrepreneur's career is often more challenging for women.

Cultural norms and societal expectations also play a role in limiting women's entrepreneurial opportunities. Women's motivations within entrepreneurship have been found to be distinct from those of men, often emphasising flexibility and work-life balance (Lombard, 2001; Edwards and Field-Hendrey, 2002; Walker et al., 2008; Craig et al., 2012; Loscocco and Bird, 2012; Thébaud, 2016; Mas and Pallais, 2017). However, the overlap of gender roles with entrepreneurial tasks often complicates achieving a harmonious equilibrium (Hyytinen and Ruskanen, 2007; Brush et al., 2009; Jennings and Brush, 2013). It is noteworthy, however, that assumptions of homogeneity can often obscure and misrepresent the unique challenges that some groups of women encounter (Patrick et al., 2016; Brush and Greene, 2021).

The business environment became increasingly challenging for women in the wake of the COVID-19 pandemic, disproportionately affecting their jobs and entrepreneurial activities (Alon et al., 2020, 2021; Albanesi and Kim, 2021; Graeber et al., 2021; Torres et al., 2023). The imposition of lockdowns and school closures amplified difficulties for employees and entrepreneurs with caregiving responsibilities, a burden predominantly borne by women who typically assume the primary role for childcare (Farré et al., 2020; Del Boca et al., 2020; Sevilla and Smith, 2020; Hipp and Bünning, 2021). While the pandemic intensified these challenges, they are not new. Using data spanning 1994-2019, a recent study by Price & Wasserman (2023) found that summer school closures in the U.S. lead to a 1.1 percentage point decline in women's employment-to-population ratio, a 9.8 percent decrease in total hours worked, and a 3.3 percent drop in women's weekly earnings, emphasising the impact of childcare responsibilities.

Such burdens obviously extend beyond the U.S., taking on additional complexity when considering the intersection of socio-economic status. In Chile, school closures have amplified educational inequalities, with students from less privileged backgrounds affected more severely (Kuzmanic et al., 2023). This pattern suggests that their mothers, already disadvantaged in the labour market, likely faced even greater challenges due to school

closures, possibly experiencing further disruptions in employment or increased childcare responsibilities.

Recent empirical evidence highlights this trend. Data from 50 countries shows that female-led firms were 4 percentage points more likely to close than their male-led counterparts during the pandemic (Goldstein et al., 2022). Similarly, businesses led by women were more prone to suffer extended closures (Liu et al., 2021), and women-owned businesses performed worse due to a higher sensitivity to health and economic risks (Birhanu et al., 2022). This situation is mirrored in academia, where female researchers, especially those with young children, were disproportionately affected (Myers et al., 2021; Deryugina et al., 2021).

3. Context

a. Business registrations in Chile

This study focuses on the first step any formal business must undertake to start operating: the registration of the firm. In Chile, there are two options for legally registering a firm.

First, entrepreneurs can do it through the Official Journal. This option requires entrepreneurs to draft and notarize their company's articles of association, then register the business and publish its details. This entire process, essential for legal business operations, must be completed within 60 days and necessitates the entrepreneur's physical presence. Second, entrepreneurs can opt for the Registry of Companies (*Registro de Empresas y Sociedades*, RES), an online platform introduced on May 2, 2013. The RES was designed to streamline the process of establishing and managing companies, enabling entrepreneurs to draft their articles of association directly online. Before the pandemic, finalising the registration process required paying for a notary's service or buying an Advanced Electronic Signature (AES) from a certified physical store. However, on April 23, 2020, a new online AES became available for nearly 1 US dollar, making the process more accessible and removing the need for in-person interactions.

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In this study, we focus on the administrative records from the RES. There are three main reasons. First, being an online platform, its digital nature allows for a more efficient data collection and analysis process, ensuring accuracy and timeliness. Second, since its introduction in 2013, the RES platform progressively became the predominant choice for new entrepreneurs. Third, resulting in a surge of new registrations and a shift to the online method, largely to the detriment of the traditional registration processes (Montégu et al., 2021).

b. School closures in Chile

We aim to understand how school closures and reopenings influenced business registrations from January 2019 to December 2021, and assess how these shifts differently impacted men and women based on their roles as parents.

Chile's response to COVID-19 was notable for its prolonged school closures, longer than most other countries. Indeed, Chile had the highest number of days with schools fully closed among OECD countries (see Figure 7.1 in the Appendix). Schools initially shut down in March 2020 and began to slowly reopen in August. Yet, by December 2020, only 15% of students had schools with in-person activities to return to them. Then, this rose to 24% in March 2021, 51% in July 2021 and 98% by December 2021. This makes Chile an interesting case study to examine the long-term impacts of such closures and how interrupting (or resuming) in-person classes affected female entrepreneurship by increasing (or reducing) childcare duties.

In Chile, mobility restrictions, public health health measures, and school openness statuses during the pandemic were established and reported weekly at the municipal level. This granularity —covering lockdowns, infection and testing rates, and school statuses—enables our study to differentiate the impact of school closures (and reopenings) from other pandemic-related effects, by exploiting variability at both municipal and individual levels.

4. Methodology

a. Data sources

i. Registry of Companies of Chile (RES)

We use administrative data from the Registry of Companies of Chile (RES), which is the most common way to register a firm nowadays. As Figure 7.2 shows, most firms in Chile are registered through RES. This is mainly because of its relative simplicity and the absence of mandatory physical steps in the whole process. RES contains data of 73.1% of all Chilean registrations of new firms, with their respective date and municipality of registration from May 2013 to December 2021. It is noteworthy that there was a substantial surge in registrations through RES at the end of April 2020. Moreover, as depicted in Figure 7.3 (in the Appendix), the significant impact of the new advanced electronic signature on the establishment of new businesses becomes evident. It is estimated that during its inaugural year of implementation, this reform was responsible for the creation of approximately 30,000 businesses nationwide (Montégu et al., 2021).

In addition to firms' registry information, the RES contains member IDs of registered firms, with some socio demographic information, such as the sex of the entrepreneur. This allows us to identify all people who were involved as a founder in the registration of a new firm and the time and place where it was held. Figure 4.1 shows the weekly evolution of men and women founding partners from January 2019 to December 2021. Here, at first, we see that there are consistently fewer female entrepreneurs than men and that those trends are similar between them, being affected by the same seasonal shocks, at least in the pre-COVID period. Additionally, we also see a sharp decline in both men and women entrepreneurs during the COVID outbreak and mandatory school closures (outlined with the first vertical dashed line). Nonetheless, after the decline in rates during March 2020, there is a rise that coincides with the implementation of the new AES on April 23rd, 2020.

Figure 4.1: Weekly number of entrepreneurs by sex
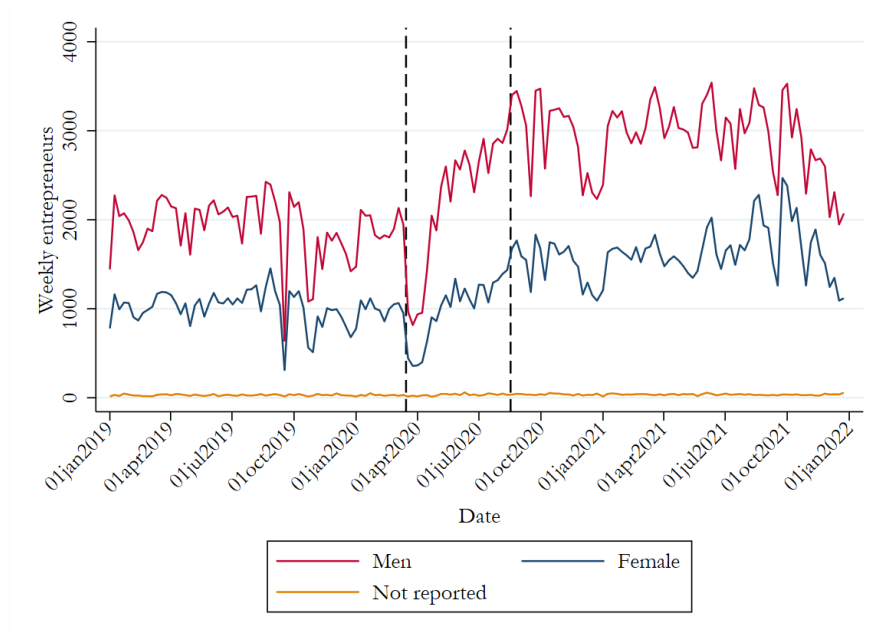
Although both groups experienced a decline in March 2020, the extent of this decrease was not uniform. Figure 4.2 depicts the female-to-male entrepreneur ratio, revealing a reduction in the number of women entrepreneurs for every male entrepreneur shortly after the government's mandatory shutdowns were enforced on March 16, 2020. Interestingly, once schools were officially permitted to reopen on August 17th, 2020, the ratio rebounded to levels seen before the COVID-19 pandemic and even exceeded those levels after August 2021.
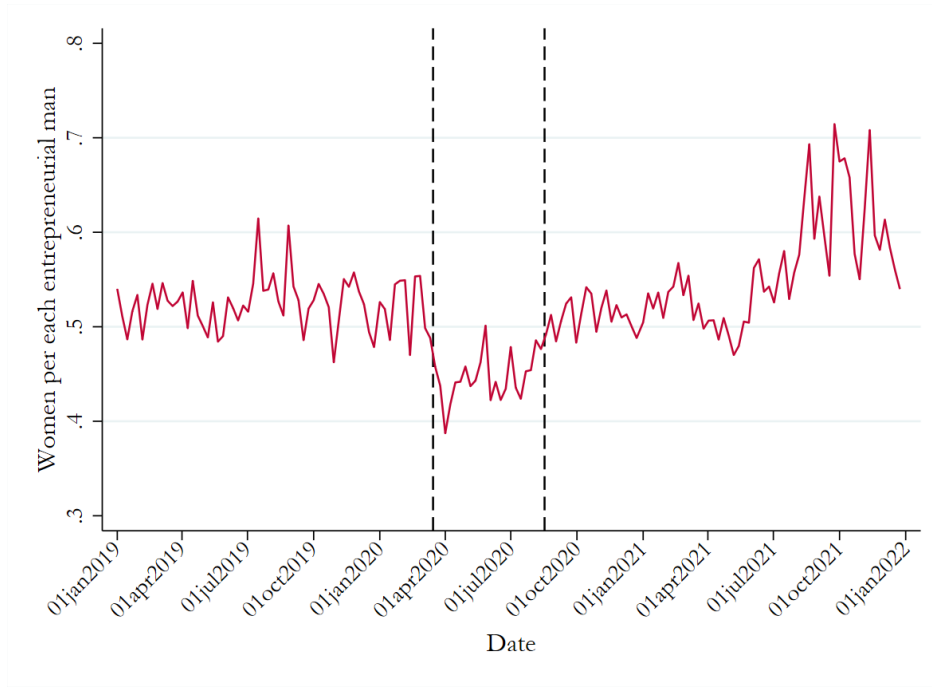
Figure 4.2: Women to men entrepreneurs' ratio

Note: The first dashed line indicates the week when schools were ordered to close by the central government, while the second dashed line indicates the day which schools were officially allowed to re-open.
Source: Own elaboration, based on public data from RES monthly reports from the Ministry of Economy, Development and Tourism.

ii. Social Household Registry (RSH)

We take advantage of RES data by merging it with the Social Household Registry (Registro Social de Hogares, RSH) from the Ministry of Family and Social Development (Ministerio de Desarrollo Social y Familia, MDSyF).

The RSH is an administrative record that consists of the main instrument for the selection of beneficiaries of subsidies and social programs in the country. It is built with self-reported data from the beneficiaries and government's administrative data coming from several public institutions[1]. With this record, we have access to individual information of sociodemographic variables from January 2019 to December 2021. These include people's

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[1] For more information, click here.

gender, age, marital status, number of children, ethnicity, labour status, labour participation and labour earnings, among others.

This database also includes information of all the subsidies given by the central government through the Social Information Registry (Registro de Información Social, RIS), from the MDSyF. This is important because, during the pandemic, the Chilean government provided assistance and subsidies totalling US$38.372 million between 2020 and 2021. Within Latin America, Chile was the country that provided support to families for the longest period (18 months), with significant coverage, reaching 90% of the Social Registry of Households and with an amount provided to families above the poverty line[2].

iii. Civil registry (SRCeI)

We also include information of the Civil Registry (Servicio de Registro Civil e Identificación, SRCeI). This administrative record contains all parent-child relationships in the national territory, with their respective IDs numbers. This is useful to determine the number of children each person of working age has, along with the respective age of each of them.

iv. COVID-19 data

Additionally, we incorporate public information about the COVID-19 pandemic. In particular, we include data on the implementation of the Step-by-Step Plan (Plan Paso a Paso), the strategic plan designed by the Chilean Ministry of Health (MINSAL) to tackle the coronavirus outbreak, as well as information of epidemiological indicators (e.g. COVID-19 infection and death rates, PCR test rates and test positivity rates) (Pertuzé et al., 2023). This data is made publicly available by the Ministry of Science, Technology, Knowledge and Innovation[4].

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[2] For more information, click here and here.

[4] For more information, click here.

The Step-by-Step plan mainly consisted of four different phases, going from the most restrictive (Phase 1 or "Quarantine"), where only essential workers had permission to leave their homes, to the less restrictive (Phase 4 or "Advanced Opening"), were high-contact activities and larger gatherings of people were allowed. Figure 7.4 (in the Appendix) shows the weekly evolution of the Step-by-Step Plan. As we observe, as soon as COVID-19 reached the country, the percentage of the national population under Phase 1 (i.e., full lockdowns) started to rise. Nonetheless, mobility constraints decreased during the spring and summer of 2020, followed by a resurgence in the winter of 2021, reaching its peak during April and May of that year. Epidemiological indicators are illustrated in Figure 7.5 in the Appendix. Here we observe that COVID infection rates reached particularly high levels during the winter months of both 2020 and 2021. Notably, the second wave of infections resulted in fewer fatalities compared to the initial wave.

v. Educational records

We include two datasets from the Ministry of Education (Mineduc). The first one provides school enrolment data spanning the years 2019 to 2021, including the corresponding municipality for each school. These data prove valuable as they facilitate the linkage of children's educational institutions with those of their respective parents, when combined with the RSH and RES datasets. The second dataset from the Mineduc has information on whether each school in the country had in-person classes or not each week during the pandemic. As stated before, all schools in the country were ordered to close by official decree on March 16th, 2020, and were voluntarily allowed to reopen on August 17th of the same year. However, after the central government signed the official decree that allowed them to start doing face-to-face classes again, few schools reopened immediately, and the vast majority took several months to reopen (see Figure 7.6 in the Appendix).

In this vein, schools also tended to react more slowly than phases to the improvement of sanitary conditions. Figure 7.7 in the Appendix shows the evolution of the percentage of students with open schools and phases of the Step-by-Step Plan. As we see, almost all schools were closed during 2020 despite a significant share of the population being in Phase 3 or

Phase 4 (with less mobility restrictions) during that year. Then, only in the second semester of 2021, a larger number of schools started to reopen. This phenomenon could be explained by political pressures, adaptation problems and the requirement to fulfil the sanitary protocols before reopening[3].

It is also noteworthy that the rise in the proportion of schools reopening aligns with the increasing trend seen in the ratio of women-to-men entrepreneurs, as illustrated in Figure 4.2. Both series are presented in Figure 4.3. In the pre-COVID era, when it was assumed that all students were attending open schools, the ratio of women to men entrepreneurs fell within the range of 0.5 to 0.55. However, during the period of mandatory school closures, this ratio decreased to approximately 0.45 women for every male entrepreneur. Subsequently, following the government's decision to allow school reopenings, over the next ten months, the ratio rebounded to its pre-COVID levels. Additionally, as the percentage of schools gradually increased towards the end of 2021, the ratio surpassed pre-COVID levels, reaching its peak in October 2021 at 0.65 women for every male entrepreneur.

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[3] Among the requirements requested by the Ministry of Health to reopen, were the sanitation of the school every 24 hours, the mandatory use of face masks and the distancing of students of at least 1 metre in bathrooms, rooms of classes and common spaces..

Figure 4.3: Women entrepreneurs to men entrepreneurs' ratio and school opening
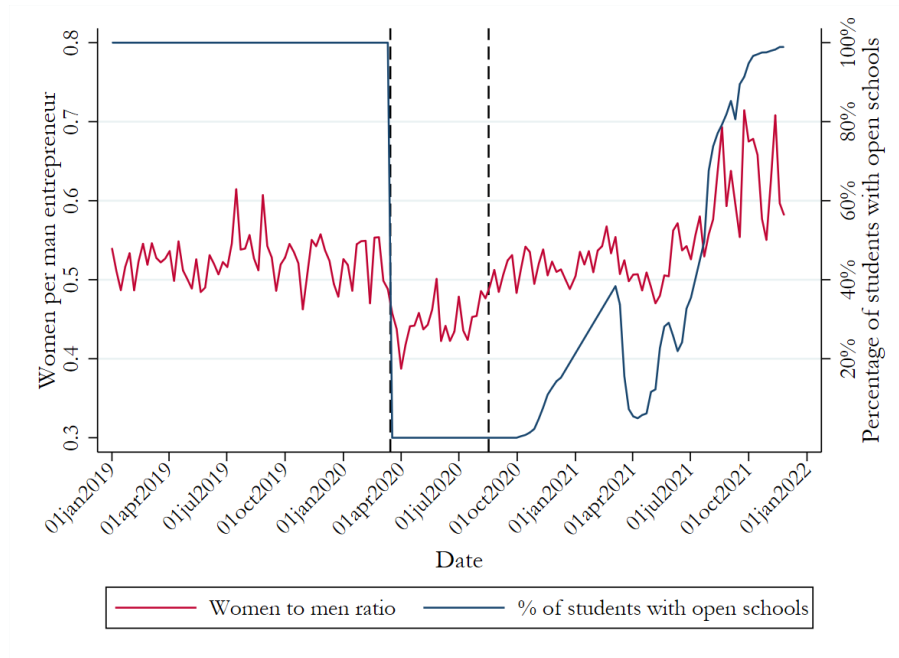
To build our final database, we merged all previously mentioned information from the 2019-2021 period on a weekly basis. We also refined our sample to include only working-age men (18-65 years old) and women (18-60 years old) who are parents of school-age children (0-18 years old) and reside in biparental households. As a result, our dataset comprises 107,904,684 fully integrated observations. This constitutes a balanced panel of 781,918 individuals for each week, with 390,959 individuals of each gender. For every observation, we recorded data about whether an individual registered a firm through the RES during a particular week and the municipality in which the individual resided during that time. Additionally, we incorporated the sociodemographic variables from RSH, the school status of their children, and the weekly municipal data from the Step-by-Step Plan and epidemiological controls.

b. Descriptive statistics

Table 1 presents the summary statistics of the entire sample and further breaks it down by gender. The data reveals that both men and women each account for half of the observations. On average, fathers are slightly older (43.1 years) than mothers (40.3 years). Approximately 4% of the sample consists of foreign individuals, and close to 10% identify as members of indigenous peoples.

Regarding employment, an average of 72% of the entire sample is currently employed. This consists of 92% of the male participants and only 53% of the female participants. The average monthly earnings for employed men stands at CLP 459,353, while for women it's CLP 312,432, which is 32% less than their male counterparts. The average household income per individual is approximately CLP 123,533, and the mean socioeconomic quintile is 54.15. Despite earning less, women receive more in state subsidies (averaging CLP 92,906) compared to men (averaging CLP 74,205). During this period, our sample indicates there are, on average, 38.2 male entrepreneurs per 1,000 men and 13.6 female entrepreneurs per 1,000 women.

Considering households with children, both men and women have an average of 1.76 children aged between 3 and 18 years. Breaking this down by age groups, there are on average, 0.31 children aged 3 to 6 years, 0.94 children aged 7 to 14 years, and 0.40 children aged 15 to 18 years. This distribution suggests that the majority of households with children tend to have kids in the middle childhood to early adolescence range (7 to 14 years).

Table 1: Summary statistics of the full sample and by sex

	Full sample Mean (St. dv)	Fathers Mean (St. dv)	Mothers Mean (St. dv)
Demographics			
Age	41.69	43.05	40.33

	(8.65)	(9.12)	(7.92)
Foreign=1	0.04	0.03	0.04
	(0.18)	(0.18)	(0.19)
Ethnicity=1	0.10	0.09	0.11
	(0.3)	(0.29)	(0.31)
Employment and income			
Working=1	0.72	0.92	0.53
	(0.45)	(0.27)	(0.5)
Labour Income (CLP)	$ 408,501	$ 459,353	$ 312,432
	(496366.5)	(552541.88)	(392937.75)
Average income in HH (CLP)	$ 123,533	$ 123,533	$ 123,533
	(146180.3)	(146180.3)	(146180.3)
Income Quintile (from 0 to 100)	54.15	54.15	54.15
	(19.07)	(19.07)	(19.07)
Subsidies (CLP)	$ 83,563	$ 74,205	$ 92,906
	(287221.22)	(255971.2)	(315122.56)
Entrepreneurs per 1,000 individuals	20.6	38.2	13.6
	(0.02)	(0.02)	(0.01)
Children in HH			
N° of Children 3-18	1.76	1.76	1.76
	(0.84)	(0.84)	(0.84)
N° of Children 3-6	0.31	0.31	0.31
	(0.51)	(0.51)	(0.51)
N° of Children 7-14	0.94	0.94	0.94
	(0.71)	(0.71)	(0.71)
N° of Children 15-18	0.40	0.40	0.40
	(0.56)	(0.56)	(0.56)
Observations	107,904,684	53,952,342	53,952,342

Note: The sample includes a balanced panel of fathers and mothers with children aged 3 to 18 years, who lived in biparental households, as indicated by the RSH, throughout the study period (January 2019 to December 2021).

The significant variability observed at both the weekly and municipal levels is critical to our analysis. It captures the differences in school closures, reopenings, and the progression

through the phases of the Step-by-Step Plan—all set against the backdrop of entrepreneurial activity. Figures 7.8 and 7.9 in the Appendix underscore the geographic variation of the Step-by-Step plan and school reopenings, respectively. For several weeks, while certain municipalities grappled with Phase 1 restrictions, others navigated the relative freedom of Phase 4. These disparities are especially evident in school reopening rates during the first half of 2021. This variability enables us to differentiate the effects of the pandemic from those of school closures. In Section 4.c, we leverage this to design an empirical strategy that accurately identifies our coefficients of interest.

c. Empirical Strategy

i. Main regression

In this section, we outline the empirical strategy that allows us to determine the effect of school closures and reopenings on female entrepreneurships. To do this, we estimate the probability of starting a business for each person i in municipality k during week t:

$$
\begin{aligned}
Entr_{i,k,t} = {} & \beta_0 + \beta_1 * School\_Closure_{i,t} + \beta_2 * School\_Reopen_{i,t} + \sum_{j=1}^{4} \beta_{j+2} * Phase_{k,t}^{j} \\
& + \beta_7 * COVID_{k,t} + \beta_8 * Woman_{i,t} + \beta_9 * School\_Closure_{i,t} * Woman_{i,t} \\
& + \beta_{10} * School\_Reopen_{i,t} * Woman_{i,t} + \delta_1 * AES_t + \delta_2 * X_{i,t}i + \gamma_k + \mu_t + \epsilon_{k,t}
\end{aligned}
\tag{1}
$$

Here, $Entr_{i,k,t}$ is a dummy that takes a value of 1 if an individual i started a business on week t and 0 otherwise. Variable $School\_Closure_{i,t}$ is a dummy that takes the value 1 if at least 1 children's schools of person i closed during week t, while $School\_Reopen_{i,t}$ equals 1 when all children's schools opened during week t, and 0 otherwise. Therefore, when $School\_Closure_{i,t}$ = 1, $School\_Reopen_{i,t}$ = 0 and vice versa after March 16th, 2020 (prior to that, both dummies are equal to 0). We further extend this analysis by considering an alternative definition of $School\_Closure_{i,t}$ and $School\_Reopen_{i,t}$, where the first variable equals 1 only when all

children's schools of person i are closed and the latter is 1 when at least 1 children's school reopened. This extension is showed in Section 6.

Then, $Phase_{i,t}^{j}$ denote 4 dummies that take value 1 when municipality i entered phase j of the Step-by-Step Plan during week t. $Woman_{i,t}$ is a dummy that is equal to 1 when the entrepreneurs are women and 0 otherwise.

Coefficients of interactions between variables $School\_Closure_{i,t}$ and $Woman_{i,t}$ and $School\_Reopen_{i,t}$, and $Woman_{i,t}$ are our coefficients of interest, since they show differentiated effects of closure and reopening of schools on the probability of starting a business for fathers and mothers. Finally, AES_{t} is a dummy that takes value 1 when the Advanced Electronic Signature entered into force in firms' creation system through RES at the national level. $X_{i,t}$ represents controls at the individual level (age, income, number of workers in the household, working status, number of elderly in the household, nationality, ethnicity, subsidies received), while γ_{k} and μ_{t} represent fixed effects per municipality and week, respectively. Finally, $\epsilon_{k,t}$ denotes the error term.

ii. Heterogenous effects

We also document potential heterogenous impacts within different sectors of the population. To do this, we disaggregate the sample by 2 different groups: one based on children's ages and the other based on household' socioeconomic quintiles.

For the first disaggregation, we categorize our sample into three distinct groups: parents with children's ages between 3-6 years, 7-14 years and 15-18 years. This categorization aligns with the different school stages in the Chilean educational system, such as pre-school, basic education, and secondary education. Subsequently, for the socioeconomic segmentation, we partition the sample according to the reported data, distinguishing among the following groups: the 40% poorest population (Quintile I and II), Quintile II, Quintile IV, and Quintile V.

5. Results

a. Main Results

Table 2 presents our estimations on how school closures and reopenings affected entrepreneurial activities of fathers and mothers within two-parent households with children aged 3 to 18 years. To delve into potential gender-differentiated effects of school closures on parental employment, our focus remains on heterosexual couples, irrespective of their marital status.

Table 2 display regression coefficients based on the primary definition of school closure and reopening indicators; where $School\_Closure_{i,t}$ is set to 1 if at least one child's school is closed, and $School\_Reopen_{i,t}$ is set to 1 when all children's schools have reopened. Additionally, in Section 6, we consider alternative definitions of this variable employing a more nuanced definition for these indicators; here, $School\_Closure_{i,t}$ is set to 1 when all children's schools are closed, and $School\_Reopen_{i,t}$ is set to 1 if at least one child's school has reopened. Furthermore, column (1) of Table 2 presents a model without fixed effects or COVID-specific controls. In contrast, column (2), detail a model that incorporates sociodemographic controls and fixed effects (FE), while column (3) represents the full model (with sociodemographic controls, fixed effects and COVID controls).

Table 2 indicates that school closures led to a notable decrease in entrepreneurship during the pandemic. As depicted in column (3), school closures reduced the likelihood of initiating a business by -0.01 percentage points (p.p.) each week. Given the size of our sample, we deduce that school closures deterred on average 82 parents of children aged 3-18 from registering a company through RES weekly. More specifically, this corresponds to 41 men and 41 women.

The interaction between the closure variable and the gender dummy suggests a more pronounced decline in entrepreneurship among mothers compared to fathers. We estimate

that school closures diminished the weekly probability of women starting a business by an additional -0.005 p.p. Considering the size of our panel, our estimates indicate that school closures barred an additional 18 mothers from launching a business each week. This translates to a cumulative negative impact of 59 weekly registrations. Furthermore, considering the gender gap before the school closures initiated (captured by the variable *Woman*), we can conclude that school closures widened the gender gap by 29,6%[4].

We now explore whether the dynamics shifted when schools started reopening. Interestingly, we cannot reject the null hypothesis that, upon school reopenings, the overall likelihood of starting a business equaled that of pre-closure periods. The coefficient of column (3) is negative but not statistically significant at the 5% level. However, the likelihood of starting a business for mothers with children aged 3-18 after the reopen of schools decreased by -0.004 p.p. each week. Applying this estimate to our sample implies that roughly 14 mothers were dissuaded each week from starting their businesses. While there was a modest increase when schools reopened, it did not suffice to return the entrepreneurship rates of mothers to pre-pandemic levels. Furthermore, considering again the gender gap before the school closures initiated (captured by the variable *Woman*), we can conclude that school reopened increased the gender gap by "only" 22,9%[5].

These results suggests that women entrepreneurs sharply declined upon school closure and increased upon school reopening, but that this increase upon reopening was not sufficient to recover pre-school closure baseline rates. This can be explained by the low attendance of students during the beginning of reopen. In fact, the return of children to school occurred significantly later following the reopening. For example, attendance remained voluntary up to March 2022, with only between 35% and 55% of students attending school each day by the end of the academic year of 2021 (Claro et al., 2021).

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[4] This is calculated by dividing coefficients of *School_closure#Woman* and *Woman:* -0.0000468/-0.000158=29.6%.
[5] As before, this is calculated by dividing the coefficients of *School_reopen#Woman* and *Woman:* -0.0000363/-0.000158=22,9%.

The uneven responses between men and women, as evidenced in Table 2, resonate with existing literature on parental time allocation. Various studies emphasise that during the early phases of the pandemic, mothers predominantly assumed the bulk of childcare responsibilities. (Amuedo-Dorantes, et al., 2023; Adams-Prassl, et al.,2020; Alon et al., 2020, 2021).

Table 2: Entrepreneurial response to school closures and reopen of fathers and mothers of biparental households.

	Main Regression		
	(1) Sociodemographic controls	(2) Sociodemographic controls & FE	(3) Full model
School closure	-0.000500***	-0.0000770***	-0.000104**
	(-6.63)	(-8.82)	(-3.26)
Woman	-0.000157***	-0.000158***	-0.000158***
	(-32.93)	(-33.13)	(-27.12)
School closure#Mother	-0.0000468***	-0.0000469***	-0.0000468***
	(-7.44)	(-7.44)	(-7.39)
School reopen	0.00000333	0.0000329**	-0.0000626
	(0.35)	(-3.17)	(-1.87)
School reopen#Mother	-0.0000364***	-0.0000362***	-0.0000363***
	(-4.03)	(-4.01)	(-4.27)
AES	0.000151***	0.000178***	0.000156***
	(21.71)	(21.71)	(16.98)
Age	-0.00000864***	-0.00000867***	-0.00000869***
	(-47.64)	(-47.67)	(-24.92)
Income (CLP)	6.37e-10***	5.97e-10****	5.97e-10***
	(61.41)	(56.52)	(19.76)
N° of workers in HH	-0.0000321	-0.00000544*	-0.00000522
	(-1.17)	(-1.98)	(-1.48)
Working (RSH)	0.00000966*	0.00000714	0.00000718
	(-2.15)	(1.58)	(1.57)
N° of elderly in HH	0.0000805***	0.0000683***	0.0000684***
	(7.13)	(6.04)	(3.83)

Foreign	0.000131***	0.0000978***	0.0000977***
	(16.36)	(11.41)	(4.61)
Ethnicity	-0.000433***	-0.0000396***	-0.0000396***
	(-8.88)	(-7.28)	(-5.90)
Subsidies (CLP)	2.21e-12	4.51e-12	3.22e-12
	(0.42)	(0.85)	(0.56)
Female pre-closure baseline mean	0.0001231	0.0001231	0.0001231
Municipal & Week FE	No	Yes	Yes
Phases & epidemiological controls	No	No	Yes
Observations	107,904,684	107,904,684	107,904,684

t statistics in parentheses
*p<0.05, ** p<0.01, *** p<0.001,

b. Heterogeneous impacts

In this section, we document the heterogeneous effects of school closures and reopenings. At first, we show the results on fathers and mothers with children of various ages, enabling us to discern the specific contexts in which this impact is most pronounced. For this purpose, we categorise parents into three distinct groups based on the presence of at least one child in specific age brackets: 3-6 years (preschoolers), 7-14 years (elementary and middle school), and 15-18 years (high school).

i. By children's age

Table 3 presents variations in estimates for each parental group. As in column (3) of Table 2, coefficients are based on models with all controls and fixed effects. Here, the interaction estimates of school closures and reopenings with the gender dummy vary between groups. For instance, school closures had a considerably smaller impact among women with children aged 15 to 18 years, leading to a decline in the probability of starting a business by "only" -0.00239 p.p. each week. In contrast, women with children aged 3 to 6 years faced the most significant effects from school closures, with a drop of -0.00734 p.p. in their probability of starting a business each week. Thus, women in the second group were around three times more affected than those in the first. Mothers with children 7-14 years experienced the second most pronounced effects, with a decrease in likelihood of -0.00529 p.p.

Moreover, the impact on the gender gap varied across different groups. Assessing the gender gap during the pre-closure period (reflected by the *Woman* coefficient), school closures notably amplified this gap, particularly among mothers with children aged 3 to 6 years, resulting in a 41.9% widening. In contrast, this gap increased by 31.9% among parents with children aged 7 to 14 years and by a comparatively lower 14.4% among parents with children aged 15 to 18 years.

Then, for two out of the three groups, we cannot dismiss the possibility that, upon school reopenings, entrepreneurial trends resembled those of pre-closure periods, even though coefficients for all age groups were negative. These results were not statistically different from zero at a 5% level. The only group exhibiting a significant decline comprised parents with children aged 3-6 years. Lastly, when examining the interaction between school reopenings and the gender dummy, we noted that the effect on mothers with children aged 15-18 years wasn't statistically significant. In contrast, the most pronounced effect occurred again among women with children aged 7-14 years. Here, the gender gap increased by "only" 27.9% comparing with the pre-closure period, a similar result for the group with children aged 3-6 years (25.5%). By contrast, the coefficient on the group with children aged 15-18 years was negative but not significant at a 5% confidence level.

Table 3: Entrepreneurial response to school closures and reopen of biparental households with children ages 3–18.

	Parents with children between 3-6 years	Parents with children between 7-14 years	Parents with children between 15-18 years
School closure	-0.000145**	-0.000101***	-0.0000958*
	(-3.17)	(-3.82)	(-2.55)
Woman	-0.000175***	-0.000166***	-0.000166***
	(-18.97)	(-30.79)	(-21.03)
School closure#Mother	-0.0000734***	-0.0000529***	-0.0000239*
	(-5.74)	(-7.29)	(-2.44)

School reopen	-0.000103*	-0.0000513	-0.0000475
	(-2.10)	(-1.82)	(-1.21)
School reopen#Mother	-0.0000447*	-0.0000464***	-0.0000267
	(-2.05)	(-3.93)	(-1.89)
Female pre- closure baseline mean	0.0001476	0.0001239	0.001169
Sociodemographic & AES controls	Yes	Yes	Yes
Municipal & Week FE	Yes	Yes	Yes
Phases & epidemiological controls	Yes	Yes	Yes
Observations	30,370,417	79,508,785	39,132,524

t statistics in parentheses.
*p<0.05, ** p<0.01, *** p<0.001.

ii. By socioeconomic quintiles

We also document results differentiating by socioeconomic quintiles. This classification divides the Chilean population by income levels. This is calculated by taking the overall household income and dividing it by the number of family members. These categories are already calculated in the RSH database, where quintiles I and II (representing lower-income groups) are consolidated into a single category.

Table 4 presents variations in estimates for each socioeconomic group. As in Table 3, coefficients are based on models with all controls and fixed effects. Here, the interaction estimates of school closures and reopenings with the gender dummy vary between groups. For instance, school closures had a considerably higher impact among women from the highest quintile income, leading to a decline in the probability of starting a business by -0.00691 p.p. each week. By contrast, women from the lowest quintiles (I, II and III) faced the lowest impact (-0.00454 p.p. and -0.00428 p.p., respectively).

Nevertheless, there was a significant difference in the probability of starting a business for women in each group during the pre-closure period. While quintile V had a probability of starting a business of 0.000313 each week during that period, for quintile I and II this was only 0.0000781, meaning that women in the first group were 4 times more likely to start a business before school closures. Thus, coefficients of interactions should be interpreted taking this into account. Then, if we consider the relative effect of school closures with

respect to the pre-closure female mean, the most affected group are women from quintile I and II, reaching a decrease of 58,1%[6] of starting a business. On the other side, quintile III suffered a 40% decreased, while the relative change for quintile IV was 35,9%. Finally, quintile V was the least affected with a relative change of "only" 22,1%.

Furthermore, considering the gender gap before the school closures initiated (captured by the variable *Woman*), we can conclude that school closures widened the gender gap by 38,8%, 28,5%, 28,8% and 21,6% for quintile I-II, III, IV and V, respectively.

Then, for two out of the four groups, we cannot dismiss the possibility that, upon school reopenings, entrepreneurial trends resembled those of pre-closure periods, even though coefficients for all groups were negative. The only group exhibiting a significant decline comprised parents from quintile I and II. Lastly, when examining the interaction between school reopenings and the gender dummy, we noted that the effect on mothers from quintiles IV and V were not statistically significant. In contrast, the most pronounced relative effect occurred among women from quintile III. Here, the relative change of quintiles I-II, III, IV and V were 45,3%, 47,1%, 12,1% and 10%, respectively.

 Finally, the gender gap increased by "only" 30,3% comparing with the pre-closure period for quintiles I-II, a similar result for the group from quintile III (33,6%). By contrast, the coefficients on quintiles IV and V were negative but not significant at a 5% confidence level.

Table 4: Entrepreneurial response to school closures and reopen of biparental households by socioeconomic quintiles.

	Quintile I and II	Quintile III	Quintile IV	Quintile V
School closure	-0.0000987**	-0.000112*	-0.000610	-0.000157
	(-3.02)	(-2.10)	(-0.87)	(-1.55)
Woman	-0.000117***	-0.000150***	-0.000182***	-0.000319***
	(-18.74)	(-14.83)	(-14.43)	(-17.64)

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[6] -0,0000454/0,00007809=58,1%.

School closure#Mother	-0.0000454***	-0.0000428**	-0.0000525***	-0.0000691*
	(-6.39)	(-3.06)	(-3.68)	(-2.55)
School reopen	-0.0000478	-0.000371	-0.0000666	-0.000185
	(-1.34)	(-0.66)	(-0.89)	(-1.76)
School reopen#Mother	-0.0000354***	-0.0000504*	-0.0000176	-0.0000312
	(-3.37)	(-2.50)	(-0.79)	(-0.83)
Female pre-closure baseline mean	0.00007809	0.000107	0.000146	0.000313
Sociodemographic & AES controls	Yes	Yes	Yes	Yes
Municipal & Week FE	Yes	Yes	Yes	Yes
Phases & epidemiological controls	Yes	Yes	Yes	Yes
Observations	58,466,747	19,120,474	15,312,239	13,236,202

t statistics in parentheses
*p<0.05, ** p<0.01, *** p<0.001,

6. Robustness checks

Additionally, in Section 6, we consider alternative definitions of our variables of interest, employing a more nuanced definition for these indicators; here, $School\_Closure_{i,t}$ is set to 1 when all children's schools are closed, and $School\_Reopen_{i,t}$ is set to 1 if at least one child's school has reopened.

Columns (4), (5), and (6) of Table 5 present results using an alternative definition for school closures and reopenings. Notably, the outcomes align closely with those in columns (1) through (3) of Table 2. Under this definition, school closures continue to exert a significant, and nearly identical, influence on overall entrepreneurship rates. However, the impact on female entrepreneurship is marginally reduced, which is congruent with the less stringent definition where the variable is set to 1 only when all children's schools are closed. In addition, school reopenings also reflect a negative but not significant effect at the 5% level on overall entrepreneurship in column (6). Conversely, the interaction with the gender variable indicates a marginally greater negative influence on the likelihood of mothers initiating businesses compared to the results in column (3) of Table 2.

Furthermore, alternative models for differentiated effects on children's age and socioeconomic quintiles (in Appendix b) present again similar results to those in Table 3 and 4, giving confidence about the main results

Table 5: Entrepreneurial response to school closures and reopen of fathers and mothers of biparental households.

	School closures & reopen 2		
	(4) Only controls	(5) FE	(6) FE & controls
School closure	-0.000509*** (-6.82)	-0.0000785*** (-9.08)	-0.000101*** (-4.55)
Woman	-0.000156*** (-33.10)	-0.000156*** (-33.29)	-0.000157*** (-33.29)
School closure#Mother	-0.0000464*** (-7.39)	-0.0000464*** (-7.40)	-0.0000464*** (-7.39)
School reopen	0.00000239 (0.26)	0.0000343 (-3.38)	-0.0000579* (-2.53)
School reopen#Mother	-0.0000386*** (-4.4)	-0.0000385*** (-4.42)	-0.0000385*** (-4.43)
AES	0.00015=*** (21.82)	0.000178*** (22.01)	0.000156*** -17.01
Age	-0.00000862*** (-49.35)	-0.00000863*** (-49.27)	-0.00000865*** (-49.35)
Income (CLP)	6.32e-10*** (61.60)	-5.93e-10**** (56.70)	5.93e-10*** (56.70)
N° of workers in HH	-0.0000351 (-1.30)	-0.000000591 (-2.17)	-0.00000570* (-2.10)
Working (RSH)	0.0000125** (-2.81)	0.00012** (2.25)	0.0000101* (2.27)
N° of elderly in HH	0.0000619*** (6.83)	0.0000542*** (5.97)	0.0000544*** (5.99)
Foreign	0.000132*** (16.68)	0.000985*** (11.65)	0.0000984*** (11.65)
Ethnicity	-0.000432*** (-8.94)	-0.0000398*** (-7.38)	-0.0000398*** (-7.39)
Subsidies (CLP)	1.41e-12 (0.27)	3.71e-12 (0.71)	2.49e-12 (0.48)

Female pre-closure baseline mean	0.0001231	0.0001231	0.0001231
Municipal & Week FE	No	Yes	Yes
Phases & epidemiological controls	No	No	Yes
Observations	107,904,684	107,904,684	107,904,684

t statistics in parentheses
*p<0.05, ** p<0.01, *** p<0.001,

7. Discussion

In this research, we evaluate the effects of pandemic-induced school closures on female entrepreneurship in Chile. Our results, based on the analysis of administrative microdata from multiple public agencies, highlight the critical role of institutions in shaping entrepreneurial decisions and outcomes.

Schools, in addition to their primary educational role, serve as an essential support system for working parents. When schools closed due to the pandemic, this support was suddenly withdrawn, causing significant disruption. Our data reveals that this had a particularly pronounced effect on mothers, who often bear a larger share of childcare responsibilities. This observation aligns with past research that has spotlighted the gendered challenges in securing funding, balancing work-life dynamics, and navigating the socio-cultural expectations unique to women entrepreneurs (Jennings and Brush, 2013; Thébaud, 2010, 2015; Castellaneta et al., 2020). "Intensive mothering", a concept reflecting the expectation that mothers should always be available and deeply involved in their children's activities, along with the societal norm that assigns household chores primarily to women (Hochschild and Machung, 2012), reduces mothers' time and resources to start and operate a new venture. This, in turn, exacerbates gender disparities in the rate of new business creation and pushes women towards less growth-oriented forms of entrepreneurship to mitigate work-family conflicts (Thébaud, 2015).

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Another notable finding of our study is the varied impact of school closures based on children's ages. Mothers with children between 3-6 years experienced a more significant decline in their entrepreneurial activities compared to those with older children. Furthermore, mothers from poorer backgrounds (quintiles I and II) are also the most affected group, compared with women with higher incomes. These insights are critical for policymakers as they point to specific population groups where support mechanisms might be most needed.

Chile, despite its advancements in various spheres, still contends with deeply ingrained informal institutions—societal expectations and cultural norms—that disproportionately burden women with caregiving responsibilities. For academics and policymakers, our study underscores the importance of institutions, both formal (e.g. schools) and informal (e.g. societal norms), in influencing entrepreneurial activities. While the negative effects of school closures on female entrepreneurship exposed an unintended consequence of such measures, they also revealed deeper, longstanding barriers that women face in their entrepreneurial journeys. Understanding the broader implications of the COVID-19 induced school closures provides an opportunity to create a more supportive environment for female entrepreneurs in the country. This will require targeted policies and a broader shift in societal perceptions, ensuring that the entrepreneurial field becomes more equitable and resilient.

8. Conclusions

In this study, we evaluated the consequences of COVID-19 school closures on entrepreneurial activity in Chile, revealing a deeper manifestation of gender disparities. Our findings shed light on an area of interest that has recently gained traction among academics, who have emphasised the need to understand the ramifications of pandemic-related school closures.

Chile's business and entrepreneurial landscape, much like the rest of the world, faced unprecedented challenges during the pandemic. Yet, it was the intersection of this global crisis with local factors, such as the country's specific pandemic responses, that created a unique context deserving of in-depth analysis. Our findings demonstrate the critical function schools play, not merely as educational institutions, but as pillars upholding women's labour and entrepreneurial activities.

Given the centrality of schools in Chilean society and their role in facilitating a balanced work-life environment, their prolonged closure brought into sharp focus the additional pressures women entrepreneurs had to contend with. These pressures were not just about managing businesses, but also the intensified domestic responsibilities that came in the absence of educational institutions. The extended school closures and the resultant impact on women's entrepreneurial ventures serve as a clear indication that even formal institutions like schools have profound, indirect effects on the broader economic fabric of society.

While our research has provided empirically grounded evidence on some aspects of this complex issue, several areas remain open for further investigation. For instance, the entrepreneurial challenges might differ based on the nature of businesses. Are tech-based startups, which might offer more flexible working hours, less affected than traditional enterprises? Additionally, could there be variations in impact based on differing education levels or household income among women? Such granular analyses could offer further nuances to our understanding.

One limitation of our study is our reliance on administrative records. While comprehensive, they do not provide a window into the lived experiences of these women entrepreneurs. Detailed surveys or qualitative studies could illuminate the daily challenges these women grappled with, from work-family conflicts to the reshuffling of priorities in the face of prolonged school closures.

Furthermore, while Chile provides a compelling case study due to its unique pandemic response trajectory, the findings might vary in different national contexts. Countries with shorter lockdowns, alternate educational continuity measures, or different economic safety nets might present different results. It would be important for future research to conduct comparative studies across different countries, considering their distinct institutional and socio-economic environments.

In wrapping up, our study underscores the multiple challenges that female entrepreneurs in Chile faced during the pandemic. As countries navigate the aftermath of the pandemic, insights such as ours will be necessary for guiding not only academics but also policymakers as they design measures to support entrepreneurs, ensuring that economies remain resilient and inclusive. In Chile, as in many parts of the world, women entrepreneurs are critical to the economy's vitality. Ensuring their challenges are understood and addressed is not just an academic endeavour, but an economic and social imperative.

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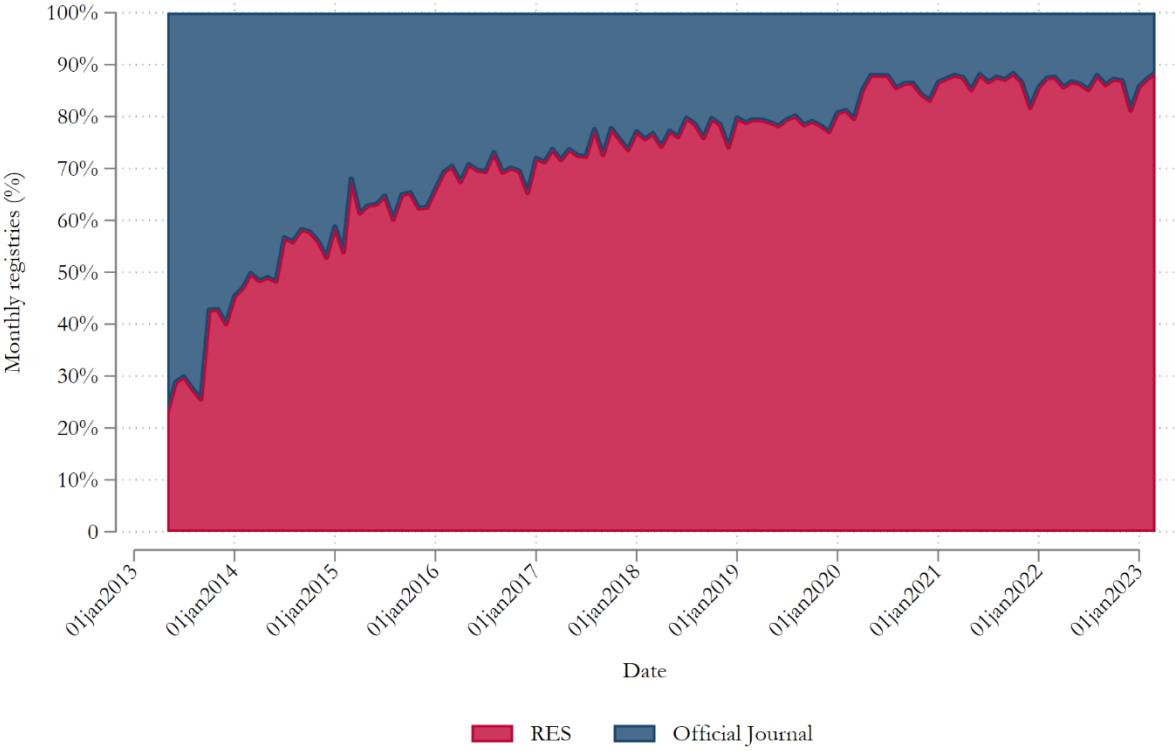
10. Appendices

a. Figures

Figure 10.1: Number of days with fully closed schools, excluding school holidays, public holidays, and weekends

(a) Primary

(b) Lower secondary

(c) Upper secondary, general

(d) Upper secondary, vocational
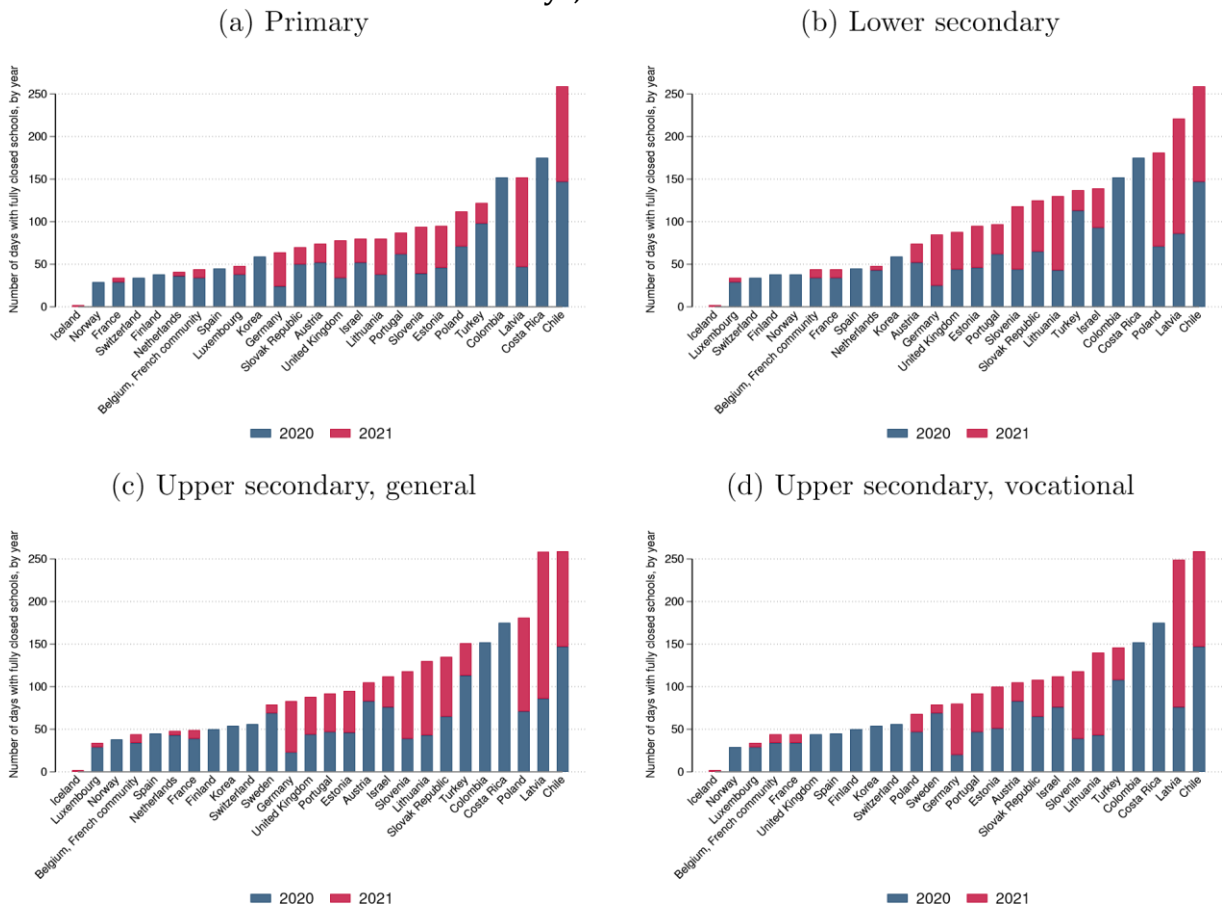
Source: Own elaboration, based on public data from OECD (2023).

Figure 10.2: Monthly number of registries of RES and the Official Journal (%)

Source: Own elaboration, based on public data from RES monthly reports from the Ministry of Economy, Development and Tourism.

Figure 10.3: Monthly number of registries of RES and the Official Journal, 2013-2023
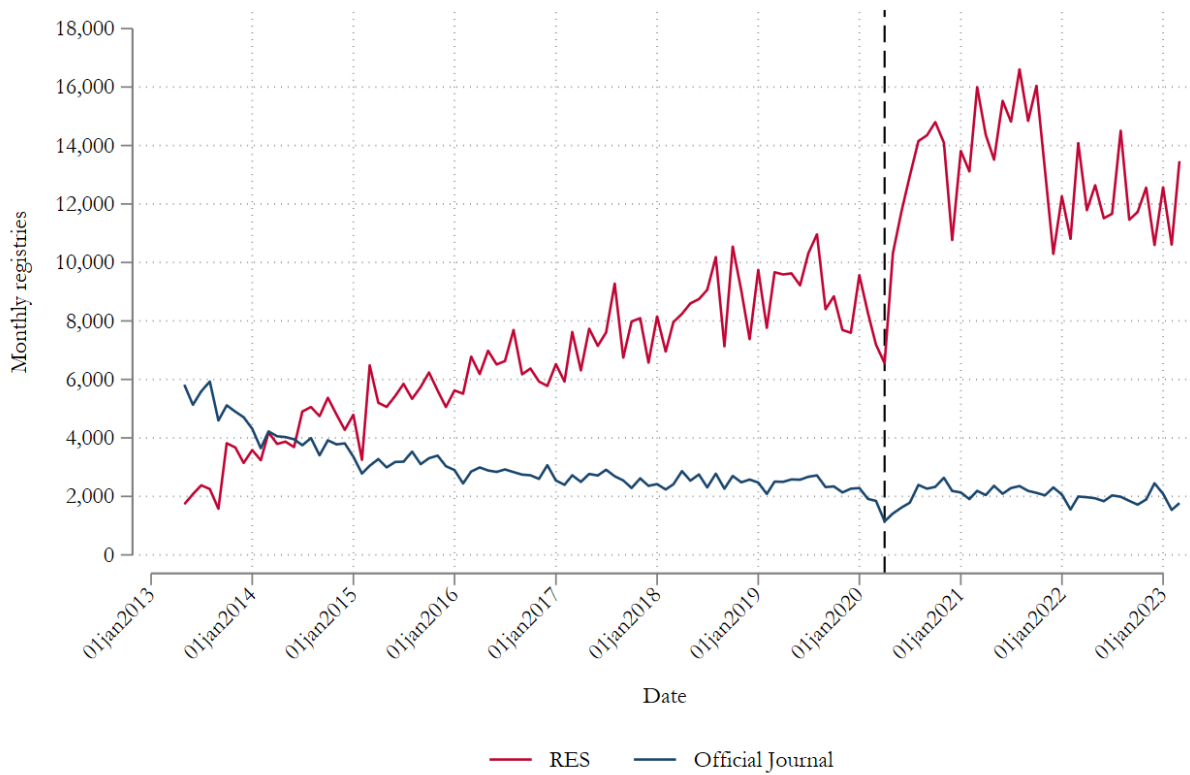
Note: The dashed line indicates the month when the new AES was implemented (2020), that made all the registration steps available fully online.
Source: Own elaboration, based on public data from RES monthly reports from the Ministry of Economy, Development and Tourism.
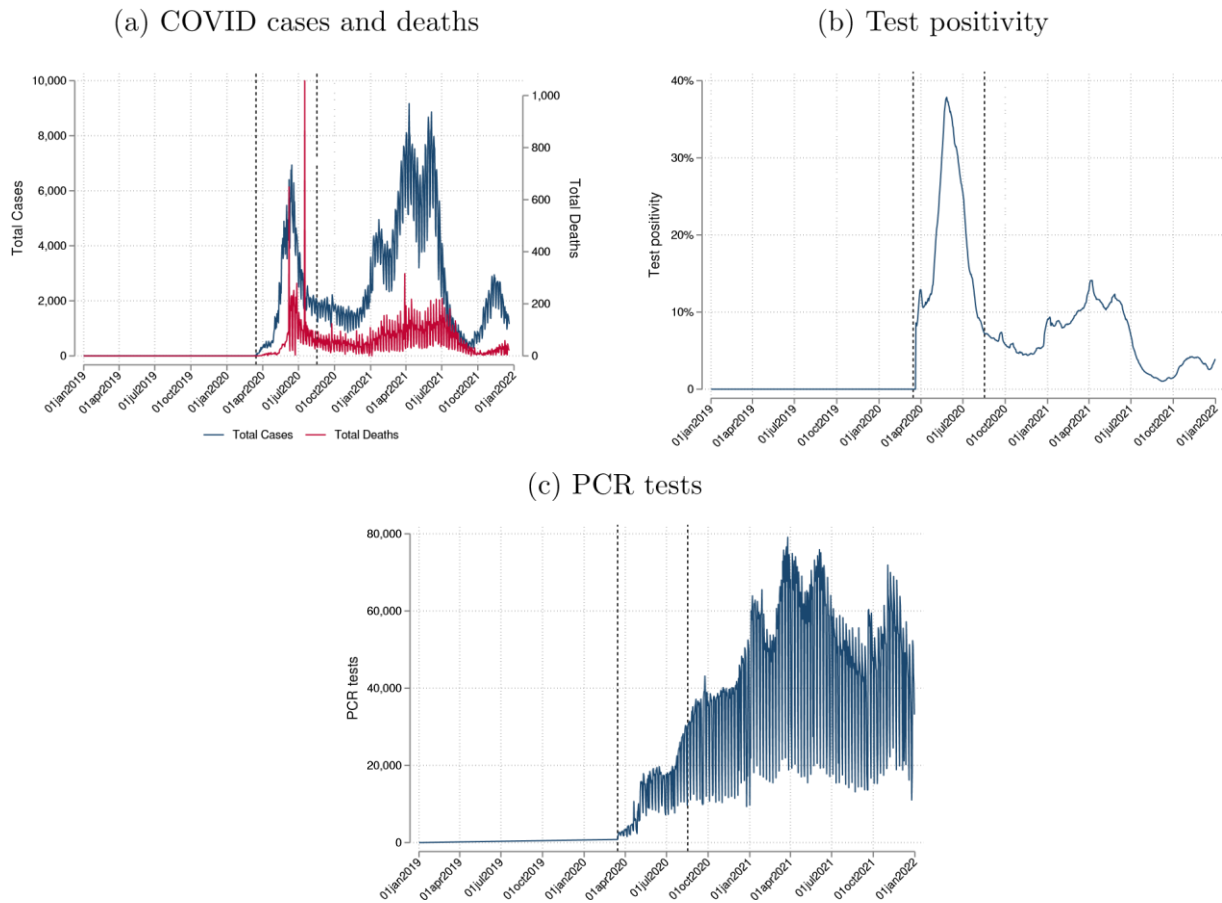
Figure 10.4: Percentage of national population in each phase of the Step-by-Step Plan
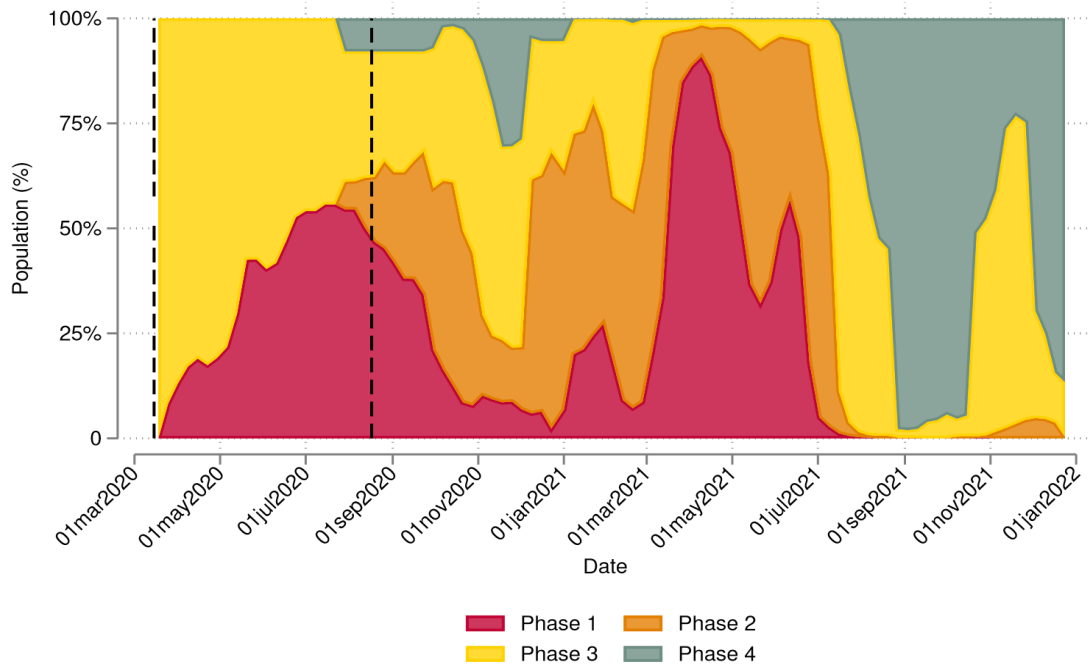
Note: The first dashed line indicates the week when schools were ordered to close by the central government, while the second dashed line indicates the day which schools were officially allowed to reopen.
Source: Own elaboration, based on public data from the Ministry of Science, Technology, Knowledge and Innovation.
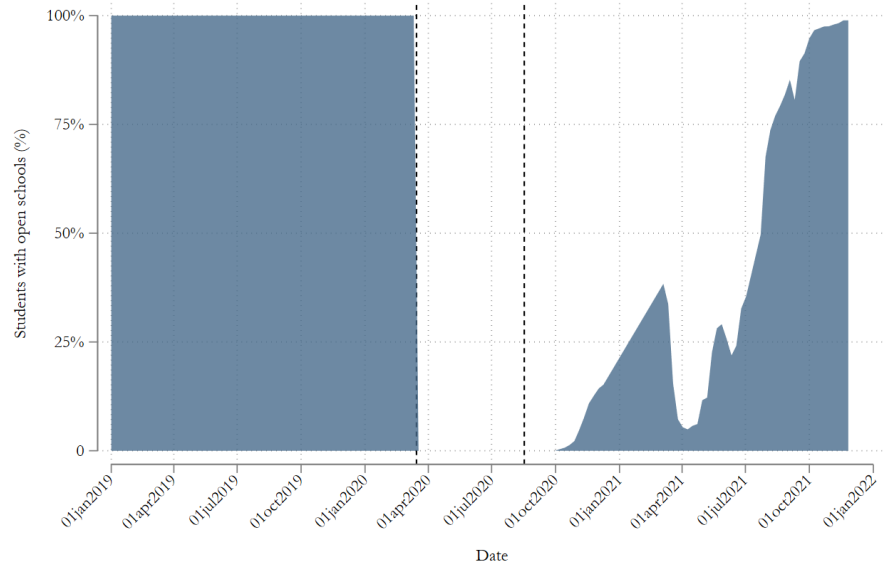
Figure 10.5: COVID-related conditions

(a) COVID cases and deaths

(b) Test positivity

(c) PCR tests

Note: The first dashed line indicates the week when schools were ordered to close by the central government, while the second dashed line indicates the day which schools were officially allowed to reopen.
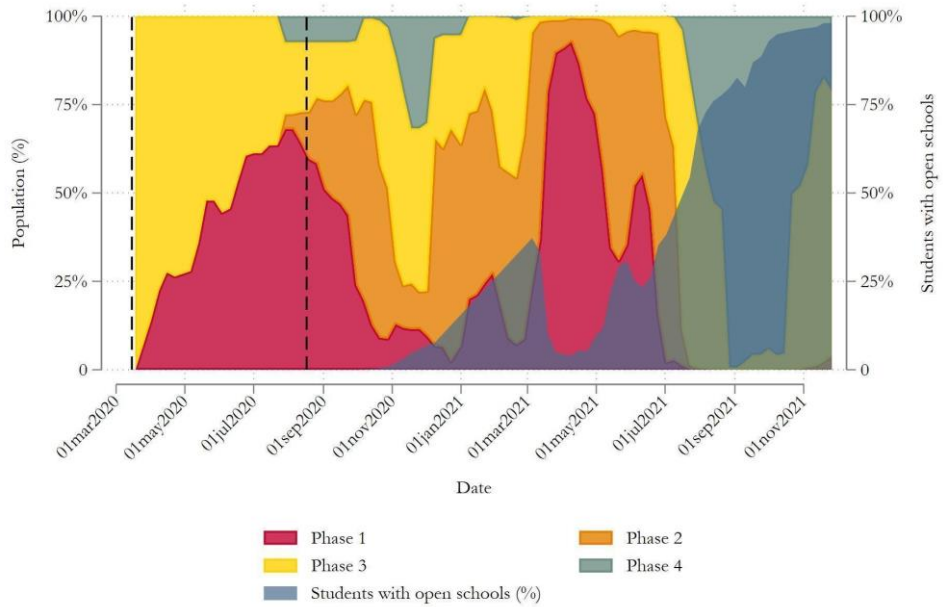
Source: Own elaboration, based on public data from the Ministry of Science, Technology, Knowledge and Innovation.

Figure 10.6: Percentage of students with open schools

Note: The first dashed line indicates the week when schools were ordered to close by the central government, while the second dashed line indicates the day which schools were officially allowed to reopen.
Source: Own elaboration, based on public data from the Ministry of Education.

Figure 10.7: Percentage of national population in each phase of the Step-by-Step Plan and percentage of students with open schools


Note: The first dashed line indicates the week when schools were ordered to close by the central government, while the second dashed line indicates the day which schools were officially allowed to reopen. Source: Own elaboration, based on public data from the Ministry of Education and the Ministry of Science, Technology, Knowledge and Innovation.

Figure 10.8: Step-by-Step Plan by municipality

| Phase 1 | Phase 2 | Phase3 | Phase 4 |

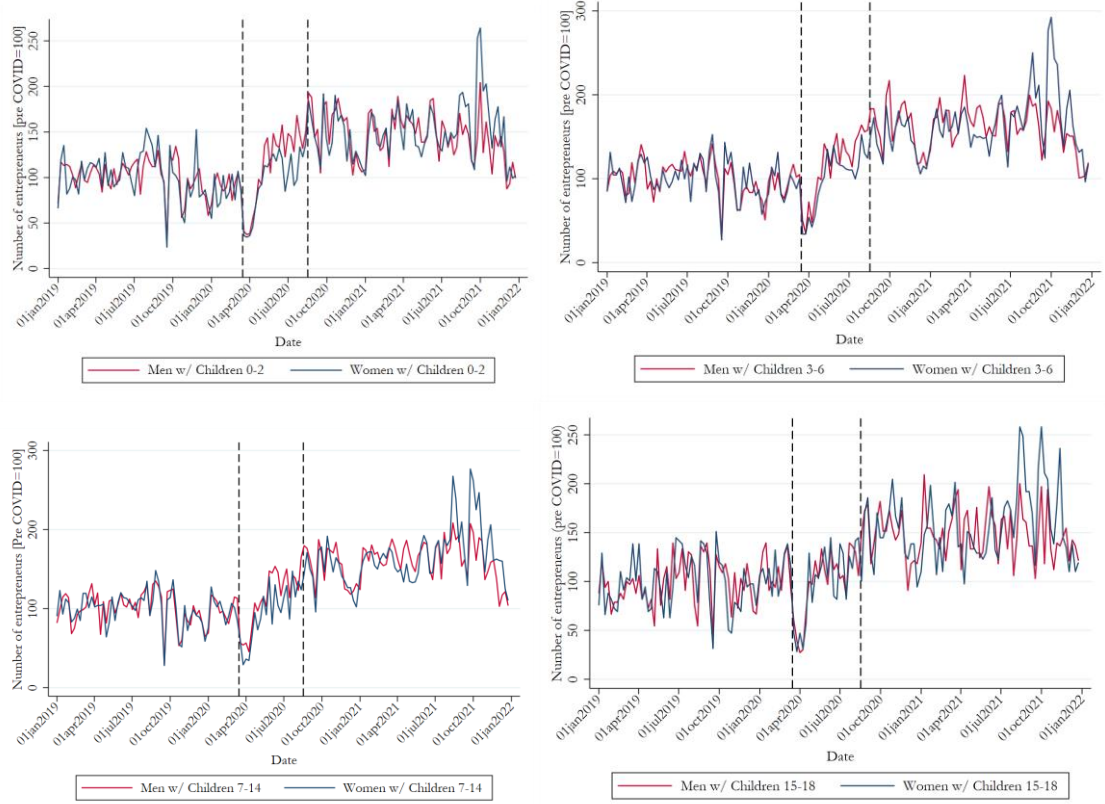Figure 10.9: Percentage of students with open schools by municipality
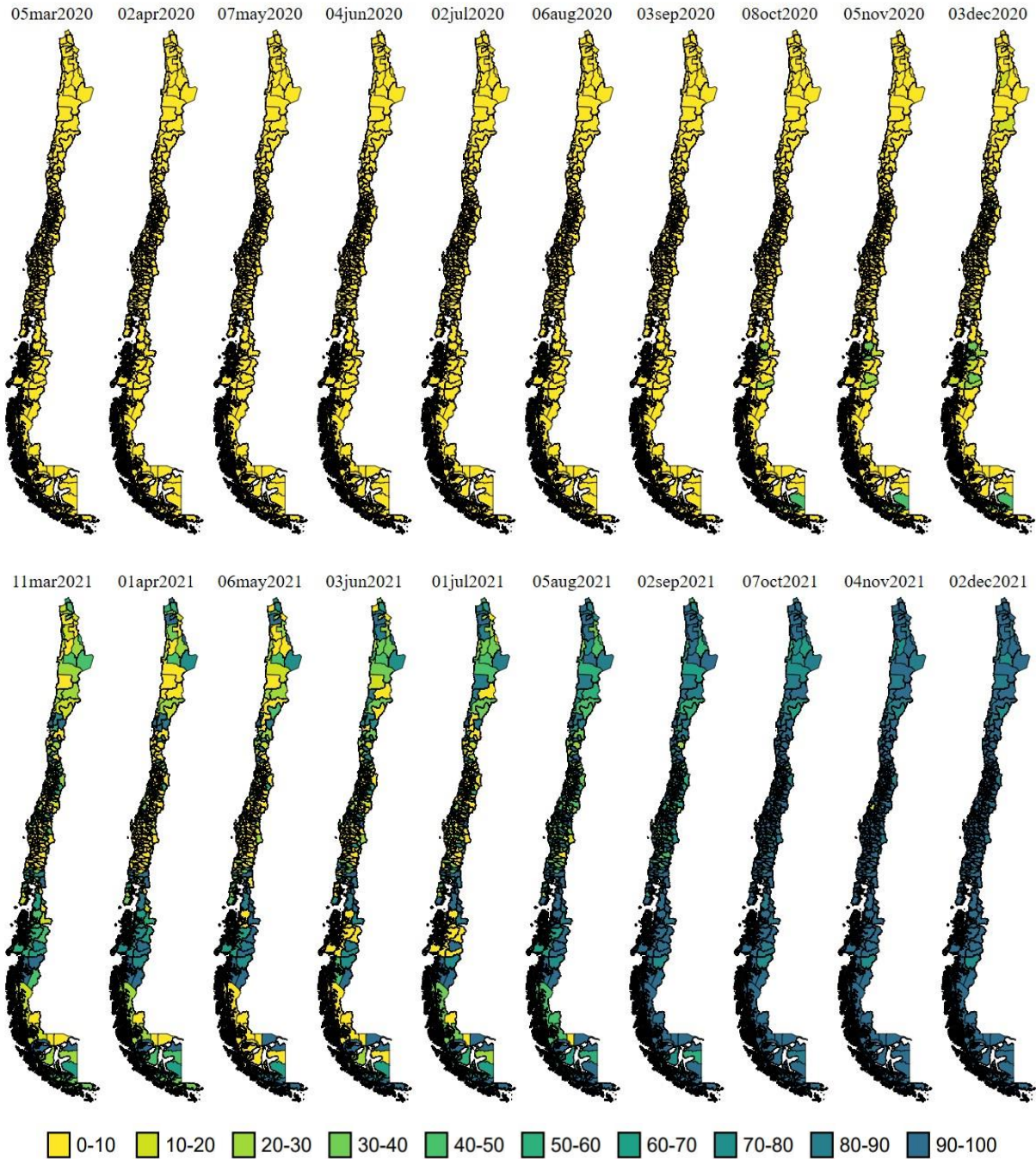
Source: Own elaboration, based on public data from the Ministry of Education and the Ministry of Science, Technology, Knowledge and Innovation.

Figure 10.10: Men and women entrepreneurs by children's age

b. Tables

Table 6: Entrepreneurial response to school closures and reopen of biparental households with children ages 3–18. (School closure and reopen 2)

	Parents with children between 3-6 years	Parents with children between 7-14 years	Parents with children between 15-18 years
School closure	-0.000145**	-0.000101***	-0.0000958*
	(-3.17)	(-3.82)	(-2.55)
Woman	-0.000175***	-0.000166***	-0.000166***
	(-18.97)	(-30.79)	(-21.03)
School closure#Mother	-0.0000734***	-0.0000529***	-0.0000239*
	(-5.74)	(-7.29)	(-2.44)
School reopen	-0.000103*	-0.0000513	-0.0000475
	(-2.10)	(-1.82)	(-1.21)
School reopen#Mother	-0.0000447*	-0.0000464***	-0.0000267
	(-2.05)	(-3.93)	(-1.89)
Female pre-closure baseline mean	0.0001476	0.0001239	0.001169
Sociodemographic & AES controls	Yes	Yes	Yes
Municipal & Week FE	Yes	Yes	Yes
Phases & epidemiological controls	Yes	Yes	Yes
Observations	30,370,417	79,508,785	39,132,524

t statistics in parentheses
*p<0.05, ** p<0.01, *** p<0.001,

Table 7: Entrepreneurial response to school closures and reopen of biparental households by socioeconomic quintiles. (school closure and reopen 2).

	Quintile I and II	Quintile III	Quintile IV	Quintile V
School closure	-0.0000999**	-0.000112*	-0.0000641	-0.000158
	(3.05)	(2.09)	(0.92)	(1.57)
Woman	-0.000117***	-0.000150***	-0.000182***	-0.000319***
	(18.74)	(14.83)	(14.43)	(17.64)
School closure#Mother	-0.0000443***	-0.0000431**	-0.0000510***	-0.0000682*
	(6.18)	(3.04)	(3.52)	(2.57)
School reopen	-0.000049	-0.0000472	-0.0000504	-0.000176
	(1.37)	(0.83)	(0.66)	(1.69)
School reopen#Mother	-0.0000393***	-0.0000488*	-0.0000243	-0.0000353
	(3.9)	(2.45)	(1.08)	(0.96)
Female pre-closure baseline mean	0.00007809	0.000107	0.000146	0.000313
Sociodemographic & AES controls	Yes	Yes	Yes	Yes
Municipal & Week FE	Yes	Yes	Yes	Yes
Phases & epidemiological controls	Yes	Yes	Yes	Yes
Observations	58,466,747	19,120,474	15,312,239	13,236,202

t statistics in parentheses
*p<0.05, ** p<0.01, *** p<0.001,