DISSERTATION

THREE ESSAYS ON GENDER INEQUALITY IN LATIN AMERICA: UNDERSTANDING LABOR MARKET SEGREGATION, JOB QUALITY, AND ENVIRONMENTAL ISSUES FROM A FEMINIST PERSPECTIVE

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In partial fulfillment of the requirements

For the Degree of Doctor of Philosophy

Colorado State University

Fort Collins, Colorado

Summer, 2024

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ABSTRACT

THREE ESSAYS ON GENDER INEQUALITY IN LATIN AMERICA: UNDERSTANDING LABOR MARKET SEGREGATION, JOB QUALITY, AND ENVIRONMENTAL ISSUES FROM A FEMINIST PERSPECTIVE

For the past three decades, Latin America experienced remarkable progress in educational attainment and health care access for women, combined with decreasing household income inequality and higher wages across the board since 2002, especially at the bottom of the wage distribution for most countries. Yet, gender job segregation in the labor market has increased since the early 1990s. Urban women persistently occupy jobs in the informal sector, where jobs are generally characterized by low wages, lack of benefits, poor working conditions, and no promotion possibilities. Concerning both urban and rural women is Latin America's unique vulnerability to the impacts of climate change and the lack of progress in preventing deforestation, which disproportionally impacts impoverished communities, especially women and children. Despite some progress on reproductive rights in several countries, persistent economic challenges and constraints present serious barriers to the advancement of gender equality and reproductive justice—understood as the right to prevent and terminate undesired pregnancies, carry desired pregnancies, and raise a healthy and happy child to the best of one's ability.

Based on the premise that such a complex scenario can only be understood through feminist research methodologies, this dissertation proposes three independent yet connected essays. Each essay focuses on a different research question that helps us better understand the gendered impacts of economic policies in Latin America, how women with different intersectional identities are

impacted by them, and how to build useful scholarship for policy makers and activists to advance gender equality and reproductive justice in the region. The first essay focuses on the connections between gender job segregation, income distribution, and real exchange rates in Latin America. For the second essay, we propose a theoretical discussion, focusing on building reproductive justice as a research program within economics. Finally, the third essay focuses on rural women, exploring the relationship between deforestation and hours unpaid care work in the Amazonia rainforest.

ACKNOWLEDGEMENTS

This dissertation is dedicated to my mother, Alice, and my brother, Guilherme. You inspire me to become a better version of myself every day; thanks for being my fortress of love and strength. I also dedicate this work to Ralf, who I thank for the infinite patience and passion necessary to be my partner during this PhD journey—and beyond. Thank you Dario, for the support and great *churrascos* every time I go back home. Thanks Ronaldo, Déia, and Gu for always believing in me and celebrating every accomplishment. Thank you Ceci and Laura, and thank you Cissa and Ita, for being examples of resilience and renewing my hope for the newer generations. Thank you Luka, for being one of the most generous people in my life for more than a decade. Thank you Pabobuno and *dindos*, for the continuous love and support, and for sharing the pain and pleasure of watching most of Grêmio's games together.

I thank my brilliant, generous advisor, Elissa Braunstein, for her guidance and friendship. I could not have asked for a better advisor, boss! I also thank Daniele Tavani, my co-advisor, for his unique insights into my research, for delicious *picanha*, and for some great conversations and *capoeira* games. I also thank him and his family for adopting and letting me take care of Gaetano.

I thank all professors that I had the pleasure to learn from during my time at Colorado State. Special thanks to Ramaa Vasudevan, Alex Bernasek, Guy Numa, and Anders Fremstad, who are unique inspirations for me as a young professor. Special thanks to Ed Barbier and Sushmita Chartterjee as well, who completed my committee and offered guidance and valuable feedback.

I would like to acknowledge Marcelo Milan's incredible support and mentoring at the beginning of my academic career, that ultimately pushed me to pursue a PhD in feminist economics. To Marcelo and all professors at Universidade Federal do Rio Grande do Sul who keep

fighting the good fight, to all my dear friends from UFRGS's Economic Development Graduate Program 2013-2015, and to all my comrades from the Diretório Acadêmico da Economia, Contábeis e Atuariais (DAECA/UFRGS 2009-2012): thank you for inspiring me to become an organizer, rebellious, feminist economist. André Augustin, Allan Cabeludo, Manu Flores, Manu Braganholo, Grazzio, Mari Garcia, Tiago Rubleski, Fernanda Valada, Léo Segura, Cris Vieceli, Luquinhas, Sylvio, Dani Nogueira, Jonattan, Gil, Nats: you taught me how much love we can build while studying and fighting for people- instead of profit-prioritizing economics.

I would never have survived this PhD program if it wasn't for the support, love, and companionship of my Brazilian family in Fort Collins: Kris (and Krisa!), Camila, Fabrício, Lucas, Michael, Sarah, Thiago, Vinícius, Taís, Isidro, Elisa, Thaisa, Vitor, Igor, and Mirna (honorary Brazilian). You are some very special beings. Equally important was the generous help and sincere friendship from colleagues in the econ department. Austin, Bhavya, Brendan, Greg, Henry, Luke, Milena, Paula, Vinícius (yes, again), Sal, Satyaki, Sean, Thomas, Vedanshi, Sai, Adam, Emily, Elene, Lackson, Manuel, you occupy a special place in my heart. And thank you Kendall, for becoming one of my most trusted friends in this country—despite sucking at one-handed pool.

Thanks to all comrades who joined the struggle for building CSU United Campus Workers; our fights are some of my proudest moments. Thank you Emily, for building UCW and some more awesome stuff (including my perfect party decorations). Thank you friends, for hearing me complain about life, graduate school, the United States, and capitalism over good local beers (or Greg's delicious and dangerous cocktails) so many times. Thanks Bel Willadino for keeping dance alive in my life. And thanks Brazilian artists for so much, including the daily reminder that *independente disso eu não passo de uma malandra, uma moleca do Brasil, que peço e dou esmolas*.

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1.1 Introduction

For the past three decades, macroeconomic policy in the Latin American region has largely reflected an orthodox approach to macroeconomic management, one that emphasizes fiscal prudence, price stability, and free trade and capital flows (Braunstein and Seguino 2018). The resulting policy mix has become known as the "macroeconomic tripod," which consists of floating exchange rates, inflation targeting, and primary budget surplus (Saad-Filho 2020, de Souza 2021). Though the region's history with financial crisis and hyper-inflation makes inflation targeting (IT) a reassuring policy option, IT tends to appreciate the real exchange rate by decreasing domestic inflation. Appreciated real effective exchange rates (REERs) are associated with lower rates of economic growth, partly because of how they discourage tradeable sector expansion, especially manufacturing (Rodrik 2008).[1] Combined with the commodity price boom of the 2000s, policies associated with the macroeconomic tripod helped induce a particularly sharp process of premature deindustrialization that Palma (2019) refers to as "non-creative destruction," with consequences for the sectoral composition of GDP and labor market demand. These changes have gender-specific effects. Erten and Metzger (2018) suggest that undervalued exchange rates lower gender gaps in labor force participation rates by increasing women's employment opportunities in manufacturing and industrial sectors. Given that in developing countries industrial sector jobs tend to be of higher quality than those in agriculture or services, REER fluctuations likely have

[1] The REER equals the nominal exchange rate (the amount of domestic currency needed to buy one unit of foreign currency) times the ratio of the price level of a country's trading partners to the domestic price level, so domestic inflation raises the REER (a depreciation).

important gendered impacts on labor segregation and income distribution (Seguino and Braunstein 2019).

This essay explores that prospect in Latin America by considering the relationship between REER and women's access to "good jobs"—defined as those that offer wages as least as high as the national median. The calculation of women's and men's relative access to good jobs is based on the distribution of their employment across 27 non-agricultural sectors and 10 occupations, so gender segregation is a key driver of women's relative access to good jobs. We hypothesize that REER appreciation changes the sectoral composition of GDP, expanding non-tradeables and discouraging job creation in tradeable sectors like manufacturing. This not only constrains women's access to positions that offer better wages and working conditions than agriculture or traditional services, but it also increases competition with men for the higher-paying jobs that remain (Seguino and Braunstein 2019). This relationship is particularly important in a Latin American context where, despite significant improvements in women's education, labor force participation, and health outcomes since 1990, gendered labor market segmentation persists in ways that hold back progress on gender equality (Borrowman and Klasen 2020). The Covid-19 pandemic and its aftermath make these questions even more pressing, as persistent losses in women's labor force participation and incomes suggest some longer-term "scarring" in Latin American labor markets, and high inflation, increasing interest rates, and tightening fiscal space further constrain employment prospects in developing economies in general (Acevedo et al. 2022).

To conduct the study, we use a dataset that combines a set of micro-level household and labor force surveys with macroeconomic data to create a panel of 15 Latin American countries between 1991-2018 (Arora, Braunstein, and Seguino 2023). We use a generalized difference-in-difference model to map how REER shocks impact the relative availability of good jobs for women

and men. Our results indicate that medium appreciation shocks (between 1.0 and 1.5 standard deviations from a country's mean REER for the period) are associated with a 4.0 percentage point decline in the share of men's employment that can be classified as good, but the correlation with women's good job share is not statistically significant. So, although gender equality appears to increase with medium appreciation shocks because women's share of good jobs increases relative to men's, this is the result of a "race-to-the-bottom" dynamic rather than a manifestation of women's climb to the top. Large appreciation shocks (between 1.5 and 2.0 standard deviation appreciations) are associated with a 1.4 percentage point increase in women's good job share, but they are of rare occurrence (constituting less than 3.6 percent of the sample). Regarding depreciation, our results indicate that large and very large shocks are associated with a decrease in men's good job share, and very large shocks are associated with an increase in women's good job share. As a result of these effects, very large depreciation shocks are associated with a 4.3 percentage point increase in women's good job share relative to men's.

Taken together, these results indicate that real exchange rate shocks have gender-specific effects, influencing both the overall availability and gender distribution of job quality. Regardless of real exchange rate movements, men have a much higher aggregate share of good-quality jobs in their employment than women among all the countries in the sample. However, appreciated real exchange rates seem to be associated with job quality losses among men in the region, likely because of their concentration in tradeable sectors. As predicted in the literature, very large depreciation shocks promote better jobs for women (1.2 percentage point increase) through the creation of better positions in the export manufacturing sector. However, very large depreciation shocks also tend to be associated with periods of economic hardship, as reflected by their correlation with a greater-than-proportional decrease in men's good job share (2.8 percentage point

decrease). Overall, we conclude that the orthodox economic policies consolidated in the macroeconomic tripod deliver questionable outcomes in the labor market, since they are unlikely to generate large-enough appreciation shocks to positively impact women's good job share and tend to decrease men's good share.

1.2 Background

While there is some consensus among economists that industrialization and structural transformation are major drivers of growth and development, their effects on gender equality are considerably more contested (Sorgner 2021).[2] An early strand of the literature commonly referred to as women in development (WID) emphasized the possibility of a virtuous feedback loop between gender equality and economic development in a "win-win" relationship.[3] Nested in modernization theory, the WID perspective assumes that development is a linear and cumulative process of structural change in which an economy moves from a mostly subsistence, rural society to an industrialized, market-oriented one (Boserup 1970, Jaquette 1982). According to this view, industrialization is problematic because it leaves women out as their traditional sources of subsistence and economic inclusion are replaced by more capital-intensive forms of production that primarily employ men. Related empirical work underscores the economic costs of leaving women out, as the causal relationship between gender equality in health, education, or labor force

[2] The rich literature in economic development defines "development" in a variety of ways. A parsimonious and popular definition comes from those who emphasize economic growth and define development as sustained increases in per capita GDP over time. a more theoretical and complex definition can be found in the Marxist dependency theory school, for example, according to whom development is the intensification of the capitalist tendencies (such as concentration and centralization of capital) over time. For the purposes of this paper, we define economic development (sometimes referred to as just "development") as an overall commitment to the UN Sustainable Development Goals focused on economic outcomes (poverty reduction; decent work and economic growth; industry, innovation, and infrastructure; reduced inequalities; responsible production and consumption).

[3] The nomenclature comes from the Women in Development Office at the U.S. Agency for International Development, established in 1976.

participation and economic growth has become a stylized fact in economics and development policy circles (Seguino 2020). In line with its optimism about market mechanisms, WID proponents maintain that women's poor job outcomes are largely a supply-side issue due to gendered differences in human capital and, to a lesser extent, discrimination—either due to employer preferences or statistical discrimination (Baert 2018; D'Onofrio-Flores and Pfafflin 2019).[4] Thus, as development generates more opportunities for women's human capital accumulation through more schooling, better health, and access to paid work, gendered human capital differentials should narrow, decreasing statistical discrimination and increasing the cost of discriminatory practices originating from employer preferences (Shulman 2003). Therefore, WID policy prescriptions advocate supply-side interventions that increase women's human capital accumulation and market access, creating a virtuous cycle where economic development brings more gender equality, which in turn brings more development (Klasen 1999).

Despite the important contributions of this literature to advancing gender-aware analysis and the economic case for gender equality, some feminist economists and human rights advocates contend that these instrumental arguments for gender equality miss its intrinsic value. According to this view, the provision of human rights (some of which are economic) regardless of gender or other intersectional identities is a policy objective *per se* (Balakrishnan, Heintz, and Elson 2016). Further, substantial evidence challenges the notion that growth and structural change necessarily benefit women or enhance gender equality (Kabeer 2016). In contrast to WID's economic efficiency argument, the gender and development (GAD) approach emphasizes the connection between gender and the social relations of production and reproduction, exploring how gender

[4] The embedded assumption is that women take longer to overcome their traditional (i.e., rural, authoritarian, patriarchal) values when compared to men. Development is assumed to promote the modern values of labor mobility and equality, increasing women's opportunities for human capital accumulation.

systems assign women and men to different roles and responsibilities, and how these dynamics are reflected in social, economic, and political theories and institutions. Women are thus not passive actors hemmed in by social norms and responding to market incentives, but rather active agents whose empowerment should be a target of development policy (Moser 1993, Razavi and Miller 1995).

According to GAD scholars, gender equality achievements can be difficult to measure, and may in fact compromise growth goals. For instance, since different dimensions of women's empowerment are often not correlated, interpreting the gendered impacts of development policies is not always straightforward (Kabeer 1999, Hanmer and Klugman 2016). Some traditional measurements of gender equality and women's empowerment can blur the real impacts of such achievements in women's lives—educational programs that keep women in school with the sole purpose of teaching them how to become better mothers and wives, for example, simultaneously censor women's professional ambitions and increase their average years of schooling (Kabeer 2005). Similarly, to the extent that women are concentrated in labor-intensive export-oriented production, gender wage gaps can in fact be part of an economy's global competitive advantage and foster high growth (Seguino 2000). In countries where development is limited by balance-of-payments constraints, gender wage discrimination can substitute for exchange rate depreciation by boosting cost advantage in export markets, leading to what has been called a "feminization of foreign exchange earnings" (Samarashinghe 1998, Seguino 2010).

When considering the case of Latin America, for the past three decades the region has shown remarkable progress in educational attainment and health care access for women, with women currently outnumbering in all educational levels in several countries (UN-ECLAC 2022). Such improvements have been combined with decreasing household income inequality and higher

wages across the board since 2002, especially at the bottom of the wage distribution for most countries, and positive GDP growth for the region as a whole since 1990 (Messina and Silva 2021, UN-ECLAC 2022).[5] Since women in the region are increasing their human capital through greater education and work experience (as reflected by women's rising labor force participation), combined with the decline in fertility we would expect these relative achievements to manifest in better labor market outcomes. Yet, horizontal and vertical segregation by gender has increased since the early 1990s, with women crowded into informal sector jobs with low wages, no benefits, and poor working conditions (Seguino and Braunstein 2019, Borrowman and Klasen 2020, Abramo 2021). Considering the failure of supply-side factors to explain the lack of progress for women in Latin American labor markets, this essay instead investigates demand-side factors, situating the approach and analysis in the GAD literature.

It is important to note that we acknowledge the persistence of Latin American *machismo*—a hypermasculinity that obliterates any other possible influences on men's attitudes and behavior (Hurtado and Sinha 2016)—as a possible cultural impediment to advancing gender equality. In fact, several recent studies indicate that the impact of such rigid gender stereotypes in Latin America indeed contribute to segregation. Examples include Carvalho Neto, Tanure and Andrade (2010), who used a mixed methods approach to document impacts of deep-rooted gender prejudice on women executives in Brazil; Rodríguez Garcés and Muñoz Soto (2018), who explore how conservative culture impacts women's labor force participation in Chile; and Reyes Suárez (2022), who use a small-scale survey to examine the influence of machismo and gender stereotypes on women in San Vicente, Ecuador. Without neglecting the importance of cultural factors, our

[5] Most Latin American countries and LA as a region had positive GDP growth every year since 1991, except for the year of 2009 and more recently, during the COVID-19 pandemic. Some countries (like Brazil and Argentina) had longer and deeper periods of recession, but they were mostly the result of internal political issues and did not spread to other countries in the region.

analysis focuses on the demand-side of labor markets, advancing the hypothesis that macroeconomic policies and structures can disproportionally promote job creation in specific sectors, decreasing the availability of higher-paying positions for women given the highly gender segregated labor markets that characterize Latin American countries.

Arora, Braunstein and Seguino (2023) provide a starting point for this discussion. They identify the share of public social spending in GDP as the macroeconomic policy that has the largest positive correlation with women's relative access to good jobs in Latin America during the 1990-2018 period. Their results corroborate our hypothesis that macro-level structures and policies alter the prospects for achieving greater gender equality in labor markets and suggest that some macroeconomic issues associated with the impacts of globalization (such as the stagnation of minimum wages) are particularly harmful to the promotion of good jobs for women. We build on their conceptual and data work to explore the relationship between real effective exchange rates (REER) and the distribution of good jobs by gender, introducing the prospect of causal inference by adopting a difference-in-differences approach to the econometric analysis.

1.3 Data

1.3.1 The gender distribution of good jobs

Our analysis covers the period 1990-2018 for 15 countries in Latin America: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Ecuador, Guatemala, Honduras, Mexico, Peru, Paraguay, and Uruguay. We use data created by Arora, Braunstein and Seguino (2023) that combines micro-level labor market data from nationally representative labor force or household survey data to create economy-wide industry- and occupation-level measures of gendered employment. The microdata comes from a variety of

national sources (Table 1), and from the International Income Distribution Database (I2D2; World Bank 2013). Due to the infrequent nature of these surveys in many developing countries, and the fact that not all countries report disaggregated sectoral and occupational data every year, the time periods of data collection across countries vary; we use a three-year moving average to deal with the panel imbalance.[6]

Table 1.1. Survey data sources and periods.

Country	Survey period	Household or Labor Force Survey
Argentina	1996-2003	Encuesta Permanente de Hogares
Argentina	2004-2014	Encuesta Permanente de Hogares Contínua
Bolivia	1992	Encuesta Integrada de Hogares
Bolivia	1997-2000	Encuesta Continua de Hogares
Bolivia	2001-2016	Encuesta de Hogares
Brazil	1993-2015	Pesquisa Nacional por Amostra de Domicílios
Chile	1994-2017	Ecuesta de Caracterización Socioeconómica
Colombia	2001-2006	Encuesta Continua de Hogares
Colombia	2007-2017	Gran Encuesta Integrada de Hogares
Costa Rica	1990-2010	Encuesta de Hogares Propósitos Múltiples
Costa Rica	2011-2012	Encuesta Nacional de Hogares
Dominican Republic	1996-2015	Ecuesta de Forza de Trabajo
El Salvador	1991-2014	Encuesta de Hogares Propósitos Múltiples
Ecuador	1991-2016	Encuesta Nacional de Empleo, Desempleo y Subempleo
Guatemala	2002-2014	Encuesta Nacional de Condiciones de Vida
Honduras	2001-2016	Encuesta Permanente de Hogares Propósitos Múltiples
Mexico	1992-2016	Ecuesta Nacional de Ingresos y Gastos de Hogares
Peru	1997-2015	Encuesta Nacional de Hogares
Paraguay	1997-2010	Encuesta Permanente de Hogares
Uruguay	1992-2015	Ecuesta Contínua de Hogares

Source: Own elaboration based on Arora, Braunstein and Seguino (2023)

[6] To check if this method significantly influenced our results, we also ran the model with a 5-year moving average. The results are in Appendix B, Table 5B.1, and show no significant difference between the two approaches. Given the scarcity of data before 1996 and after 2016, we also ran a regression only for this time frame. The comparison between the full regression (1990-2018) and this restricted years regression (1996-2016) is shown in Appendix B, Table 5B.2, and shows similar results when compared to the main results discussed in the paper.

Estimates of women's and men's relative access to good jobs are based on an analysis of weekly incomes of both paid employees and self-employed workers across 27 non-agricultural sectors (*j*) and 10 occupational categories (*k*) in each sector (a table with all industries and the proportion of women in each industry is shown in Appendix A, Table A2, as well as a table with all occupations and their gender representation in Table A1). Weekly incomes are calculated based on hourly wages paid (or net income earned) and hours worked. For each occupation *k* within each sector *j*, jobs with a median weekly income (w_i^{jk}) at least as high as the national median ($\overline{w}$) are categorized as good-quality employment (E^G). We calculate the sum of total good jobs (i.e., total high-quality employment groups) for each country in a given year as in Equation (1.1), where the subscript *i* refers to either women (*W*) or men (*M*).

$$E_i^G = \sum_{jk}^{JK} E_i^{jk},\ E_i^{jk} = 0\ if\ w_i^{jk} < \overline{w} \tag{1.1}$$

The three dependent variables include the share of good jobs in total employment by gender as given in equation (1.2), women's share of good jobs (ES_W^G) and men's share of good jobs (ES_M^G); and women's relative share of good jobs as given in equation (1.3). So, our good job share dependent variables capture what percentage of employed women (men) have a job in which they earn at least the national median wage, while the relative good job share dependent variable captures gender segregation—how the proportion of women who have good jobs compare to the proportion of men that have good jobs.

$$ES_i^G = \frac{E_i^G}{E_i^T} \tag{1.2}$$

$$W/M\ \ good\ job\ share = \frac{ES_W^G}{ES_M^G} \tag{1.3}$$

Figure 1.1 shows the proportion of workers in industry and services that has a good job for each gender (ES_i^G), starting in the mid-1990s when we can include nearly all the countries in the

sample. So, for instance, in 1996 about ¾ of men's jobs in the services sector were classified as good jobs, while a little under 40 percent of women's service sector jobs are good jobs. The good job share in Figure 1.1 is a population-weighted average for Latin America, with weights corresponding to labor force size; Figures 1.2 and 1.3 use the same weighting method. Note at the outset that men are at the top of the figure and women at the bottom, indicating that a higher share of men's jobs in industry and services are classified as good jobs relative to women. Men in services tend to occupy more highly paid positions particularly in trade activities and the FIRE sector (finance, insurance, and real estate). The share of men working in services with good jobs, however, is decreasing through time, suggesting that these sectors may be particularly vulnerable to the macroeconomic conditions that characterize the 1990-2018 period. Women are concentrated in the domestic and community service sector, characterized by low wages and less directly impacted by globalization. A detailed breakdown of sectors and positions is shown in Appendix A, Table A3. For both men and women, an increasing percentage of workers in the industrial sector have good jobs through time (in the mid-1990s, 18.9% of women in industry had good jobs; in 2018, that number increases to 24.2%). Figure 1.1 also shows that, regardless of the broad sector in which men work, the majority have good jobs; for women, less than 40% have good jobs. This indicates some persistence in vertical and horizontal gender segregation within each broad sector.

Figure 1.2 illustrates the proportion of workers within each sector that have good jobs, disaggregated by gender. Another way of reading the figure is to add the shares for women and men within a sector to get the share of good jobs in total employment for that sector. Focusing on industry, where in 1997 52.5% of industrial sector jobs could be classified as good jobs (adding up the shares for women and men), women working in industry had 9.1% of those good jobs (4.8 percentage points out of 52.5%), with men constituting the other 91.9%. In 2018, 62.9% of

industrial sector jobs could be classified as good, and women's share of these jobs stayed constant (8.9%). A much higher share of good jobs goes to women in the services sector; in 2017 women occupied 16.9% of good jobs in the services sector. For men, changes over time are more pronounced: jobs in industry are getting better, and jobs in services are getting worse. As illustrated in Figure 1.3, these trends indicate stagnation in good job creation for women and men overall, resulting in stagnation of achievements on gender equality in the Latin American region. Figure A4, in Appendix A, shows that such stagnation is true not only for shares, but also in absolute terms: the total number of good jobs offered in Latin America does not increase through time, and the distance between the number of good jobs occupied by men and the number of good jobs occupied by women doesn't vary much—the women to men in good jobs ratio fluctuates between 0.33 and 0.44 in Latin America, with no clear trend during our sample period.

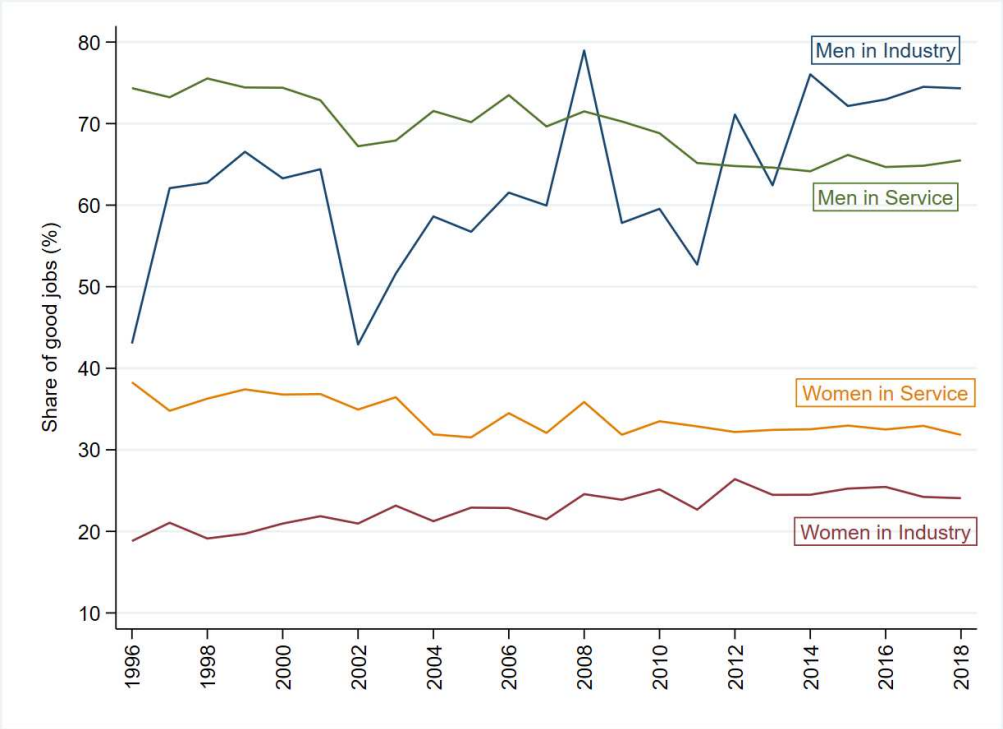

Figure 1.1. Share of good jobs in total employment by gender and broad sector. All countries. Source: Own elaboration based on Arora, Braunstein and Seguino (2023)

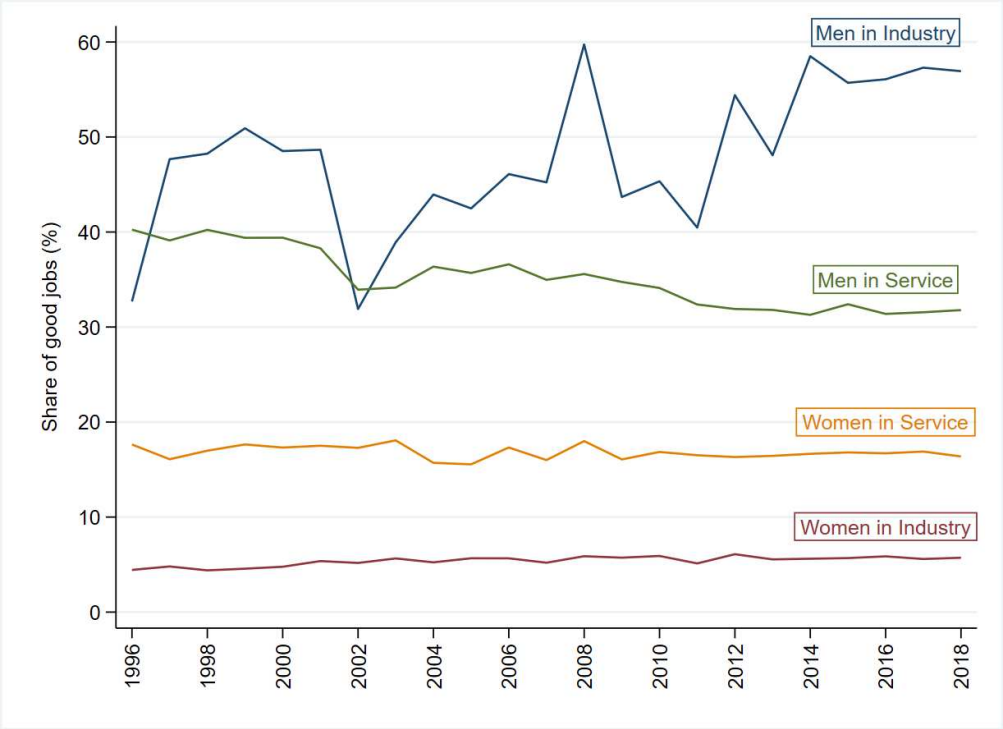

Figure 1.2. Percentage of good jobs in industry and services, by gender. All countries.

Source: Own elaboration based on Arora, Braunstein and Seguino (2023)

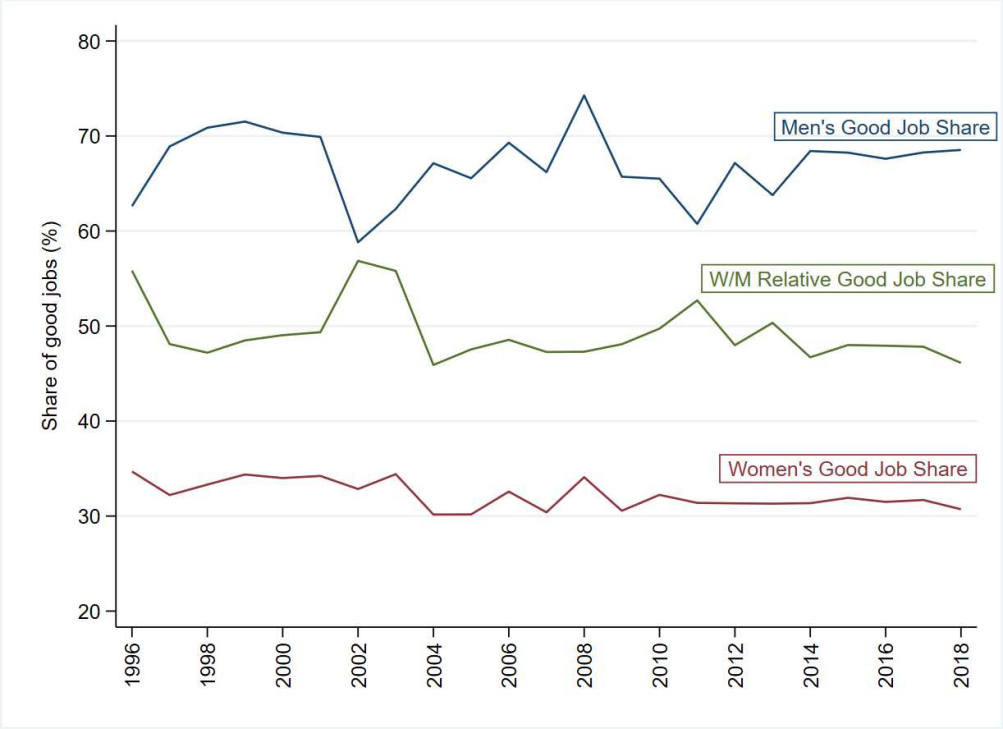

Figure 1.3. Percentage of good jobs by gender. All countries

Source: Own elaboration based on Arora, Braunstein and Seguino 2023

Taken together, these aggregate data trends underscore the importance of gender segregation in determining the gender distribution of better-paying jobs. Figure A3 in Appendix A shows the distribution of non-agricultural employment by sector and quality for Latin America. Lower-paying service sector jobs grew from 29.6% of total employment in 1996 to 38.0% in 2018, while the share of industrial jobs decreased from 29.8% to 26.8%. Since men are more likely to occupy these better-paying jobs, they also tend to be more negatively affected by these trends. Relatedly, women see no significant improvement in their good job prospects despite having higher levels of educational attainment than men. As a result, gender equality as measured by women's relative share of good jobs may increase in labor markets, but this may result from worsening opportunities for men, not better opportunities for women.

1.3.2 REER shocks

To identify the REER shocks that we hypothesize contribute to the above trends, we use the REER index provided by the ECLAC-CEPALSTAT dataset. A decrease is equivalent to an appreciation and an increase a depreciation. The series was available for all countries except for Argentina, which we calculated by multiplying Argentina's nominal exchange rate by the ratio of the US GDP deflator to that of Argentina's. We then calculate the mean REER of a country during the 1990-2018 period and observe how many standard deviations from the mean is each year's REER. Since our mechanism assumes that REER shocks will change the sectoral composition of GDP and impact the availability of jobs, we use the annual mean REER instead of a higher frequency measure (such as quarterly or monthly data) to allow enough time for these shocks to have an impact on the real side of the economy (and be consistent with the no anticipation assumption of our modeling strategy, as explained in the next section). We then divide these shocks

into eight bins according to their direction (appreciation or depreciation) and size (small, if the shock is between 0.5 and 1.0 standard deviations (SDs); medium if between 1.0 and 1.5 SDs; large if between 1.5 and 2.0 SDs; and very large if greater than 2.0 SDs).

Our sample consists of 15 countries and 29 years, so there are 435 possible shock observations. For the period analyzed, shocks did not occur 37.5% of the time (163 episodes); we observe 144 appreciation shocks (33.1%) and 125 depreciation shocks (29.4%). Despite being more frequent, appreciation shocks tend to be small (77 episodes, 17.5%) or medium (52 episodes, 11.95%). Large appreciation shocks occurred 12 times (2.76%), and very large shocks were only observed on 3 occasions—two times in Bolivia and one time in Chile. Depreciation shocks tend to be greater, with 57 small-size observations (13.1%), 30 medium (6.9%), 30 large, and 11 very large (2.53%). Figure 1.4 depicts how these shocks are distributed in time, by size and by country (Appendix A, Figure A2, shows the mean REER index and size of shocks for each country).

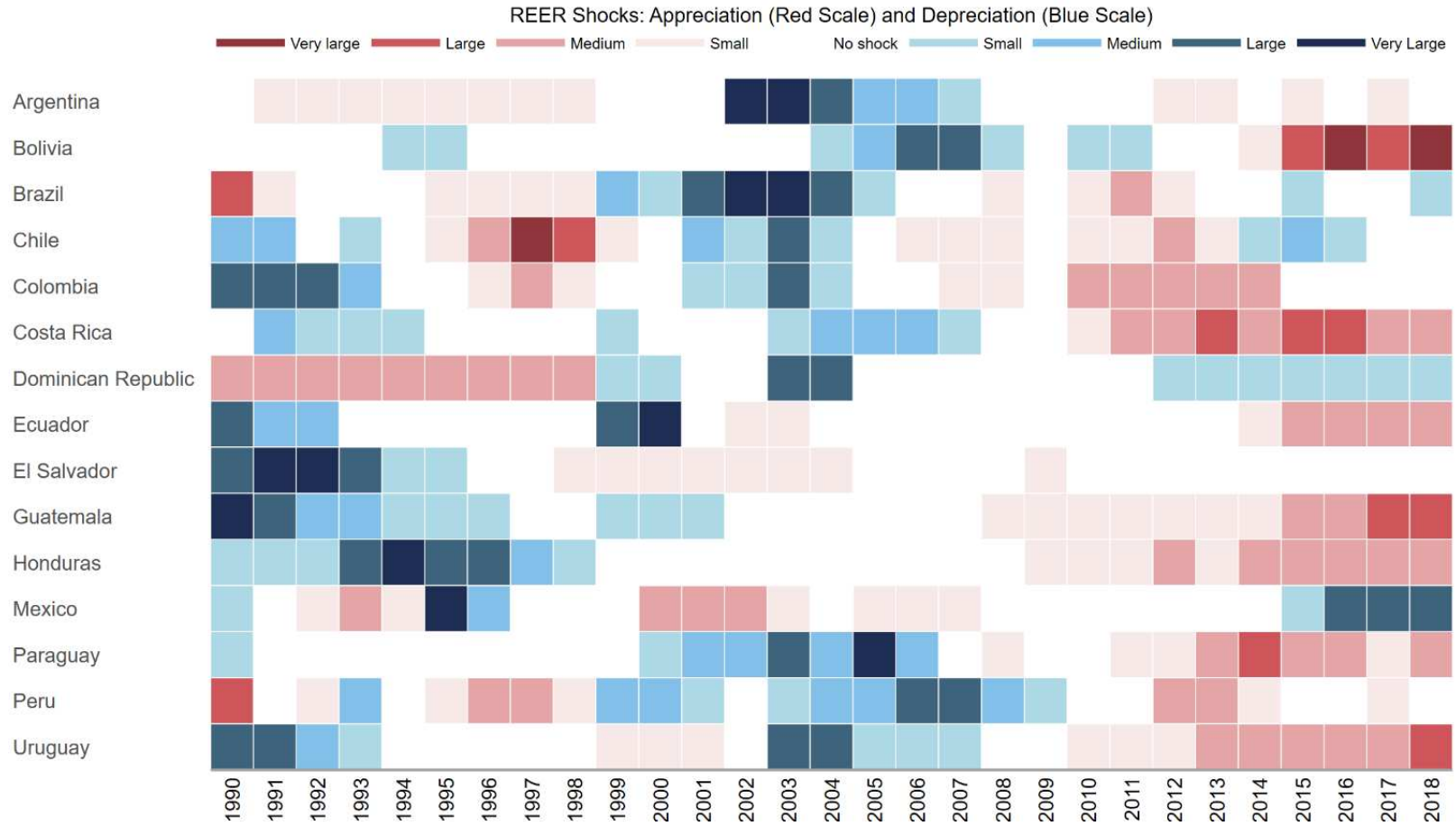

Figure 1.4. REER shocks by size (standard deviations from a country's mean).

Source: Own elaboration based on ECLAC-CEPALSTAT 2023

1.3.3 Other macroeconomic variables

Other macroeconomic structures and policies are likely to influence job quality, so we include supply-side and demand-side controls in the analysis. However, since macroeconomic variables tend to be highly correlated with one another, we also adopt a parsimonious strategy to avoid the problem of multicollinearity. We start with a basic model including four controls and explore different specifications; the full model includes eight controls in total.

In the basic model, the only supply-side control is women's mean years of education as a proportion of men's. Increases in human capital are frequently proxied by education in macroeconomic models and are also associated with better economic conditions overall—better education opportunities for women, a historically excluded group, likely mean that there are better opportunities for individuals in an economy (Cohen and Soto 2007, Barro and Lee 2013). Given the high correlation between women's educational achievement as a proportion of men's and a multitude of gender inequality dynamics in labor markets (and elsewhere), we expect women's relative education to capture most of the supply-side dynamics determining the relative availability of good jobs for women (Braunstein, Bouhia and Seguino 2019).

Additional supply-side controls include average fertility and women's labor force participation rate as a proportion of men's. In general, lower fertility is associated with fewer care responsibilities and more time in paid work for women, which increases work experience and the likelihood of maintaining a full-time, higher-paying job (Klasen 2019). Furthermore, gendered social norms that promote doubts about mothers' commitment to paid work may exact a "motherhood penalty" in the labor market. They also limit the availability of good jobs for women, both by decreasing the likelihood of promotion and opportunities for over-time, and by segregating mothers into part-time positions or the informal sector where hours tend to be more flexible

(Berniell et al. 2021; Villanueva and Lin 2020). At the same time, higher fertility tends to benefit men in the labor market, both because of facing less potential competition from women, and conservative social stereotypes that presume and support fathers as primary breadwinners and family providers leading to a "fatherhood premium" (Baranowska-Rataj and Matysiak 2022).

Regarding the relative labor force participation control, the expected correlation with women's or men's share of good jobs is not clear. If horizontal segregation is persistent and women's increasing labor force participation is crowded into sectors that predominantly employ women, higher women's LFPR will decrease the share of good jobs in women's employment. If women compete with men for positions in a more diverse spectrum of sectors, women's higher market participation may increase their share of good jobs and decrease men's.

Moving on to the demand-side controls, our baseline model includes controls for investment, the volume of international trade, industrial productivity, and financial openness. Investment is measured by gross fixed capital formation (GFCF) as a share of GDP; intuitively, more investment is associated with better job opportunities for everyone, and highly correlated with economic growth.

Since we are trying to measure the impact of REER on job quality by gender through the channel of labor market segregation, controlling for the structure of international trade becomes important in our analysis. The export of labor-intensive manufactures tends to be associated with increases in the relative demand for women's labor in industry. However, the region's sharp deindustrialization in the past two decades effectively decreased industrial employment for women faster than for men (Seguino and Braunstein 2019). We control for the structure of international trade by including manufacturing exports as a share of imports in our regression. As countries

progress up the value-added ladder in trading relations, we would expect the ratio of manufactured exports to imports to increase.

To control for financial openness, we use the financial openness index as defined by Chinn and Ito (2008), which measures the extent of capital controls based on information from the International Monetary Fund's *Annual Report on Exchange Arrangements and Exchange Restrictions* (AREAER). Liberalization of international capital flows increases international capital mobility, which facilitates the allocation of resources to financial speculation and decreases workers' bargaining power, ultimately contributing to wage stagnation (Grabel 1993; Kohler et al 2019). It is likely that greater financial openness is associated with a decrease of higher-paying jobs in the service sector, particularly tradable services, which tend to be occupied by men. Since women are concentrated in less tradable services like education, health, and care services in general, they are less prone to suffer negative impacts on job quality.

We measure industrial productivity as the ratio of real industrial output to industrial employment. Despite women's higher educational achievements, gains in industrial productivity are associated with losses in women's industrial employment as more capital- or technology-intensive jobs more typically go to men (Tejani and Milberg 2016; Seguino and Braunstein 2019). In terms of overall job quality, evidence suggests that the relationship is nonlinear: for low- and middle-income countries, increases in industrial productivity tend to be associated with women's loss of good jobs in industry. But at more advanced stages of development and higher levels of industrial productivity, higher-paying service sector opportunities appear for both women and men (Arora, Braunstein and Seguino 2023).

Our last demand-side control includes foreign direct investment inflows (FDI) as a share of gross fixed capital formation. The Chinn-Ito measure of financial openness discussed above

reflects a policy decision rather than actual international capital flows and is likely to be more closely associated with short-term portfolio investment and financial speculation than FDI. Note that FDI in Latin America is primarily invested in resource extraction, and our analysis is limited to non-agricultural sectors (though it does include mining and quarrying) (Veltmeyer 2016, UN-ECLAC 2022). However, the spillover effects of those investments into other sectors—like transportation—can be significant for the gendered distribution of good jobs in our analysis. A high share of FDI in overall investment likely signals both heavy dependence on resource extraction (a sector that does not produce much employment) and more competition for non-agricultural jobs. Although men dominate employment in extractive sectors and associated sectors that benefit from spillovers, given the limited employment effects of extractive activities overall, the net effect on the availability of good jobs by gender is not immediately clear (Veltmeyer 2016; Perks and Schulz 2020).

1.4 Modelling strategy

To capture the impact of REER shocks in job quality by gender in a panel with 29 years and 15 countries, we chose a generalized difference-in-differences model, which is designed to explore within-country variation resulting from a REER shock (treatment) over time using country and time fixed effects; this model is adequate since there are pretreatment gaps that persist through time (Lee 2016; Wing, Simon and Bello-Gomez 2018). Given that exchange rate shocks are continuous (instead of binary), we use a continuous design so that the REER shocks are divided into bins but vary within each bin. Thus, the size of the dose matters (Callaway, Goodman-Bacon and Sant'Anna 2021). We cluster standard errors by country. The treatments are somewhat randomly distributed through countries and time as illustrated in Figure 1.4 but impact all jobs

within a country at the same time, and the treatment effects are heterogenous (Velentgas et al 2013; Abadie et al 2023).[7]

This modeling strategy assumes that changes in job quality for countries with no REER shocks are good counter-factual for changes in job quality we would have observed for countries that suffered REER shocks, controlling for the demand-side and supply-side variables described above. The model also assumes no anticipation: agents do not adjust their creation or destruction of good jobs in year t based on how they expect REER to behave in year $t+1$. Since we use average annual REER this does not seem like a particularly strong assumption. When we run the model with lead REER shocks (i.e., shocks that occurred in time $t+1$), results indeed indicate that the no-anticipation hypothesis is satisfied (Appendix B, Table 3B).

A REER shock (treatment) is defined as any REER change larger than 0.5 standard deviations from the country's period mean. Hence, periods without changes of this magnitude are the control periods (37.5% of total observations). The treatment equals one multiplied by the size of the shock or dose as measured by how many standard deviations from the country's mean that shock was. To test if continuous treatment presents a problem of selection bias (that is, the bias that comes from assuming different treatment groups respond similarly to a given dosage as described by Callaway, Goodman-Bacon and Sant'Anna (2021)), we also run all models with binary instead of continuous shocks. This change does not impact our results, and the outputs of these regressions are presented in Appendix B, Table 2B.

[7] Our model is like the one presented by Lindo et al (2020) that measures the effects of abortion -clinic closures and on clinic access, abortions, and births using variation generated by a law that shuttered nearly half of abortion clinics in Texas. The most significant differences are that: (1) since they are interested in number of abortions (a discrete variable), they use a Poisson distribution of fixed effects, and we measure good jobs as a ratio of total jobs, so we use a conventional Gaussian distribution; (2) we have several shocks in our model.

Since we have two types of shocks (appreciations and depreciations), we run the model with three different control groups: (1) a model with only appreciation shocks, so the control group can experience either depreciation shocks or no REER shocks at all; (2) a model with only depreciation shocks, so the control group can experience either appreciation shocks or no REER shocks at all; and (3) a model with both appreciation and depreciation shocks, so the control group is not experiencing any REER shocks. The results for all three models are very similar (Appendix B, Table 1B), but the statistical significance of the third specification—including both shocks—is higher because the control group is more homogeneous. The results of the third specification are reported in the next section.

We start with a baseline model using only four controls, then add further supply-side controls (supply model), demand-side controls (demand model), and finally all controls (full model). Since the results are consistent through each specification, we only report the results with the full model in the results section (the full model with covariates is presented in Appendix A, Table A3; all results are presented in Appendix B, Table 1B). Our model is defined by:

$$\begin{aligned} Y_{ct} = \theta_t + n_c + \beta_1 SmDepShock_{ct} D_{ct} + \beta_2 MeDepShock_{ct} D_{ct} + \beta_3 LaDepShock_{ct} D_{ct} \\ + \beta_4 VLaDepShock_{ct} D_{ct} + \beta_5 SmAppShock_{ct} D_{ct} + \beta_6 MeAppShock_{ct} D_{ct} \\ + \beta_7 LaAppShock_{ct} D_{ct} + \beta_8 VLaAppShock_{ct} D_{ct} + \delta X_{ct} + u_{ct} \end{aligned} \quad \textbf{(1.4)}$$

Where:

Y_{ct}: good job share (ES_W^G, ES_M^G, or ES_W^G / ES_M^G)

θ_t: year fixed effects

n_c: country fixed effects

D_{ct}: dose (shock's size)

X_{ct}: set of controls

1.5 Results

The results in Table 2 indicate that exchange-rate shocks appear to be generally associated with an increase in women's relative share of good jobs, as evidenced in column (3). However, considering the separate effects of shocks on the share of goods jobs in men's and women's employment in columns (1) and (2) respectively gives a much more qualified picture of the relationship between REER shocks and gender equality in the labor market.

Medium appreciation shocks (those between 1.0 and 1.5 standard deviations below the country's period mean) are associated with a sort of "race-to-the-bottom" dynamic on gender equality: the share of good jobs in men's total employment decreases by 4.1 percentage points, while no improvement in women's good job share is identified. Therefore, women's good job share relative to men's increases by 4.0 percentage points, but not because of women gaining employment in better-paying sectors and occupations. Large appreciation shocks are somewhat rare (12 out of 435 possible observations as described in Section 1.3) but are associated with a 1.4 percentage point increase in women's good job share and a 3.5 percentage point increase in women's relative good job share—a significant improvement in gender equality. Most of these shocks occur after 2013, and further analysis indicates that it might be a result of women leaving self-employment in the informal sector, particularly in the domestic service sector, and getting formal jobs (IMF 2019; ILO 2021).[8] We tested this hypothesis by running the regression excluding the domestic service sector. The impact of large REER appreciation shocks loses statistical significance, so it is plausible that the decline in women's self-employment as domestic workers is driving the result, since women's labor force participation increases during this period (the results of these regressions are presented in Appendix B, Table 6B). The domestic service sector

[8] The level of informality in Latin American countries is highly heterogenous, but it is overall negatively correlated with level of education: the more educated workers are, the less likely they are to have an informal job (IMF 2019).

employs a significant percentage of workers in Latin America (around 7 percent of total employment and 21 percent of women's employment in our sample) and is characterized by high levels of informality and a lack of good job opportunities (see Table A2). Given that the average size of this sector slightly decreased during this period and the average age of domestic workers increased by eight years during the 2013-2018 period, it is possible that younger women found better job opportunities in the formal sector (ILO 2021).

Table 1.2 Results for model with no shocks as control group, all controls.

	(1) Men's Share	(2) Women's Share	(3) W/M Ratio
0.5 >= Depreciation < 1	-0.003	0.002	0.001
	(0.015)	(0.010)	(0.025)
1 >= Depreciation < 1.5	-0.029*	0.008	0.034*
	(0.015)	(0.008)	(0.016)
1.5 >= Depreciation < 2	-0.028**	-0.000	0.016
	(0.010)	(0.005)	(0.013)
Depreciation >= 2	-0.028**	0.012***	0.043***
	(0.010)	(0.004)	(0.012)
0.5 >= Appreciation < 1	-0.004	0.014	0.022
	(0.016)	(0.011)	(0.023)
1 >= Appreciation < 1.5	-0.041**	0.007	0.040*
	(0.018)	(0.011)	(0.021)
1.5 >= Appreciation < 2	-0.019	0.014**	0.035*
	(0.012)	(0.006)	(0.018)
Appreciation >= 2	-0.000	-0.002	-0.005
	(0.009)	(0.005)	(0.011)
N	277	277	277
Country FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Controls	Full	Full	Full

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Recall that depreciation shocks are slightly less frequent than appreciation shocks, with 125 episodes compared to the 144 appreciation shock episodes. Still, depreciations over the "medium" size of 1.0 standard deviation from the country's period mean are associated with a decrease in men's good share, as evidenced in column (1) of Table 2. Men's concentration in tradable sectors and their high representation among well-paid service sector jobs (such as in the finance, insurance, and real estate sector) largely explains this relationship. This period is characterized not only by a decrease in the overall availability of industrial jobs in the region, but also by a decrease in good service sector jobs and an increase in lower-paying service sector positions. Specifically, the number of jobs offered in the FIRE sector showed little increase over time for all countries, while the retail and repair of household, office, and computer goods sector, characterized by lower-paying jobs, increased substantially.

Only very large depreciation shocks are associated with an increase in women's good job share. The positive and statistically significant relationship between women's good job share and inward FDI (shown in Table A3) might suggest that, when FDI increases, more investment is being directed to employment-intensive industries other than the extractive sector, so jobs in the export manufacturing industry are being created for women. The manufacturing sectors of food, beverage and tobacco and textile and wearing apparel are the ones that offer the largest proportion of industrial jobs for women in sample countries. After 2006, when depreciation shocks are rare, there is a decline in this type of employment for women, particularly in the textile and wearing apparel manufacturing sector. Despite these sectors not being characterized by a large share of good jobs for women, they still offer better positions on average when compared to community and domestic services, a sector that employs 21% of women in our sample (Table A2). Women's employment in high-tech manufacturing also increases when depreciation shocks occur and tends

to be stagnant when no shocks or appreciation shocks are observed; however, only 2% of women are employed in this sector in our sample (Table A2).

Large depreciation shocks are associated with a 1.2 percentage point increase in women's good job share but are also associated with a 2.8 percentage point decrease in men's, resulting in a 4.3 percentage point increase in women's relative share of good jobs. A similar share of men and women are occupied in trade services and the FIRE sector, but men are significantly more likely to occupy higher-paying positions. These sectors are also more negatively sensitive to the impacts of large currency depreciation, and both women and men lose jobs as a result, but men lose more jobs classified as good jobs. For women in these sectors, job loss is more-than-compensated by the increase in manufacturing sector positions, as discussed above. Since large depreciation shocks tend to be associated with periods of macroeconomic instability and high inflation, this result suggests that these conditions may lead to a sort of gendered competition for the higher-paying jobs that remain. Appreciation shocks are also associated with an increase in the proportion of construction jobs for men, which tend to offer a smaller share of good positions when compared to other sectors.

The covariates used in the regression confirm some results expected from the literature (the full output of these regressions is shown in Appendix A, Table A3). Fertility is positively associated with men's share of good jobs, some evidence of a fatherhood premium—or at least less competition with women for good jobs. Men's job quality seems to be more vulnerable to financial openness—likely connected to their concentration in the tradable sector. Women's average years of education as a proportion of men's is consistently positively associated with women's good job share and always highly statically significant. Our regression results also

indicate that industrial productivity is negatively associated with women's good job share, aligning with the results observed by Tejani and Milberg (2016) and Seguino and Braunstein (2019).

One of the challenges of conducting causal inference analysis in macroeconomic data, particularly when evaluating the impacts of REER shocks, is the lack of reliable, long-term trends without treatment. The nature of REER shocks also prevents the utilization of common methods to avoid bias in difference-in-difference analysis, such as centering time-variant shocks to time zero to analyze pre- and post-shock parallel trends (Roth *et al* 2023). To test the robustness of the model, we examine different specifications (as described on Section 1.4) and explore how much our results depend on our specific definition of the treatments and the control group (Appendix B, Tables 1B). We build models with different specifications considering only two types of shocks: depreciation shocks larger than one standard deviation and appreciation shocks larger than one standard deviation. We also analyze regressions in which the shocks are divided in bins but with six bins instead of eight, so that the control group is formed by observations in which no shock larger than one standard deviation occurred (instead of one-half of a standard deviation). Overall, the results consistently show that increases in women's relative good job share are being driven by a decrease in men's relative good job share. We also consider "contaminated" control groups in which the shocks are either appreciation or depreciation, so that the control group experiences no shock at all or a shock in the opposite direction. Even when compared with this heterogenous control group, the results are consistent, so our model shows robustness even when the control group is purposely poorly identified.

We further test robustness by considering lead and lagged shocks, and by using discrete instead of continuous difference-in-difference approaches in various specifications (all regressions are presented in Appendix B). Lead models suggest that the no-anticipation assumption holds, and

lagged models indicate that the annual average contemporaneous REER shock (i.e., the treatment specified in our analysis) is indeed more impactful and statistically significantly associated with changes in good job shares by gender when compared with lagged shocks. Interestingly, when comparing the results of the discrete model with the continuous model (i.e., when the size of the shock is not allowed to vary within each bin versus when the size of the dose matters), the statistical significance of the results is consistent across models but the magnitude of the parameters is considerably larger on the discrete specification for large and very large shocks (Table 2B.7). This suggests that the impacts of the shocks are non-linear. Our analysis is based on the results of the continuous specification, which presents a more conservative estimate of the impacts of REER shocks on job quality.

1.6 Concluding discussion

These results point to some important policy implications. First and foremost, they imply that real exchange rate shocks have gender-specific effects, influencing both the overall availability and the gender distribution of job quality in Latin America. Despite the adoption of macroeconomic policies associated with appreciated real exchange rates throughout the region, larger appreciation shocks are rare and tend to increase women's good job share. Very large depreciation shocks are associated with an increase in women's good job share (largely in manufacturing) and a greater-than-proportional decrease in men's good job share, resulting in a rise in women's relative share of good jobs. The persistent horizontal and vertical segregation that characterizes Latin American economies is a key channel through which these REER shocks affect the gender distribution of job quality. Although this segregation affords men disproportionate access to higher-paying jobs than women overall, men are also more likely to lose these better jobs

when REER shocks occur—either through appreciation or depreciation. To acknowledge the opposite impacts of REER shocks for men and women, and design gender-aware economic policies that promote good jobs for women without disproportionately decreasing the availability of good jobs for men remains a significant challenge.

BUILDING REPRODUCTIVE JUSTICE AS A RESEARCH PROGRAM IN ECONOMICS

2.1 Introduction

In 1994, black women in the United States created the concept of reproductive justice (RJ) aiming to bridge the gap between reproductive rights and social justice movements. Organizations like the SisterSong Women of Color Reproductive Justice Collective (a broad coalition of various grassroots organizations and individuals representing primary ethnic populations and indigenous nations in the United States) proposed this new paradigm centered on the needs of women of color grappling with issues of pregnancy, birth, abortion, and parenting, recognizing that peoples' ability to make meaningful choices about their reproductive lives is shaped by intersecting systemic oppressions (Ross and Solinger 2017; Eaton and Stephens 2020).[9]

They criticized the traditional reproductive rights agenda narrow focus on "choice", which propagated an individualistic perspective and excluded people who couldn't access the choice market due to class, religion, societal norms, or mobility constraints, for example (West 2009; Onís 2015; Roberts 2015; Price 2020). Social justice movements, on the other hand, frequently shared a broad perspective that didn't center the role of reproduction for societies, how power structures colonize people's reproductive health for economic and political goals, and whose bodies are exploited for their achievement (Shaw 2013; Ross and Solinger 2017). Building from those movements, the RJ agenda focuses on three main rights: (1) the right to have children, (2)

[9] Despite acknowledging that women are not the only people biologically capable of carrying pregnancies (non-binary, gender non-conforming, and transgender men, for example, may also be able to give birth) here we are discussing the experiences that were being centered by the early reproductive justice movement, without minimizing other communities. This paper attempts to be as inclusive as possible in terms of language, understanding that inclusion is a central value of the reproductive justice framework. Our efforts are limited by the rapidly changing conventions and terminologies in the healthy debate of inclusive language.

the right to not have children, and (3) the right to parent happy and healthy children to the best of one's ability, understanding that those rights are severely impacted by different oppressions in a stratified society (Ross et al. 2001; Silliman et al. 2004; Ross et al. 2017; Ross and Solinger 2017).

This powerful new framework soon grew among scholars and activists, attracted by its unique capacity to articulate a wide range of pressing concerns for underprivileged individuals and communities—such as racism, xenophobia, classicism, homophobia, environmental degradation, and ableism—while still centering reproductive issues. In 2003, the National Organization for Women—the largest feminist organization in the United States, founded in 1966 and currently with more than half a million members—included the concept of reproductive justice in one of their newsletters for the first time. In 2004, doctors Jael Silliman, Marlene Fried, Loretta Ross, and Elena Gutiérrez published the first book focusing on RJ, titled *Undivided Rights: Women of Color Organizing for Reproductive Justice*. Their backgrounds as activists and intellectuals in the fields of education, history, philosophy, women's studies, and sociology solidified reproductive justice as a framework nested in grassroots movements and collective action that simultaneously dialogues with transdisciplinary academic circles.

The ambitious task of "proposing both a theoretical paradigm shift and model for activist organization" (Ross et al. 2017, p. 8) resonated among a diverse set of scholars that identify in RJ a theory, practice, and strategy to advance scholarship in several fields and ultimately promote human rights progress (Silliman et al. 2004). Efforts to consolidate the RJ framework within academia are observed in fields such as law (e.g. West 2009; Luna and Luker 2013; Franklin 2018; Murray 2020), health and medicine (e.g. Gold 2017; Knight et al. 2019; Leath 2022), environmental and natural resources (e.g. Gaard 2010; Hoover 2018; Liddell and Kington 2021), communications and media (e.g. Jaworski 2009; Onís 2015; Sundstrom 2015), psychology (e.g.

the special issue on reproductive justice published by the Journal of Social Issues—a journal of the Society for the Psychological Study of Social Issues—in 2020, with ten papers), and others.

In the field of economics, however, we don't see similar excitement. Despite our great history of important contributions from feminist economists to the discussion of reproductive rights and contraception, frequently from international and intersectional perspectives (e.g. Smyth 1996; Beutelspacher, Martelo, and García 2003; Blunch 2019; John, Tsui, and Roro 2020; Pekkurnaz 2020; Myers 2022), and the adoption of reproductive justice in some academic spaces recently—like the International Association for Feminist Economics (IAFFE) Presidential Panel during the 2023 Allied Social Science Associations (ASSA) Annual Meeting—there's barely any use of the term in economic journals. When using EconLit and SciELO to search for online peer-reviewed journals in the field of economics written in English, Spanish, or Portuguese—which account for more than 95% of contemporary academic publications (Beigel and Bringel 2022)—papers that mention reproductive justice are mostly published in interdisciplinary journals that do not have economics as their primary field.[10]

The only papers published in journals that have economics as their primary field and mention reproductive justice are Bahn et al. (2019), published in *Feminist Economics*, and Hartmann (2023) and Olmsted and Killian (2023), published in the *Review of Radical Political Economics*.

[10] Using the EconLit search engine, I find papers discussing reproductive justice published in the Yale Law Journal, Annual Review of Law and Social Science, Journal of Health Politics, Policy and Law, Journal of Public and International Affairs, Human Geography, and Indian Journal of Gender Studies. The SciELO search engine shows a similar pattern: a few publications discussing economic issues in law, health, and anthropology journals, and no publications mentioning reproductive justice in economics journals. EconLit is a comprehensive library of economics that includes over 1.6 million records. It covers economic literature published over the last 130 years from leading institutions in 74 countries plus over 500 journals, and it is updated weekly. SciELO is the Scientific Electronic Library Online, which compiles publications from more than a thousand journals located in Argentina, Brazil, Bolivia, Chile, Colombia, Cuba, Costa Rica, Ecuador, Venezuela, Peru, Uruguay, Spain, Portugal, Mexico, and South Africa. It constitutes the most comprehensive scientific online library in Latin America. My last search for "justiça reprodutiva", "justicia reproductiva", and "reproductive justice" in EconLit and SciELO was on February 26th, 2024; since then, new entries may have been uploaded.

Amongst these, Bahn et al (2020) is the only publication that centers their discussion in the reproductive justice framework. The paper relies on a structural analysis to shows that Targeted Restrictions on Abortion Providers (TRAP) laws make women less likely to move between occupation and into higher-paying occupations, that public funding for medically necessary abortions increases full-time occupational mobility, and that contraceptive insurance coverage increases transition into paid employment. Bahn et al (2020) constitutes a good example of how the RJ framework can highlight structural, international, and intersectional issues to prevent analytical blind spots. Hartmann (2023) and Olmsted and Killian (2023) also cite "reproductive justice" in their pieces, but that's not the central framework used in their analyses.[11]

This essay attempts to start that discussion, claiming that the adoption of the RJ framework as a research program in economics would increase feminist scholars' ability to conduct meaningful research and contribute to social movements and policy making in several ways. We argue that such a framework can increase interdisciplinary and transdisciplinary research, address economics' overreliance on WEIRD (Western, educated, industrialized, rich, and democratic) samples (Henrich, Heine, and Norenzayan 2010; Lowes 2021), improve our ability to detect analytical blind spots, prevent policy gaps—when governments act in ways that undermine their own stated goals (Altman and Pannell 2012)—and increase the connection among academic feminist scholarship, social movements, and policy makers.

Our essay is organized as follows. We first differentiate RJ from reproductive rights and reproductive health, highlighting why this framework can be particularly fruitful to economics

[11] Hartmann (2023) presents the history of the Institute for Women's Policy Research (IWPR) and just mentions RJ movements once, in the context of IWPR history and struggles. Despite their accurate (but brief) characterization of the RJ framework and clear intersectional, international, and justice-focused perspective, Olmsted and Killian (2022) do not rely on the reproductive justice framework in and on itself, creating what they call the social and reproductive health and justice (SRHJ) approach.

scholarship. Then, we define RJ as a research program and identify its core hypothesis and auxiliary hypotheses. Next, we apply the framework to a selected historical example to illuminate its usefulness for economic science and the feminist agenda. Finally, we discuss the relevance of advancing this research program and debate possible tensions of such applications in future analyses.

2.2 Reproductive justice as a useful framework for economics

The general idea that women's rights are constrained by a complex system of oppressions is not new in economics. Even John Stuart Mill in *The Subjection of Women* (2006 [1896], p. 26), considered by many the first piece by an economist discussing gender equality, claims that "what is now called the nature of women is an eminently artificial thing—the result of forced repression in some directions, unnatural stimulation in others". Feminist economists discussed such structural constraints for decades, frequently including an intersectional approach, which is defined as "the need to account for multiple identity [not only gender] when considering how the social world is constructed" (Crenshaw 1991, p. 1245). Such discussion, however, are mostly centered in reproductive rights (particularly on the right to planned pregnancy and abortion access) and reproductive health (eg. Beutelspacher, Martelo, and García 2003; Crane 2005; Gammage, Sultana and Glinski 2020).

The reproductive health and reproductive rights frameworks are important contributions to the feminist economics literature, but they can be incorporated and complexified in the reproductive justice framework. In fact, RJ authors addressed some of the limitations of those approaches, specifically talking about the heavier weight they put on the individual—particularly on the idea of "choice"—rather than on communities, collectives, structures, and historical backgrounds. RJ

agrees that legislation, access to health care, and education about those resources are necessary to guarantee a person's autonomy in making meaningful decisions about their reproduction; in fact, those constitute basic human rights (Ross & Solinger 2017). However, the position that such individual occupies in society, their religious/spiritual beliefs, the history of their community, and so many other factors are just as important—and sometimes even more relevant—to understand and fight against human rights violations.

Consider the example of a pregnant native-American woman whose pregnancy offers risks for her own well-being. If she only has access to the Indian Health Services, she can't legally have an abortion through her healthcare, and if she lives in a state with an abortion ban (like Texas), mobility and income limitations can eliminate access to a private option too. If these options were available, it doesn't mean that now she has access to "choice." Maybe the religious/spiritual beliefs of her community would push her to seek an at-home, hidden abortion option, or maybe a history of forced sterilization of her community members by the health care system would make her too afraid of using medical resources (Lawrence 2020; Torpy 2020). Further, it is important to understand the structural conditions that might have prevented her from accessing affordable and safe birth control in the first place (the history between indigenous communities and the health care system may also play a role here), and which factors contributed to her pregnancy complications—maybe climate and land use changes generated food insecurity and malnutrition, or maybe a disability prevents her from carrying a pregnancy to term.[12] The RJ framework allows us to not lose sight of those possibilities, while still promoting the idea that reproductive rights and reproductive health are essential. Particularly, it helps us see why economic policies focusing only on those two issues could be insufficient for the promotion of "choice," and better captures the

[12] In the Section 2.5, we present a historical (instead of hypothetical) example of how the RJ framework can promote the integration of the reproductive rights and health agendas, advancing reproduction decisions as a human right.

intersectionality and historical processes that can only be understood when we consider collectives, not only individuals, as important social agents.

Table 1 summarizes the differences among the three frameworks. In Section 2.6, we discuss the limitations of the RJ framework in more detail and justify why we defend its adoption within economics despite them.

Table 2.1. Differences between frameworks: reproductive health, reproductive rights, and reproductive justice.

	Reproductive Health	**Reproductive Rights**	**Reproductive Justice**
Main problem addresses	Lack of information about and access to reproductive and health care services	Lack of legal protection guaranteeing individuals' access to reproductive decisions	Society's institutions, environment, economics, and culture prevents communities and individuals from exercising self-determination
Key players	Health care providers and educators	Advocates (legal experts, policymakers, elected officials)	Organizers (including reproductive rights and health activists)
Constituents	Patients	Voters, lobbyists	Women, people with uterus, and their communities
Strategy	Improving research, access, quality, quantity, and education about health care services, focusing on reproduction	Protecting existing laws, demanding their enforcement, and creating/passing legislation guaranteeing access to reproductive rights	Promoting the leadership of and connection between grassroots groups, individuals, and communities who identify and confront multi-layered oppressions in society focusing on reproduction issues
Limitations	Diminished structural and intersectional approach (provision of services and education about them happen at the individual level)	Promotes individual (instead of collective) rights at its core, and ignores the disenfranchisement of some communities	Long-term change approach, which confronts sticky institutions (power and social values)

Source: own formulation based on ACSJ (2005).

2.3 Reproductive Justice as a research program

According to Lakatos (1978), a new research program is created within a specific field of knowledge not to provide new tools to answer old research questions, but precisely to analyze and explain different phenomena and new issues. Reproductive Justice was created by women of color to address the intersectionality of urgent matters that crossed their bodies, but were still somehow distant from each other in organized social movements and academia: the social justice and the reproductive rights agendas. It is, therefore, an attempt to understand and change pressing issues about reproduction within contemporary societies, bringing that complex intersection to the forefront.

Instead of focusing on individual-based decisions and how to increase their resources (either in terms of more rights, more health care, or more access to and education about both), RJ frames questions centering structural issues, like capitalism and imperialism dynamics, race and gender as varying social constructs, social struggles and organized social movements. By defining RJ as a (Lakatosian) research program, we can formulate a framework that is broad enough to enlighten the study of different societies in varying historical contexts, but also specific enough to contribute to the advancement of economic policy construction, evaluation, and overall economic analyses.

Lakatos (1978) creates a theoretical model for a research program: it is a collection of interrelated theories, united by a common hypothesis that forms its core. Around the core, there are a series of auxiliary hypotheses, which allows for the dialogue of diverse theories (in our case, different schools of thought and fields in economics) and diverse applications of the framework.[13] We follow the philosophical tradition of critical rationalism, which can be defined as a framework

[13] Kvangraven (2020) provides an interesting discussion about dependency theory as a Lakatosian research program, elucidating how this framework can embrace diverse points of view while preserving a theory's strengths and relevance.

in which both falsificationism and situational logic can be accommodated, depending on the context (Caldwell 1991, Kerstenetzy 2022). That way, a hypothesis is not build based on its ability to be falsified, but through the exercise of fitting together elements of social reality aiming to produce an explanation for them. Situational logic considers that the method of explanation of the social world consists in sufficiently analyzing the situation of active humans to explain the action with the help of the situation (Popper 1978).

To properly formulate these hypotheses, we built word clouds of selected written pieces of the reproductive justice literature, identified key words, grouped them into categories, and established connections among them. A piece is selected if the answer is yes to either one of the following questions: Is the piece's main goal to define reproductive justice (either in general or within their field of expertise)? Does this piece center the history or the main goals of the productive justice movement? Using that criterion, the selected pieces were Ross et al. (2001), Silliman et al. (2004) (chapter by chapter analysis), ACSJ (2005), West (2009), Luna and Luker (2013), Shaw (2013), Roberts (2015), Ross et al. (2017) (chapter by chapter analysis), Ross and Solinger (2017) (chapter by chapter analysis), Eaton and Stephens (2020), and Price (2020). Figure 2.1 shows the example of Luna and Luker (2013); since their goal was to define reproductive justice within the context of law, it is understandable that words "law" and "rights" are the most common. For this reading, we highlight the frequency of the words rights, law, legal, women, social, people, race, color, Black, State, children, class, politics/politicians, and activism, which we map into the broader categories of human rights, gender, race and ethnicity, inequality, intersectionality, activism and social change, and safe and dignified childbirth and parenting.

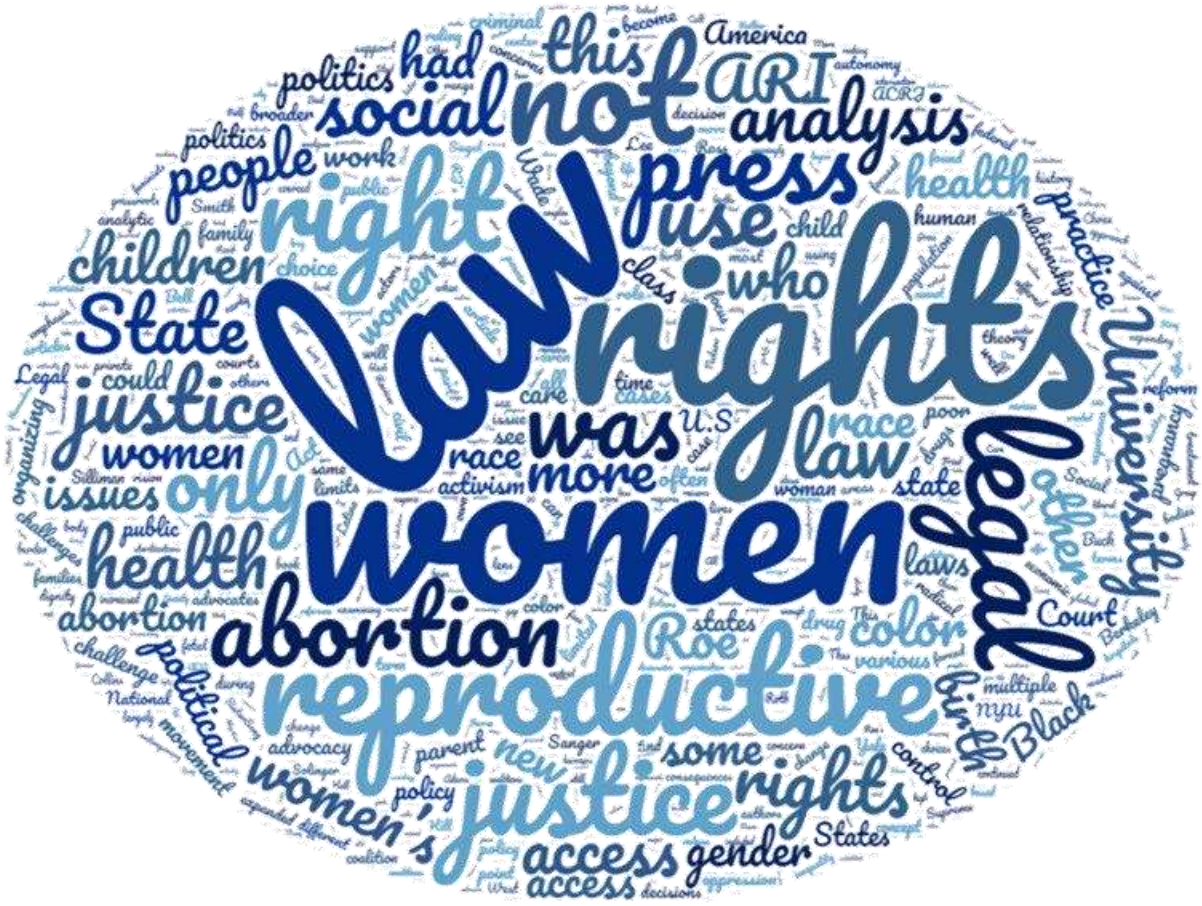

Figure 2.1. Word cloud example using Luna and Luker (2013)

Source: own formulation based on Luka and Luker (2013)

From these analyses, the core hypothesis of the RJ research program becomes evident: people's abilities to make meaningful reproductive decisions for themselves and their communities is severely restricted by systematic and intersectional oppressions. Given the very recent development of RJ, the set of auxiliary hypotheses is more challenging to define (especially with the deep interdisciplinary nature of RJ academic production), but that's one of the advantages of the definition of a research program: new hypothesis can be included as the framework develops, and our goal is to define RJ as a useful research program within economics only, so we can focus on the research questions that are relevant to our science. Our literature review suggests four

auxiliary hypotheses: (1) capitalist development produces colonization and polarization; (2) sexual autonomy and reproductive freedom (safe and dignified fertility management, childbirth, and parenting) are human rights; (3) gender and race/ethnicity are socially constructed concepts that exist under a strict hierarchy defined by those in power; (4) grassroots movements and academic production (and constant dialogue among them) are necessary for social change.

The capitalism development trends and the centrality of colonization and polarization for RJ are clear in the historical analysis of (the lack of) access to safe and dignified fertility management. Ross and Solinger (2017) start their book examining the history of the thirteen colonies of the United States with the purpose of showing "how colonizers, enslavers, employers, and the state, among other entities, have used reproductive capacity to pursue goals associated with power, wealth, status, and property" (Ross and Solinger 2017, p. 16), precisely to stress that connection between advancing a societies' mode of production (centered in the idea of wealth and private property accumulation), class polarization (while making explicit the intersections among class and other identities) and colonization of nations, communities, peoples, and bodies.[14] The centrality of class, property, income, and sovereignty as key elements to access resources (such as power, health care, rights, education, dignified housing, safe water, and food), together with RJ's preoccupation with understanding them as structural constraints, instead of individual choice-limiters, constantly shaped by the mode of production and those in power, is an integral element of the analyzed literature.[15]

[14] An interesting discussion about the concept of body (de)colonization centering the experience of women of color is presented in Blackwell (2023).

[15] Lana and Luker (2013) discuss how white supremacist ideas and the rise of industrial capitalism in the United States impacted fertility policies and gave rise to the reproductive rights framework, together with a classicist and sexist "professionalization" project promoted by medical doctors to limit abortion practices. Their historical analysis is built within the RJ framework and is a good example of the importance of this auxiliary hypothesis, and of how RJ can complexify the knowledge of historical processes with its holistic, structural perspective.

The discussion about sexual autonomy and reproductive freedom as human rights is also a constant preoccupation of the literature and grassroots movements, and a particularly important element for the discussion of RJ among law studies. In economics, tensions between feminist movements working on gender justice and economic justice agendas highlight the difficulty of promoting human rights in a diverse global context, frequently promoting an unnecessary and atomistic hierarchization of oppressions (being poor versus being of native/indigenous race, for example) instead of a convergence of agendas that understand all human rights as equally important and achievable (Barton 2005). The integrated analysis, holistic vision, and comprehensive strategies that push against structural conditions of control and constraint proposed by RJ assumes human rights promotion as unnegotiable, therefore being an important auxiliary hypothesis of this research program.[16]

The definition of race and gender as socially constructed dynamic concepts is also central, and the inclusion of these categories in the auxiliary hypothesis doesn't mean that they are more important than other intersectional identities of people and communities—in fact, intersectionality is part of the core hypothesis of the research program. We established Hypothesis 3 by analyzing the always-present term "women of color" in the RJ literature, the importance of understanding gender as the social category used to organize and understand sexuality and reproduction, and the central role that RJ authors and social movements give to white-supremacy ideology as a dominant and perverse structural constraint. Hierarchies of gender—which women are better, superior, mother-material ("legitimate mothers")—and race/ethnicity—who is consider part of "whiteness" and therefore allowed more power, respect, resources, and legitimacy, either legally or by social

[16] It is important to acknowledge the distinction between positive and negative rights in this discussion; such definition is one of the many tensions of the RJ framework. We will present that discussion in Section 2.6.

institutions and culture—are particularly dynamic definitions that must be treated as a separate hypothesis in the definition of this research program.[17]

Finally, the social change element of the RJ framework and the necessary dialogue among grassroots movements and academic production to achieve it is evident as a hypothesis due to the very roots of RJ, and the convergence of intellectuals, academics, and activists that characterize the framework. All definitions of RJ we accessed had a clear social change goal (frequently called liberation), saw activism and social organizing as the means to achieve it, and highlighted the role of theories and research as an integral part of that process. As Ross et al. (2017, p. 7) described, reproductive justice "focuses on structural oppression and the development of new theories and activism to create radical pathways of resistance and strategies for change that incorporate the complexities of our diverse economic, racial, gendered, cultural, and geographic locations".

There are, of course, other hypotheses and elements of analysis that are common to several RJ papers, books, and pamphlets. Migration status as a social construct that exist under a strict and dynamic hierarchy, for example, is particularly important for some communities, but since it seems to be a category relevant to the United States more than anywhere else (in fact, several grassroots movements located in the Global South ignore it completely), we decided not to include it, and feel that it can be added as a ramification of auxiliary Hypothesis 3.[18] Similarly, the unequal impacts of climate change, overwhelmingly felt by poor women of color living in periphery countries/regions through decreasing infrastructure, poverty intensification, and biological

[17] We use the word "whiteness" in quotes to reflect the deep and malleable definitions of white races globally, while still highlighting the global white supremacy ideology. A good framework that explores race and racism as a modern global project that takes shape differently in diverse structural and ideological forms across all geographies but is based in global white supremacy is presented in Christian (2019).

[18] GIRE (*Grupo de Información em Reprodución Elegida*, Information Group in Elected Reproduction), for example, is a reproductive justice organization located in Mexico that doesn't mention migration status as a category of analysis in their reports and documents. The National Latina Institute for Reproductive Justice, on the other hand, highlights such element as one of the most important aspects of the struggle of Mexican women in the United States.

reactions are increasingly discussed among RJ researchers and activists (Denton 2010; Hoover 2018). However, the debate is not consistently presented among the literature analyzed, and we claim that such analysis can be included as a further consequence of capitalist development, dialoguing and advancing auxiliary Hypothesis 1. Our auxiliary hypotheses consist of the main themes identified in the literature that seemed relevant for the RJ framework within economics, and not an exhaustive list of all phenomena and elements of analysis that this rich framework can provide. We reiterate our proposal of defining a research program that constitutes a starting point for research and activism within economics, instead of a definite and limiting description of which topics can be studied under the RJ framework.

The hypotheses here discussed are also not inaugurated by the RJ framework; in fact, several schools of thought in economics share similar perspectives and research questions. What makes the RJ framework unique is the proposition of all these elements simultaneously. According to Lakatos (1978), the definition of the core and auxiliary hypotheses allows for the identification of the method capable of approaching these questions successfully, and it is through the review of schools of thought within economics that propose similar hypotheses that we can establish such a method. In the next section, we discuss which contributions within economics address similar issues and, therefore, contribute to the building of the global, historical, feminist, holistic method requested by the RJ research program.

2.4 Synthesis: development, feminist, and stratification economics as building blocks for the Reproductive Justice research program

The definition of RJ's hypotheses above explicit the method required by this framework: a global (instead of local), historical (instead of ahistorical and generical), feminist (bringing gender

and power as central elements of analysis), holistic (instead of linear) one. We understand that method refers to the techniques used to gather evidence supporting hypotheses, methodology refers to theories and analysis of how research should proceed, and epistemology discusses adequate theories for understanding phenomena (Harding 1987). With this in mind, we propose a synthesis among different schools of thought in economics that we believe align these three elements with unique capacity to advance the RJ research program, highlighting elements of analysis proposed by these theories that contribute to the understanding of the hypotheses outlined in Section 2.3. Specifically, we rely on strains of development, feminist, and stratification economics theories.

2.4.1 Contributions from development economics

The discussion about polarizing forces of capitalism, colonization/imperialism, and the advancement of social justice from a class perspective has been a topic of discussion among development economics for more than a century. Out of the three schools of thought here outlined, this is the most traditional and controversial one, with several competing and often contradictory definitions of development among its researchers.

To dialogue with the RJ research program, it is important for the development theory to approach development through the lens of a global historical analysis—so we are not interested in the literature focused on the creation of abstract models of economic growth, for example—and that such development tends to promote polarizing trends, that can be at least partially challenged by the organized civil society.[19] There are several development theories that fit that criteria, e.g.:

[19] The discussion about to what extent those trends can be challenged, and which instruments are legitimate and efficient to stop or attenuate those polarizing tendencies (voting, peaceful protesting, striking, terrorism, *guerrillas*, etc.) is vast, and echoes some of the discussions currently taking place within the RJ movements. Here, we are assuming that any theory that assumes some possible attenuation of those polarizing tendencies (decreasing income inequality within a country, for example) through some sort of civil organizing (e.g. unionizing) belongs to the group of development theories that can serve as a building block for the RJ framework.

dependency theory (and all it ramifications), post-colonial theory, classical Marxian economics, neo-Marxist economics, some approaches to global value chain analyses, some approaches to post-Keynesian analysis, world systems theory, certain classes of north-south trade models, Canadian staple theory, theories of imperialism, and theories of subordinate financialization (Kvangraven 2020).

Depending on the application of the RJ framework—if to the analysis of a short-term contemporary on-going phenomena or a long-term historical trend, if for a country of the global south or a region in the global north, if focused on income polarization within a nation or wealth concentration among countries, etc.—one development theory may be more suited than other. We claim that this research program is broad enough to dialogue with any development theory that relies on the basic premises discussed above (i.e. global historical approach assuming dynamic polarizing tendencies that can be at least partially challenged), and that an underlying acknowledgement of how that polarization takes place and how it's being challenged (or not) is necessary for an analysis to be nested in the RJ framework here defined.

2.4.2 Contributions from feminist economics

Feminist economics differentiates itself from gender economics due to two main ideas: its clear agenda of advancing gender equality and the centrality of power (and unequal access to it) as an element of analysis. Instead of assuming that gendered economic outcomes, such as smaller labor market participation for women in most societies, are a result of natural endowments or different opportunity costs, feminist economics understands oppression and power struggles as necessary elements for the understanding and the advancement of equality in society. Therefore, feminist economics (instead of the broader area of gender in the economy) is the school of thought that best

serves as a building block for the RJ framework, directly dialoguing with the structural and intersectional constraints idea, the definition of gender as a socially constructed concept that dynamically changes to serve the interest of those in power, and particularly resonating with auxiliary Hypothesis 4: the need for research and activism to walk hand-in-hand.

Within feminist economics, some concepts are particularly fruitful for applications of this research program, since they were designed to investigate similar hypotheses to the ones outlined in Section 2.3. First and foremost, the idea of intersectionality—the concept that people's different identities are integrative (instead of additive)—was developed within feminist social sciences, is widely used among feminist economists, and is clearly imperative to the RJ research program. In fact, Ross et al. (2017, p. 8) claim that, in the RJ vision, "intersectionality is our process; human rights are our goal." Such concept highlights the need for a holistic method, capable of capturing the universality, simultaneity, and interdependence of identities that cross different human beings, who are entitled the same human rights.

About sexual autonomy and reproductive freedom (safe and dignified fertility management, childbirth, and parenting), and the critique from the RJ framework to the individualistic idea of "choice" promoted by several reproductive rights and health movements, feminist economics literature showed similar concerns with such simplistic, individual-based approach. Particularly, the discussion about voice and agency, and the possibility of exercising those within one's household and community, in the market, or in the State are important elements of analysis pushed forward by feminist economics tradition (Kabeer 1999; Gammage, Kabeer, and Rodgers 2016).

Gammage, Kabeer, and Rodgers (2016) define agency as the capacity for purposive action, and the ability to make decisions and pursue goals free from violence, retribution, and fear, while voice is the ability to articulate practical needs and strategic interests, individually and collectively,

in the private and public domains, and the guarantee that such manifestations will be heard, listened to, and acted on. Those two elements of analysis are useful for the understanding and evaluation of sexual autonomy and reproductive freedom, and directly dialogue with the structural, collective, and intersectional focus propagated by RJ.

Further, the three main rights advanced by RJ movements—namely the right to have children, to not have children, and to parent happy and healthy kids to the best of one's ability—are central in social reproduction theory, a perspective also nested in the concepts of intersectionality, structural analysis, polarizing tendencies of capitalism, and necessary articulation between academia and activism (Bhattacharya 2017). Its deep roots within Marxist theory, however, that centers the oppressions propagated by the capitalist mode of production through its process of accumulation and can only be surpassed through a revolutionary process, characterize social reproduction theory as one possible applications of the RJ framework, but not necessarily the only one; as discussed in Section 2.4.1, there are several other development theories within economics that can contribute to the RJ research program.

So, feminist economics and the concepts of intersectionality, voice, and agency, together with the contributions about the reproductive rights agenda as understood by social reproduction theory, are the main elements of analysis that we identify as relevant for the building of the RJ research program within economics. Again, we stress that many other elements can (and should) be included depending on the application of the framework—the capabilities approach, for example, is relevant to feminist economics and frequently used for the analysis of well-being (Nussbaum 2003; Strenio 2020), and so is the concept of economic empowerment (Kabeer 1999) —but our goal is to map central concepts that serve as building blocks within economic literature

for the analysis of our core and auxiliary hypotheses, therefore justifying our parsimonious approach.

2.4.3 Contributions from stratification economics

Out of the three schools of thought highlighted here, stratification economics is the most recently developed one, and its origins are associated with a blind spot within economic literature that is central to the RJ research program: the study of the significant and enduring disparities in income and wealth by social groups (Darity 2005; Davis 2014). This school of thought understands that hierarchization is structural and intentional, designed to perpetuate power dynamics, and that individual's responses to stigmas associated with different social groups (defined by race, ethnicity, gender, sexuality, etc) dynamically reinforce stratification (Darity 2005). Therefore, stratification economists highlight the need for a historical method, that systematically and empirically (instead of anecdotally) investigates the rise and maintenance of these hierarchies within societies (such as white supremacy), and sustains that only conscious policies to combat the privilege of certain groups can effectively decrease stratification.

Some of the core contributions of the stratification literature are the importance of colonization for the long-term poverty of a nation/region, the role of intergeneration wealth for the maintenance of group power, and the analysis of overwhelming evidence that challenges the idea that more capitalist development—and highly correlated variables, such as higher average educational attainment—decrease discrimination and social exclusion of certain groups. Therefore, the historical, intergenerational, power-centered analysis promoted by stratification economists directly dialogues with the RJ framework, and the argument about capitalist development possibly generating polarizing tendencies not only in terms of class, but also among social groups (in terms

of their income, wealth, and power), is an essential contribution for the analysis of the auxiliary Hypothesis 1 (capitalist development produces colonization and polarization).

Further, stratification theory proposes a debate about the tensions between structural oppressions and individual's acknowledgements, ideas, and actions when faced with them. Instead of relying on the masculine figure of the rational choice model, according to which people are going to behave seeking their immediate perceived utility-maximization based on their ability to highlight belonging to socially advantaged groups, this school acknowledges the value of community, individual dignity, rights of peoples, fairness, and justice as core beliefs share by many individuals that, instead of personal costs, can be long-term unnegotiable goals (Davis 2018). As discussed in Section 2.6, such tension is an important topic to be addressed in the RJ framework, and stratification economics provides good tools of analysis for that task.

2.5 Possible applications of the RJ framework: a historical example

In Section 2.3 we defined RJ as a Lakatosian research program, identifying its core and auxiliary hypotheses. In Section 2.4, we nested that research program in the intersection between development, feminist, and stratification economics, and highlighted some elements of analysis within these schools of thought that seem particularly useful to constitute the building blocks of this framework. Now, we will apply that theoretical model to a historical example, supporting our claims that such research program can address economics' overreliance on WEIRD samples, improve our ability to detect analytical blind spots, prevent policy gaps, and increase the connection among academic feminist scholarship, social movements, and policy makers.

By the late 60s and early 70s, neo-Malthusian theories started to spread among economists and policy makers. Instead of just focusing on food supply—the original Malthusian proposition,

according to which food grows in arithmetic projection while population grows in geometric projection—this new school of thought used more refined arguments to defend population checks, like evoking the "Entropy Law" or second Law of Thermodynamics to justify why nature resources were necessarily limited (Georgescu-Roegen 1971).[20] The popularity of these ideas incentivized the global North to finance policies of population control on the global South—like the one-child-policy in China, stablished in 1979, and the "Emergency" period in India (1975-77), which sterilized millions of people (Wang *at al* 2016; Gupte 2017).[21]

In the United States, that meant the resurgence of the Eugenics movements (that lost popularity among scholars and politicians since the Nuremberg trials, in the 1940s), especially with the creation of new pseudo-biological theories of species evolutionary development, like the r/K selection theory created in the late 60s (Mehler 1989).[22] Not surprisingly, black leaders and movements in the United States—from the Black Panthers to Malcon X—saw the federal funding of birth control campaigns, announced by President Lyndon B. Johnson in 1965, with great distrust (Cooper 2023). For them, it seemed like a plan to exterminate the black race, especially after the new wave of coerced sterilizations of minority women: the *Jessin v. County of Shasta* case of 1969, which ruled that "voluntary sterilization is legal when informed consent has been given, that sterilization is an accepted method of family planning, and that sterilization may be a fundamental right requiring constitutional protection," together with the US$383 million dollar allocation to

[20] The second law of thermodynamics claims that energy/matter necessarily moves from high entropy (organized and highly usable) to low entropy (chaotic and unusable), so the limited stocks of high entropy materials on Earth (like fossil fuels) would be the basis of our scarcity.

[21] Gupte 2017 reports several ideological and financial incentives from the global North to help with the mass sterilization project, including a US$66 million loan from the World Bank to the Indian government from 1972 to 1980 specifically for sterilization purposes.

[22] The r/K selection theory claims that some species reproduce lots of offspring and invest little resources in each (r strategy), like cockroaches, while others reproduce less and invest more resources to see the few offspring thrive (K strategy), like humans. Doctors like J. Phillip Rushton applied the theory to humans, claiming that black races were biologically closer to r strategies, while whites and Asians (named yellow race in his classification) were biologically closer to K strategies (Mehler 1989).

family planning (including to sterilization procedures) through the Family Planning Services and Population Research Act in 1970, resulted in women sterilizations increasing 350 percent from 1970 to 1975, with about one million women being sterilized per year, the vast majority being poor women of color—particularly Native American, but also black and brown women (Lawrence 2000; Torpy 2000).

This created a severe tension within liberation movements in the United States, particularly black-centered ones: in one side, there were educated men with well-founded theories about white supremacy, capitalism, and oppression, fighting the (very real) black race erasure project and even arguing, due to religious beliefs, that women are men's fields to produce his nation—in the words of Elijah Muhammad, mentor of Malcon X (Cooper 2023). On the other side, there were women with very good reasons to welcome state-funded birth control, building a black-centered notion of reproductive rights that simultaneously claimed the right to deny childbearing while fighting state and market coercion; they were accused of supporting the Eugenics project when defending such policy (Nelson 2003; Roberts 2014; Cooper 2023).

The RJ research program provides several insights for the analysis of this historical episode. First, through the lens of development theory, we understand the polarizing tendencies of capitalism that culminated in the rise of anti-imperialism and social justice movements worldwide in the 1960s and 1970s, and the material conditions that contributed to the surge of neo-Malthusian and Eugenics policies as a response. Stratification economics provides us the theoretical tools to analyze the white supremacy ideology behind the policies pushed forward by those in power, and together with the feminist concept of intersectionality, also provides historical grounds for the understanding of why men dominated the rhetoric of social justice movements, but were still excluded from and directly confrontational towards the State power dynamics. Also important is

the analysis of how individual women made decisions (if using the service or not) based on individual interests versus group dynamics, and how their perception about their ability to perform motherhood was impacted by socially constructed stereotypes of a black woman at the time. Finally, the definition of reproductive rights as not only women's rights to carry a healthy pregnancy and raise children, but also the right to deny such reproductive choices (a human right minimized or even denied by some men leaders), together with the concepts of voice and agency—the recognition that, even within social justice movements, women didn't have agency (since their ability to make decisions about their own reproductive destinies were targeted Eugenics support) nor voice (particularly collectively, since their manifestations about reproductive rights were not heard, listened to, and acted on) in this specific discussion—are central for the critical analysis of this period.

These elements allow us to increase our knowledge about how public policies can impact communities with historical reasons to deny, confront, and distrust birth control programs (decrease our reliance on WEIRD samples). This example also illustrates how the 1960-70s birth control public policy ignored black women in the United States, particularly the ones articulated in social justice movements, therefore not reaching one of the most vulnerable populations in terms of health care coverage in the country. It shows that if policy makers, researchers, and social movements were more integrated, it would be possible for this issue to be acknowledged and increase the likelihood of the promotion of coercion-free reproductive decisions as a human right. Looking at this historical example through RJ lens allows us not to point finger at some individuals or organizations, but rather analyze the situation with the complexity that characterizes it, advancing the evaluation of public policy beyond the mere culpability of black men, for example.

2.6 Concluding remarks

This essay aimed to define Reproductive Justice as a research program in economics. Far from proposing a strict and static definition of what RJ is, our approach suggested the definition of one core and four auxiliary hypotheses nested in a multidisciplinary overview of the RJ literature (both produced in academic and activist circles), then situated such research program in the intersection between development, feminist, and stratification economics, and finally defined some useful and necessary elements of analysis within each of those schools of thought in a parsimonious fashion. We selected what we believe are the most useful concepts within economic thinking to support and investigate the hypotheses outlined in the research program, incentivizing the addition of other elements of analysis depending on the application of the framework.

The exercise of this essay is, therefore, a starting point for a discussion. Several questions remain answered, and a few tensions within the RJ framework seem particularly challenging and fruitful for future discussion within economics. We highlight two: the tension between the individual level stigmatization, associated with personal bias and discrimination, versus the social groups reparations agenda, associated with historical social exclusion (particularly in a world of relevant intersectionalities); and the definition of negative and positive human rights, with the associated discussion of how to promote public policy to address them.

As discussed in Section 2.4.3, we propose stratification economics as one of the building blocks of this research program precisely given its preoccupation and adequate analytical tools to deal with such complex contradictions. Maybe additional elements of analysis need to be integrated in the research program for that goal—like the club goods concept from the standard goods taxonomy and the capabilities approach (Davis 2022)—but the framework here proposed welcomes these additions. Further, we argue that such complex dynamics must be comprehended

through a complex research program, that relies on global, historical, feminist, holistic methods, which is precisely what the RJ framework proposes.

The negative versus positive rights distinction—i.e. a government's obligation to refrain from unduly interfering in people's mental, physical, and spiritual autonomy, versus a government's obligation to ensure that people can exercise their freedoms and enjoy the benefits of society, respectively—is particularly important for public policy and activism. If sexual autonomy and reproductive freedom are human rights, they must be equally promoted by elected officials and policy makers, but which ones are negative and which ones are positive rights, and how these definitions change through time? The recent overturn of *Roe v. Wade*, for example, can be interpretated as a transition of abortion rights from the later to the former in the United States. As another example, the right to have kids and parent them to the best of one's ability is so broad and involves so many elements that it is challenging to define limits. Should the provision of assisted technology for people who want to carry pregnancies be a positive right? What about people who biologically can't carry pregnancies regardless of technology access, should be a society's duty to somehow provide children for them? Again, we claim that the RJ framework is uniquely equipped to deal with such challenging debates. It is through the radical centering of intersectionality and the connection between activism and research that we can investigate these issues and trace public policy aware of the variety of needs and wants of diverse communities.

One of the most common criticism faced by the RJ framework is precisely its goal to acknowledge such a broad set of questions and social issues, which requires too much time and energy to understand and confront. We claim that this broad perspective is one of its most important strengths: RJ proposes that reproductive freedom is an essential part of the inalienable and untransferable human rights, but not everyone is oppressed the same way, or at the same time,

or by the same forces; so reproductive justice is universally applicable because every human being has the same human rights, becoming a unified theory and practice dedicated to the study of the constant oppression and struggling against oppression of different human experiences. This is why we believe that the RJ research program should be included in economics, and this is the relevance we identify in our contribution.

IMPACTS OF DEFORESTATION ON UNPAID CARE WORK FOR WOMEN IN THE BRAZILIAN AMAZONIA

3.1 Introduction

Case studies and anecdotal evidence indicate that women in Latin America (and elsewhere) suffer unique impacts from deforestation (e.g. Hardoy & Pandiella, 2009; Mello, 2014; Jat et al, 2016; Carino and Diniz, 2019). There are several channels through which deforestation impact women differently: lower supply of forest resources, for example, can decrease paid work opportunities for women who are occupied in the production of craft goods—a typical activity for women in forest areas—while smaller availability of firewood can lead women (and children, who are also commonly responsible for firewood pickup) to walk longer distances, potentially developing back problems from carrying weight (Buckingham-Hatfield, 2000; Koda, 2004). Deforestation is also associated with worse health outcomes for individuals in rural areas, with the spread of mosquito-transmitted diseases, less nutrition resulting from soil and water erosion, and food contamination (Confalonieri, 2000; Mainville et al, 2006; Lense et al, 2020; Oktan et al, 2022; Fletcher et al, 2023; Riquetti et al, 2023). If women workers depend on forest resources, deforestation can decrease the availability of paid work opportunities for women and their productivity overall; simultaneously, if the impacts of deforestation generate adverse health consequences, it is likely that the demand for unpaid care services—which are overwhelmingly performed by women—and the time necessary to perform those tasks increases.

However, deforestation can also increase paid employment opportunities for individuals in the short run. In fact, the short-run benefits of forest degradation and land-use change are frequently greater than the measurable benefits of forest preservation for rural households, especially in

developing countries (Barbier, 1997; Golub et al, 2021). This poses the questions: do women in forest areas increase their hours of unpaid care work when forest resources decrease? If so, is that mostly a consequence of the income effect (i.e., better paid employment opportunities for men allow women to decrease hours of paid work and increase unpaid work) or is it the result of increased demand and time necessary to perform unpaid care services?

To investigate the main research question and the corollary, we first explore the channels through which a decrease in forest resources can increase unpaid care work hours for rural women. We rely on a broad literature review to establish three different yet interconnected channels: the partner income channel, the own income channel, and the health and nutrition channel. From there, we create a set of testable hypotheses to identify if deforestation indeed increases the amount of unpaid care work for women, and which channels are likely driving this result. While the channels are applicable to forest areas in general, we limit our data analysis to the Brazilian Amazonia biome. This choice is motivated by the importance and uniqueness of this rainforest and also to take advantage of the reliable, satellite-generated dataset on deforestation available for the region (Valeriano et al, 2004). Brazil also conducts household-level surveys in the rural areas of Legal Amazonia since 2004, which allows for panel analysis.[23]

This essay is structured as follows. The next section presents the mechanisms behind the three channels connecting deforestation to an increase in women's unpaid care work, detailing each channel and its assumptions. Then, we present the two datasets used in our analysis, as well as some characteristics of our sample. We highlight some challenges associated with the household

[23] The Legal Amazon corresponds to the area of activity of the Amazon Development Superintendence (SUDAM), delimited in accordance with Article 2 of Complementary Law no. 124 signed on March 1st, 2007. The Legal Amazon was established with the goal of defining the geographical delimitation of the political region in which SUDAM operates, aiming the promotion of inclusive and sustainable development in the area and the competitive integration of the region in the national and international economy.

survey data, and how they shaped testable hypotheses that dialogue with our research question and corollary. Finally, we present our modelling strategies and results, followed by a concluding discussion section.

Our results indicate that higher deforestation is indeed associated with an increase in unpaid care work hours performed by women in rural areas, controlling for income, household size, cooking fuel, among other relevant controls. For men, on the other hand, deforestation is associated with a decrease in unpaid working hours. We see the opposite results for weekly hours of paid work: higher deforestation is associated with more paid working hours for men and less working hours for women. Overall, all three channels here outline seem to be relevant and partially explain the results we see, but our data analysis doesn't indicate which one is dominant.

3.2 Mechanisms

Relying on feminist economics, gender in the economy, and feminist political ecology literature, we identify three channels through which deforestation can be associated with an increase in unpaid care work hours for women: the partner income channel, the own income channel, and the health and nutrition channel. Starting with the partner income channel, the household time allocation choice here follows a traditional Beckerian logic, well discussed in gender in the economy literature.[24] Given the prevalence of traditional gender norms in rural and forest areas and also the gendered segregated control over land resources and agricultural inputs, this channel assumes that higher earnings opportunities that arise from deforestation disproportionally benefit men (Deji, 2011; Croppenstedt, Godlstein, and Rosas, 2013; Sommer,

[24] The word Beckerian refers to the ideas of economist Gary Becker and the school of thought known as the New Household Economics. For a critical presentation of Gary Becker's perspective on marriage and household dynamics compared with political economy and feminist approaches, see McCrate (1987).

Tasmin, and Shandra, 2021). Thus, the opportunity costs for each household member changes, leading women to increase their contribution to the household enterprise by increasing their hours of unpaid care, while household income increases (or at least doesn't decrease, if there is perfect substitution between the man's new income and the portion of income that the woman gives up).

In our data analysis, deforestation happens at the state level as an exogenous shock; our unit of analysis is the household, and no individual household can impact deforestation. Most deforestation is perpetrated due to large-scale businesses purposes, so households themselves do not contribute significantly to clear-cut deforestation (Barbier, 2019). However, they can increase their income if deforestation increases because such businesses can bring more commercial activities, services, and employment opportunities. The partner income channel implies that deforestation makes women and the household as a whole better-off in the short run due to the income increase that can arise from these opportunities, so that women choose to perform more unpaid care work either because that gives them more pleasure when compared to paid work or because the quality of care that they provide is higher (or perceived as higher) when compared to the alternatives: a different family or community member providing unpaid care (including the possibility of state or non-profit institution provision without out-of-pocket payment) or market provided care services.[25]

[25] Since Becker's model relies on standard mainstream assumptions, with rational individuals acting to maximize their utility and marriage being defined as a free-market contract, women choosing to increase their unpaid working hours necessarily means that they will be better-off—that conclusion depends on the assumption that people are perfectly altruistic in the household, so women don't lose bargaining power when decreasing their share of cash contribution to the household's income. However, feminist literature shows that these "choices" can be coerced, considering the prevalence of social stereotypes and women's unique hardships in the labor market (i.e., maybe women only have poor choices available, so it is not accurate to claim that women are better-off when in reality they might have moved to an equally poor situation). Moreover, the short-run perception of being better-off might fade over time, since being out of the labor force decreases their human capital and less individual income increases women's dependence on their partner, which can make them more vulnerable (Bergmann, 1981). Without minimizing the importance of this debate, we refrain from discussing these longer-term impacts on women's well-being, since we focus on the short-term impacts of deforestation in unpaid care work.

The very nature of care services frequently means that the quality of care as experienced by the care recipient depends on who is providing it, and market-provided alternatives for direct care provision tend to be worse substitutes when compared to unpaid or state-provided care services (Folbre, 2002; Folbre and Wright, 2012).[26] Doing an arts project with the help of your father is different than getting help from a babysitter, for example, and eating your grandmother's lasagna with your family is different than having a frozen, store-bought lasagna for dinner. When women's earnings are not high enough to hire high-quality market provided care services, or when high-quality market or community provided care services are not available—not an uncommon scenario for rural and forest areas—an increase in women's unpaid care work as a results of higher household income is more likely to occur.

The own income effect, on the other hand, necessarily decreases the well-being of women and the household as a whole. Highlighted by feminist political ecology literature, this channel describes the situations where women's incomes decrease as a result of deforestation, assuming that less forest resources decrease their productivity for both paid and unpaid work (i.e., the same activities take more time). Women's income can depend on availability of forest resources due to cultural practices of their communities, that rely on women's knowledge and labor to produce unique arts and crafts products (the example of women from the Tupama River in the Brazilian Amazon illustrates how the availability of forest resources coupled with well-designed development projects can be determinant to women's income and well-being; this experience is described in detail on Appendix C). Women are also commonly responsible for the production of food, alcoholic and non-alcoholic beverages, and medicinal products for trade, that depend on the

[26] Direct care provision refers to situations in which the care recipient is physically present when the care work is being provided. Indirect care provision, on the other hand, means that the care recipient is not physically present. For the arts project example, indirect care provision is when the father is buying stationary supplies so that he can better assist his child in the arts project, and direct care is when he is supervising and orienting his kid activity.

collection of wild-caught meat, fish, wild fruits, vegetables, poles, weaving materials, thatch, medicinal plants, firewood, and other inputs (Cavendish, 2000; Colfer, Elias, and Jamnadass, 2015; MacGregor, 2017). The rarer these inputs are, the more time it takes to find and extract them, decreasing production efficiency and women's earnings.

Unlike the partner income channel, this increase in women's unpaid care work hours is not out of choice but out of need. The production of arts and crafts, food, beverages, and medicinal products frequently involves a mix of subsistence and trade production, and more time spent on these activities also means more unpaid work hours. Further, a decrease in purchasing power can also mean more hours dedicated to the provision of indirect care goods and services: instead of buying water, food, clothes, and butane gas cylinder (the most common cooking fuel for Brazilian households both in rural and urban settings), now women will have to pick-up clean water from the well, grow and crop a larger share of their food, sew clothes, and rely on firewood as the main cooking fuel. Indirect care provision is more susceptible to replacement by market provided alternatives without substantial decreases in quality, so the own income channel promotes an increase in women's unpaid hours of work and a decrease in their well-being and the household's.

Assuming that men will not share the unpaid care work load and that women will not benefit from better earnings opportunities when deforestation occurs (i.e., assuming gender norms are persistent), if we observe deforestation being associated with more hours of unpaid care work provision, an increased household income would indicate that the partner income effect is dominant, a decrease in household income would indicate that the own income effect is dominant, while constant income would be dubious. If an increase in unpaid care provision is mostly through the provision of direct care, that would indicate that the partner income effect is dominant, while a larger increase in indirect care provision would indicate the prevalence of the own income effect.

Both channels are likely present simultaneously, however, so the impact on women's well-being can be dubious even with an increase in household income, given that the difference between direct and indirect care can be blurry, and a decrease in individual income can be associated with a decrease in women's well-being and bargaining power within the household especially when their spouse increase their earnings (Hartmann, 1981; Argawal, 1997).

Like the own income channel, the nutrition and health channel also decreases women's and the household's well-being. There are several mechanisms through which that can happen; we highlight three: the soil and water erosion mechanism, the mosquito transmitted diseases mechanism, and the cooking fuel mechanism. Around one billion people rely on wild foods to supplement their diets worldwide, and women are mostly responsible not only for the collection and preparation of the food, but also for providing care for individuals affected by malnutrition (Shackleton, Shackleton, and Shanley, 2011). Increases in malnutrition, sickness, and disability among family members increase the demand for care work, both paid and unpaid.

About the soil and water erosion mechanism, land use change from forest to annual agricultural or pasture area is associated with soil erosion and decreases in the soil organic carbon stock, which alters the pH, bulk density, texture, field capacity, wilting point and water holding capacity of the soil (Oktan et al, 2022). The fallout of soil erosion is a substantial reduction in biomass and grain production, with less arable areas for subsistence production and less nutritional crops (Pimental, 2006). Further, reduction in vegetation cover and crop residues resulting from deforestation can exacerbate soil erosion and have a cascading effect on soil degradation and desertification, while also changing the mineral composition of the soil; leaching of naturally occurring minerals can increase the levels of minerals such as mercury in fish and water, which is toxic for humans (Mainville et al, 2006; Hulkarni, 2021). Deforestation is also associated with water erosion, not

only decreasing the availability of fish and water-sourced foods, but also significantly altering hydrological processes (Lense et al, 2020). These changes are associated with water and fish contamination due to changes in sediment transportation, and intensification of droughts and floods (Sampaio et al, 2007; Riquetti et al, 2023).

The mosquito-transmitted diseases mechanism refers to the highly documented fact that deforestation is frequently followed by the proliferation of some mosquito species in the short run, particularly of the *Aedes* and *Anopheles* genus (Daszak, Cunningham, and Hyatt, 2001; Kessing et al, 2010; Gottdenker et al, 2014; Gibb et al, 2020; Fletcher et al, 2023). The *Aedes Aegypti* mosquito can transmit up to 25 diseases, the most common being dengue, yellow fever, chikungunya, and Zika, while *Anopheles* is the mosquito responsible for the transmission of malaria. These illnesses not only prevent an individual from performing paid work and cause short-term increases in the demand for care, but they can have longer-term consequences—such as liver problems, heart problems, and encephalitis—and even cause death.

Finally, the cooking fuel mechanism refers to the decreased availability of firewood as a result of deforestation, which leads to more time dedicated to firewood pick-up (an activity commonly performed by women and children) and longer distances traveled carrying weight, increasing the prevalence of spine damage and pregnancy complications (Anker, 1997; Kadota et al, 2020). A rich case study literature throughout low-and-middle-income countries associates the lack of firewood with the production of less nutritive meals, since most grains (such as beans and soy) take a long time to cook and firewood scarcity frequently means only one cooked meal a day (Agarwal, 1992; Santow, 1995; Buckinghan-Hatfield, 2000). Malnutrition, in turn, increases the incidences of anemia and pregnancy complications (Dyches & Rushing, 1996; Shen and Williamson, 1999).

The usage of fuels other than firewood for cooking and heating, such as agricultural crops and dung, is associated with impoverishment of health conditions due to the toxic smoke produced by the burn of such materials, and are not as efficient for cooking (Dankelman and Davidson, 1988; Katz and Monk, 1993; Buckingham-Hatfield, 2000). Firewood scarcity, therefore, increases the prevalence of diseases and malnutrition for individuals in rural areas, increasing women's hours of unpaid care work directly—through increasing time dedicated to firewood collection—and indirectly—through increased demand for care services due to illness, disability, and malnutrition of family members.

The soil and water erosion mechanism, the mosquito transmitted diseases mechanism, and the cooking fuel mechanism are not an exhaustive list of how deforestation can promote poor health and nutrition outcomes; we can think of mental health issues associated with the death of a loved one due to malaria, for example, or severe development consequences due to long periods of malnutrition. We chose to highlight soil and water erosion, mosquito-transmitted diseases, and firewood scarcity because they constitute three well-documented ways through which deforestation can increase the demand for care services, and they illustrate the interconnectedness among deforestation issues (e.g. a change in hydrological processes can facilitate the proliferation of *Aedes Aegypti* mosquitoes, since they lay their eggs on the water, and floods can intensify soil erosion and desertification).

Further, these three mechanisms likely impact own income and partner income as well, so we highlight that these mechanisms and channels are happening simultaneously. The separation and description of each channel is an analytical exercise to help us identify if there is one channel that is dominant (i.e., what is the net effect of deforestation on women's unpaid care work hours). A straight-forward economic analogy is the well-know evaluation of the impact of higher wages on

hours of work: we know that the income effect and the substitution effect are both present and moving in opposite directions, and we can estimate which is one is dominant based on the observable decision of time allocation by individuals. Here, the exercise is similar, yet significantly more complex given the channels described. A summary of the channels is presented in Figure 3.1 below.

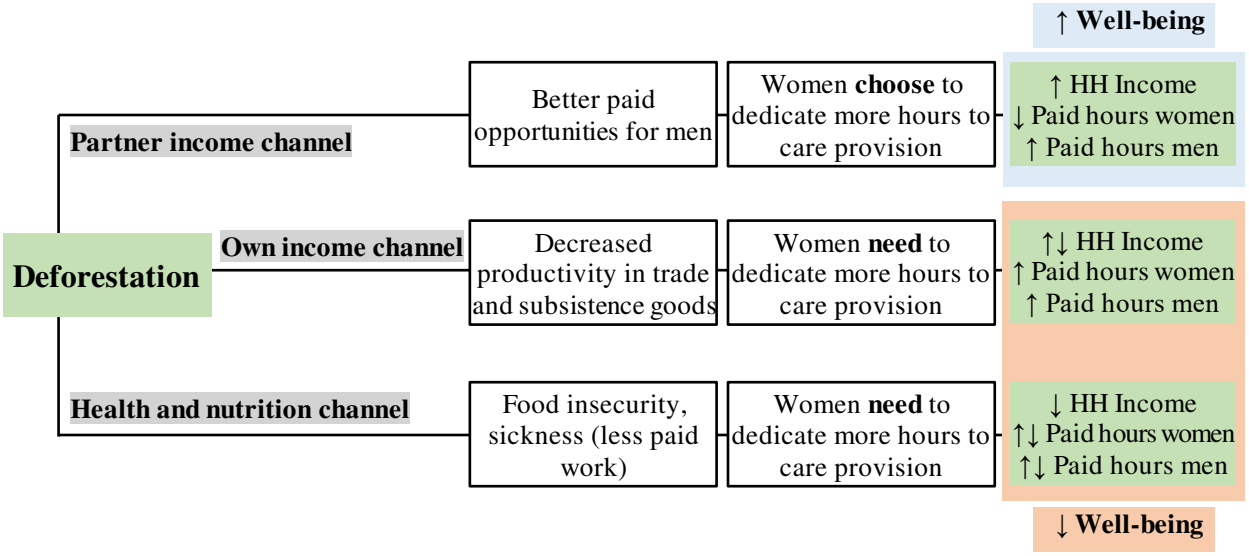

Figure 3.1. Mechanisms.

Source: own elaboration.

The three channels through which deforestation can relate to an increase in women's unpaid working hours here outlined characterize important possibilities that allow us to explore our research question and corollary, not the only channels through which that relationship can exist. Despite knowing this limitation, we argue that the proper identification and mensuration of these three channels is highly consequential, since it allows us to identify if the net impacts of deforestation for women in the short-run are likely to increase or decrease their well-being and the household's. If the partner income channel prevails, for example, there is an incentive for

deforestation promotion that complements the commonly documented short-term earnings incentives for rural households, which indicates a blind spot in forest preservation policy.

3.3 Modeling strategy

We aim to test if women who experience higher levels of deforestation do higher hours of unpaid care work when controlling for labor-saving technologies access, infrastructure development, and other characteristics that impact unpaid care work hours (like marriage and parental status). We approach our research question by using an ordinary least squares model, with hours of unpaid care work and hours of paid work as our dependent variables and gender, deforestation, and an interaction between gender and deforestation as our independent variables of interest. Given the channels described in Section 3.2, we control for household income and for cooking fuel (if firewood is used as the main cooking fuel or not); unfortunately, our dataset doesn't allow us to control for mosquito transmitted diseases nor soil and water erosion, but these variables are likely correlated with household income per capita. We also do not have data on the type of care work provided (if direct or indirect). We further control for household size and presence of other women in the household (by including a binary variable that equals one when the individual has a co-living mother or daughter).

Haussman tests indicate that a fixed effects modelling approach is preferred, and composite linear Wald tests show that year and regional fixed effects should be added to our regression (regional fixed effects are included by using the variable "control", described in Section 3.4.2 below, and capture regional time-invariant heterogeneity). A modified Wald test for groupwise heteroskedasticity in fixed-effects regressions identifies heteroskedasticity, so we include White-corrected robust standard errors. We also test standard errors clustered at the state level to allow

more variation, and the results are similar (the comparison between the random effects model and different specifications of fixed-effects models is shown in Appendix C, Table C.2 for women and unpaid work, Table C.3 for men and unpaid work, Table C.4 for women and paid work, and Table C.5. for men and paid work). Our regression is defined by Equation 3.1.

$$Y_i = \beta_0 + \beta_1 Defor_{it} + \beta_2 Gender_{it} + \beta_3 Defor * Gender_{it} + \gamma X_{it} + \theta_t + \theta_c + e_{it} \quad \textbf{(3.1)}$$

Where:

Y_{it} = Hours of unpaid care work or of paid work (ln)

$Defor_{it}$ = Deforestation (either in Km² or percentage)

$Gender_{it}$ = Binary variable for gender (either woman or man)

$Defor * Gender_{it}$ = Interaction term multiplying deforestation and gender

X_{it} = Vector of controls

θ_t = Time fixed-effects

θ_c = Regional fixed-effects

For the regressions where Y_{it} is hours of unpaid care work, if we find β_1, β_2 and β_3 different than zero and $\beta_3 > 0$ when $Gender$ equals one for women, our hypothesis is confirmed: deforestation is associated with higher hours of unpaid care work for women. When we run the regression with $Gender$ equals one for men, a lack of statistical significance or $\beta_3 \leq 0$ indicates that indeed gender roles are strict, and men don't engage in unpaid care work activities even if deforestation increases.

For regressions using hours of paid work as the dependent variable, β_1, β_2 and β_3 different than zero and $\beta_3 < 0$ when *Gender* equals one for women indicates that the partner income channel is the prevalent one, while $\beta_3 > 0$ implies that either the own income channel or the health and nutrition channel is dominant. When *Gender* equals one for men, β_1, β_2 and β_3 different than zero and $\beta_3 < 0$ suggests that the health and income channel is dominant; other results don't allow us to infer any conclusions, given that higher deforestation being associated with more hours of paid work for men is possible in all three channels here analyzed.

3.4 Data

Our analysis requires the merging of two datasets, one with information about deforestation and one with household- and individual-level data. Deforestation data was extracted from PRODES (Project to Monitor Deforestation in the Legal Amazon by Satellite), while household surveys were extracted from PNAD (National Household Sample Survey).

3.4.1 Deforestation Data

PRODES synthetizes satellite data on net deforestation by municipality in the Brazilian Legal Amazon captured by LANDSAT satellites. For each year of PRODES mapping, mosaics are generated in geotiff format where the original spatial resolution is 30x30 meters. After generating the annual mosaics, a TerraView System function is used to outline the pixels of each class mapped by PRODES within each municipality; then, this number of pixels per municipality is transformed into an area in Km², providing a reliable and precise dataset for deforestation.

We are interested in two measures: area deforested (Km²) and percentage of deforestation. Area deforested is directly provided by PRODES through the variable *incremento*, which measures

the annual increment in clear-cut deforestation within the Legal Amazonia. Clear-cut deforestation is defined as the total removal of forest cover in a short period of time, and is mostly associated with land use change: the forest cover gives places to agricultural, pasture, hydroelectrical, or urban use. It can be abandoned and start a regeneration process, but that is rare. For PRODES to identify clear-cut deforestation, the deforested area must measure at least 0.0625Km² (6.25ha). To calculate percentage of deforestation, we take *incremento* in year *t* for municipality *i* and divide by total forest coverage of municipality *i* in year *t-1*, i.e., we see how much forest cover was lost as a proportion of forest cover in the previous year for a given municipality.

3.4.2 Household survey data

PNAD is the most comprehensive, longest running household survey in Brazil. The rural areas of Rondônia, Acre, Amazonas, Roraima, Pará and Amapá—6 out of the 9 states that form the Legal Amazon area, together with Maranhão, Tocantins and Mato Grosso—were only included in the survey in 2004, so that's the earliest data available for our analysis. The data is presented at the state level, so the municipality-level data provided by PRODES had to be aggregated up to allow the merging of datasets.

The survey is conducted using two questionnaires: one asking about individual characteristics, and one asking about household characteristics. To nest individuals in households, the questionnaires provide a control, a series, and an individual number. The control number starts with two digits indicating the state (so we can infer in which state this person and household is), followed by six digits that indicate location; we know that people and households with the same control number are in the same area, but PNAD doesn't inform the size or geolocation of the area due to data privacy reasons. People with the same control and series number are people sharing a

household, so we used these numbers to map people inside households across the two questionnaires for a given year. We also used the control, series, and individual numbers to map people and households across time. That doesn't guarantee that we are looking at the same people and the same households across different years of the survey; instead, we are comparing a representative individual and a representative household of a specific area across time.

Starting in 2016, PNAD was discontinued and fully substituted by PNAD-C (National Household Sample Survey – Continuous). PNAD-C visits the same household five times in a given year, and each visit has one specific questionnaire. Questions about unpaid household work are part of the 5th visit questionnaire, which happens during the 4th trimester of the year; PNAD was conducted during the month of September every year in our sample, and since we are arguing that hours of unpaid care work depend on seasonal-changing environmental conditions, it can be problematic to compare hours of unpaid care work from PNAD (collected in September) with PNAD-C (collected in October, November, or December).[27] Further, the control, series, and individual numbers do not appear in PNAD-C; it uses a different set of codes to identify individuals and households across visits. Unlike PNAD, PNAD-C asks a number of questions regarding different activities of unpaid care work before asking weekly hours dedicated to these activities, which can lead to higher self-reported numbers of hours when compared to PNAD. For all these reasons, we only use data from PNAD, so our panel goes from 2004 to 2015 without data for 2010—it was a census year, so no household survey was conducted.

The panel is unbalanced, and there are several unanswered questions in most questionnaires, so the size of the sample varies depending on which variables we pick as part of the analysis. Using the matched method described above, we observe each individual an average of 2.8 times

[27] Both PNAD and PNAD-C ask the number of hours dedicated to unpaid care work in that week specifically.

throughout the 11 years of the panel. Given that sparseness, we didn't use moving averages or any other method to complete the missing data.

Since our research question and the mechanisms are focused on rural households, we dropped individuals living in urban areas out of our sample. Municipalities in Brazil have a big incentive to maximize the portion of land that is declared urban, since the territorial tax for urban properties is collected by the municipality itself while the rural property tax is collected by the federal government. PNAD tries to correct this issue by diving urban households in three categories: urbanized urban, non-urbanized urban, and isolated urban. We only dropped individuals living in urbanized urban household; 4 percent of our remaining observations are in non-urbanized urban areas, and less than 3 percent are in isolated urban areas.

3.4.3 Characteristics of the sample

Table 3.1 shows summary statistics for unpaid care work hours, paid work hours, household size, education, income, and deforestation (both total area and percentage of deforestation). Not surprisingly, women work more hours of unpaid care work than men (18.16 more hours a week, on average) and men work more paid hours when compared to women (17.25 more hours per week, on average). Note that the minimum amount of unpaid care work hours is zero, because we include people who declared they didn't perform any care work for the household; similarly, people who were unemployed or out of the labor force during the refence week are reported to work zero hours of paid work. We include the zeros to capture people who move from not performing (un)paid work to performing some amount of (un)paid work and vice-versa. When looking only at people who worked at least one hour of (un)paid work during the reference week,

the trends of women working more unpaid hours and men working more paid hours are kept, indicating strong gender roles (Appendix C, Table C.1).

Table 3.1. Summary statistics, women and men subsamples

			Women		
	mean	Sd	max	min	Count
Unpaid care work hours	23.25	15.24	98	0	68,828
Paid work hours	12.09	16.46	98	0	68,828
HH Size	4.93	2.29	19	1	88,910
Education (years)	5.03	4.05	17	1	89,023
HH wage bracket	2.18	1.20	7	0	88,928
Deforestation (km2)	17.4432	18.2936	73.9250	0.2396	89,023
Deforestation (%)	0.0080	0.0088	0.0401	0.0002	89,023
			Men		
	mean	sd	max	min	Count
Unpaid care work hours	5.09	7.21	98	0	79,940
Paid work hours	29.33	20.13	99	0	79,940
HH Size	4.84	2.37	19	1	101,381
Education (years)	4.54	3.73	17	1	101,488
HH wage bracket	2.25	1.23	7	0	101,386
Deforestation (km2)	17.4224	18.2552	73.9250	0.2396	101,488
Deforestation (%)	0.0079	0.0088	0.0401	0.0002	101,488

Source: PNAD, 2004-2015.

Our summary statistics show some expected trends: women are more educated than men on average (despite the very low average years of education for both genders), and tend to live in households with less income. PNAD divides household income per capita in eight brackets, and bracket two corresponds to per capita income between ¼ and ½ of the national minimum wage; bracket three is up to one minimum wage. So, the average household in our sample is living in poverty—since the income is per capita, the very low income bracket is partially explained by the large average household size of our sample. The data shows other important markers of poverty: 30 percent of individuals are illiterate, 18.5 percent don't have access to electricity, and only 20.45 percent live in a household connected to a sewage system. Such statistics are highly correlated

with geographical isolation: almost 75 percent of our sample lives in what is classified as an isolated rural area, meaning that the closest neighbor is at least 50m (164 feet) away.

The period of 2004-2015 is overall characterized by decreasing deforestation, but 20.67 percent of observations in our sample see deforestation increasing (i.e., a larger percentage of forest was clear-cut when compared to the previous year in the state where they live). A slightly smaller share of observations increased their amount of paid working hours when compared to a previous year: 16.21 percent. We also observe a decrease in the average number of hours dedicated to unpaid care work, with only 16.87 percent of our sample showing an increase in unpaid work hours when compared to the previous year. This trend mimics what we observe worldwide; the development of labor-saving technologies arrives slowly in poor households of periphery countries, but makes large impacts in terms of hours of unpaid household work (Barret and Browne, 1994; Ferrant and Thim, 2019). The period of 2004-2012 was also marked by significant improvements in Brazil's infrastructure, particularly on transportation and electricity, with increasing infrastructure investment as a share of GDP (Puga and Pereira, 2016). Social and physical infrastructure development tends to have gendered impacts, with women disproportionally benefiting from new paid employment opportunities and decreasing hours of unpaid care responsibilities (Agénor and Agénor, 2014; Lei, Desai, and Vanneman, 2019; Zacharias et al, 2019; Small and van der Meulen Rodgers, 2023).

3.5 Results

We start by testing our main research question: do women in forest areas increase their hours of unpaid care work when forest resources decrease? Using weekly hours of unpaid care work as our dependent variable, results from Table 3.2, Regression 1 indicate that, at the 1% level, we

reject the null hypothesis that the β_1, β_2 and β_3 are zero and observe $\beta_3 > 0$, so higher levels of deforestation are indeed associated with more hours of unpaid care work for women. Since Regression 1 shows a negative coefficient for deforestation but positive coefficient when the term is interacted with gender, we infer that higher levels of deforestation are associated with less hours of unpaid care work for men. Regression 2 shows no statistical significance for the interaction term, so percentage of deforestation (how much forest cover was lost as a proportion of last year's forest cover) seems to matter more than how many kilometers of forest cover were lost. Finally, the added controls behave as expected: larger households and presence of mother or daughter decrease the hours of unpaid household work for an individual (the workload is shared), and more hours of paid work are associated with less hours of unpaid care work.

Table 3.2. Impact of deforestation on time of unpaid domestic work (ln) for men and women

	(1) Women and deforest (%)	(2) Women and deforest (km2)
Deforestation (%)	-4.913***	
	(0.736)	
Deforestation (km2)		-0.001**
		(0.000)
Gender (W=1)	0.833***	0.863***
	(0.009)	(0.010)
Deforestation*Gender	4.396***	
	(0.723)	
Deforestation (km2)*Gender		0.000
		(0.000)
HH Size	-0.013***	-0.013***
	(0.002)	(0.002)
Cooking fuel (Firewood=1)	-0.003	-0.004
	(0.008)	(0.008)
HH Income (ln)	-0.001	-0.001
	(0.001)	(0.001)
Co-living mother or daughter (Y=1)	-0.056***	-0.055***
	(0.008)	(0.008)
SE	Robust	Robust
Time FE	Yes	Yes
Regional FE	Yes	Yes
Intercept	Yes	Yes
N	102,569	102,569

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Now we can move on to explore the next research question: Is it the partner income channel, the own income channel, or the health and nutrition channel that mostly explains the increase in women's unpaid work hours when deforestation increases? To explore this question, we use the same modeling strategy described in Equation 3.1 and the same controls—household

size, income, if firewood is the main cooking fuel, and if there is a mother our daughter co-living—but with weekly hours of paid work (ln) as our dependent variable.

Results from Table 3.3 indicate that an increase in deforestation is associated with a net decrease in women's weekly hours of paid work, while an increase in deforestation is associated with an increase in the amount of paid working hours per week for men. This suggests the prevalence of either the partner income channel or health and nutrition channel. The negative coefficient of the cooking fuel binary variable indicates that individuals living in household in which firewood is the main cooking fuel dedicate less hours to paid work on average, which suggests that indeed the health and nutrition channel is present. Firewood can also be a proxy for geographical isolation, where there is less availability of paid employment opportunities and the line between subsistence production and trade productions is more blurred. Table 3.3 also shows that household size is associated with more hours of paid work, while in Table 3.2 we observed that bigger households correlate with less hours of unpaid work on average; this might indicate the presence of children who contribute to unpaid household care, but do not exercise paid employment.

Table 3.3. Impact of deforestation on time of paid work (ln) for men and women

	(1) Women and deforest (%)	(2) Women and deforest (km2)
Deforestation (%)	2.828***	
	(0.511)	
Deforestation (km2)		0.000
		(0.000)
Gender (W=1)	-0.480***	-0.502***
	(0.010)	(0.011)
Deforestation*Gender	-3.615***	
	(0.718)	
Deforestation (km2)*Gender		-0.001
		(0.000)
HH Size	0.007***	0.007***
	(0.001)	(0.001)
Cooking fuel (Firewood=1)	-0.063***	-0.062***
	(0.008)	(0.008)
HH Income (ln)	0.000	0.000
	(0.001)	(0.001)
Co-living mother or daughter (Y=1)	-0.048***	-0.049***
	(0.013)	(0.013)
SE	Robust	Robust
Time FE	Yes	Yes
Regional FE	Yes	Yes
Intercept	Yes	Yes
N	93,468	93,468

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

3.6 Conclusion

Our results indicate that deforestation is associated with an increase in the amount of unpaid care work performed by women in the rural areas of the Brazilian Amazonia, while it is associated with a decrease in men's time of unpaid care work for the household. For paid work, on the other hand, deforestation is associated with an increase in the amount of paid work performed by men,

while the amount of paid work performed by women decreases. Taken together, the results show a time-poverty impact of deforestation: a 1 percent increase in deforestation is associated with a 4.4 percent increase in women's time of unpaid work per week, *ceteris paribus*, and a 3.6 percent decrease in women's time of paid work, *ceteris paribus*; for the average women, that is one extra hour of unpaid work per week, and 26 minutes less paid work per week (using the means from Table 3.1). For the average men, a 1 percent increase in deforestation is associated with a 4.9 percent decrease in time of unpaid work per week, *ceteris paribus*, and a 2.8 percent increase in time of paid work, *ceteris paribus*; for the average men, we see a 15 minute decrease in unpaid work per week, and a 49 minutes increase in paid work per week. In our sample, a one percent increase in deforestation is associated with a 34 minute increase in the total hours worked by women and men (summing paid and unpaid work) per week, everything else hold constant.

Regarding which channel is driving this result, we find evidence that all channels outlined in Section 3.2 can be present, but no conclusive results to infer which channel is dominant. Rather than providing a definitive conclusion, this essay proposes the beginning of a research agenda, advancing that the correct identification of these mechanisms have important public policy and gender equality implications. Total hours of paid and unpaid care work are associated with changes in women's and household's wellbeing, and the impact of deforestation on time-use is frequently less explored than the income and fertility impacts. This has the potential to expand public policy design aiming forest preservation, that should consider measures of well-being beyond income that change rural household's incentives towards environmental preservation.

If more granular household-level data becomes available, allowing for the identification of how close a household is to a deforestation shock, casual inference methods can be applied to illuminate how women respond to higher deforestation shocks in terms of time use. Such

advancement would also allow for the observation of possible heterogeneity among different communities—given the significant diversity among groups within the Brazilian Amazonia. Various modelling strategies seeking to identify which channel is dominant should also be encouraged, such as principal component analysis. Overall, there is much to be explored in this research agenda; this essay is a contribution to this much-needed debate.

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APPENDIX A

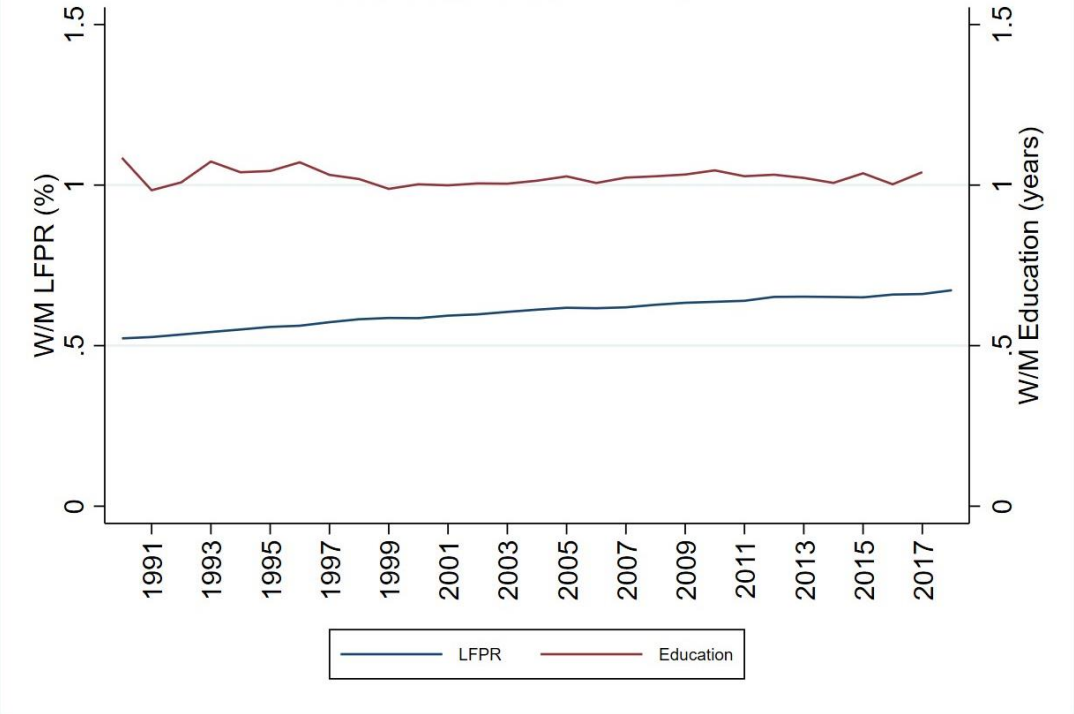


Figure A1. Women's relative labor force participation rate and median years of education. All countries.

Source: UN-ECLAC 2023

Table A1. Gender representation by occupation. All countries.

	Women's share of employment (%)	% of Total Employment		Share of Good Jobs (%)		
		Men	Women	Men	Women	W/M
Service and market sales workers	60	14	28	57	3	5
Clerks	57	6	11	83	59	70
Elementary occupations	53	16	24	15	3	19
Professionals	51	9	12	97	95	98
Technicians	42	9	9	95	77	80
Senior officials/owners	37	6	4	95	79	84
Others	31	0	0	49	20	41
Skilled agricultural	30	1	0	46	65	142
Machine operators	22	14	4	85	8	9
Craft workers	17	26	9	54	4	8

Source: Own elaboration based on Arora, Braunstein and Seguino (2023)

Table A2. Gender representation by sector. All countries.

	Women's share of employment (%)	% of Total Employment		Share of Good Jobs (%)		
		Men	Women	Men	Women	W/M
1. Industrial sector		**36**	**15**	**61**	**22**	**36**
1.1 Manufacturing Sector		18	14	70	19	27
1.1.1 High-Tech Manufacturing		6	2	93	57	61
1.1.1.1 Basic chemicals & chemical products	34	1	1	87	65	74
1.1.1.2 Coke, petroleum & nuclear fuel	18	0	0	95	84	89
1.1.1.3 Metals, fabricated metal, machinery, vehicles, transport equipment	16	4	1	94	53	56
1.1.2 Other manufacturing industries		12	12	57	12	21
1.1.2.1 Textile & wearing apparel	71	2	7	49	7	14
1.1.2.2 Food, beverage, tobacco	39	4	4	68	15	21
1.1.2.3 Leather, footwear, wood, paper, rubber, plastic, furniture	27	5	2	55	18	32
1.1.2.4 Minerals & mineral products	14	1	0	42	30	72
1.1.3 Non-Manufacturing Industrial Sector		18	1	52	62	119
1.1.3.1 Utilities (gas, water, electricity, sanitation recycling)	19	1	1	72	56	78
1.1.3.2 Mining & quarrying	10	1	0	76	63	83
1.1.3.3 Construction	3	15	1	49	66	135
2. Services		**64**	**85**	**69**	**34**	**49**
2.1 Market Services		51	61	64	18	28
2.1.1 Trade activities		28	30	52	14	26
2.1.1.1 Hotels & Restaurants	58	3	8	44	8	19
2.1.1.2 Retail trade & repairs; household office & computing goods	51	15	23	39	9	24
2.1.1.3 Wholesale trade	29	3	2	81	49	61
2.1.1.4 Sale, maintenance, motor vehicle parts and repair, automotive fuel	10	5	1	71	60	85
2.1.2 Transport & travel services		9	1	79	69	87
2.1.2.1 Cargo handling & storage, transport services, travel agencies	21	1	0	51	76	148
2.1.2.2 Land, water & air transport	6	9	1	83	66	79

(Continues on the next page)

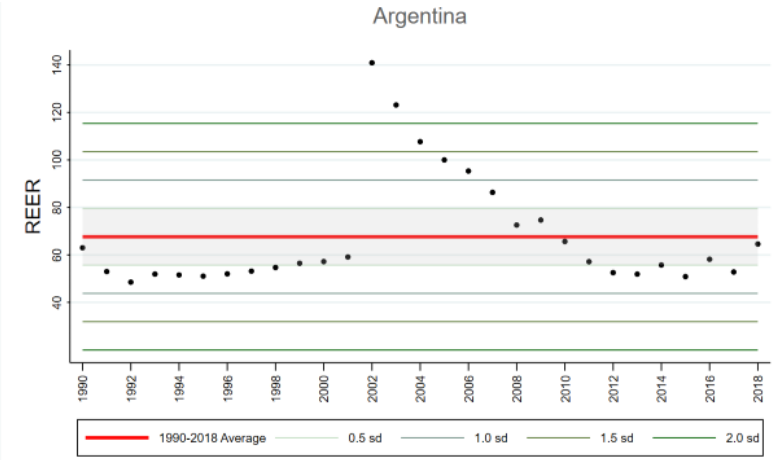
2.1.3 FIRE services		10	9	86	64	74
2.1.3.1 Financial intermediation, insurance	47	2	2	98	96	98
2.1.3.2 Membership & International organizations	45	1	1	73	39	52
2.1.3.3 Professional, business, administrative services, R&D	39	5	4	82	52	64
2.1.3.4 Publishing, software consultancy, database activities; post & teleco	33	2	2	91	62	68
2.1.3.5 Real estate services	30	1	0	84	65	77
2.1.4 Community & domestic services		4	21	45	3	8
2.1.4.1 Domestic services	93	1	15	15	0	1
2.1.4.2 All personal services	74	1	4	40	4	9
2.1.4.3 Entertainment & recreation activities; rental transport & other goo	35	2	1	60	38	62
2.2 Non-Market Services		13	24	89	73	83
2.2.1 Education & healthcare		6	18	90	72	80
2.2.1.1 Healthcare, veterinary & social services	72	2	7	90	67	75
2.2.1.2 Education	70	4	10	90	75	83
2.2.2 Public administration	36	6	4	89	83	93

Source: Own elaboration based on Arora, Braunstein and Seguino (2023)

Table A3. Full model, continuous, with covariates.

	(1) Men's Share	(2) Women's Share	(3) W/M Ratio
0.5 >= Depreciation < 1	-0.003	0.002	0.001
	(0.015)	(0.010)	(0.025)
1 >= Depreciation < 1.5	-0.029*	0.008	0.034*
	(0.015)	(0.008)	(0.016)
1.5 >= Depreciation < 2	-0.028**	-0.000	0.016
	(0.010)	(0.005)	(0.013)
Depreciation >= 2	-0.028**	0.012***	0.043***
	(0.010)	(0.004)	(0.012)
0.5 >= Appreciation < 1	-0.004	0.014	0.022
	(0.016)	(0.011)	(0.023)
1 >= Appreciation < 1.5	-0.041**	0.007	0.040*
	(0.018)	(0.011)	(0.021)
1.5 >= Appreciation < 2	-0.019	0.014**	0.035*
	(0.012)	(0.006)	(0.018)
Appreciation >= 2	-0.000	-0.002	-0.005
	(0.009)	(0.005)	(0.011)
Manufacturing X/M	-0.079	-0.000	0.041
	(0.075)	(0.024)	(0.087)
GFCF/GDP	-0.002	-0.001	-0.001
	(0.004)	(0.001)	(0.005)
Industrial Productivity	0.001*	-0.000	-0.001
	(0.000)	(0.000)	(0.000)
Financial Openness	-0.121**	-0.026	0.050
	(0.047)	(0.029)	(0.066)
W/M Education	0.005	0.702***	1.079*
	(0.454)	(0.218)	(0.569)
Industrial Productivity 2	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Inward FDI/GFCF	0.034	0.021	0.029
	(0.040)	(0.013)	(0.027)
W/M LFPR	0.138	0.229*	0.312
	(0.200)	(0.107)	(0.289)
Fertility	0.111**	0.028	-0.020
	(0.045)	(0.036)	(0.075)
N	277	277	277
Country FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Controls	Full	Full	Full

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$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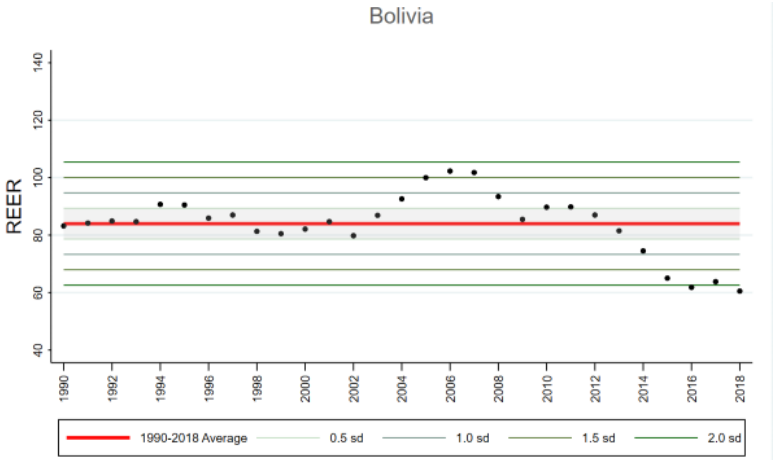
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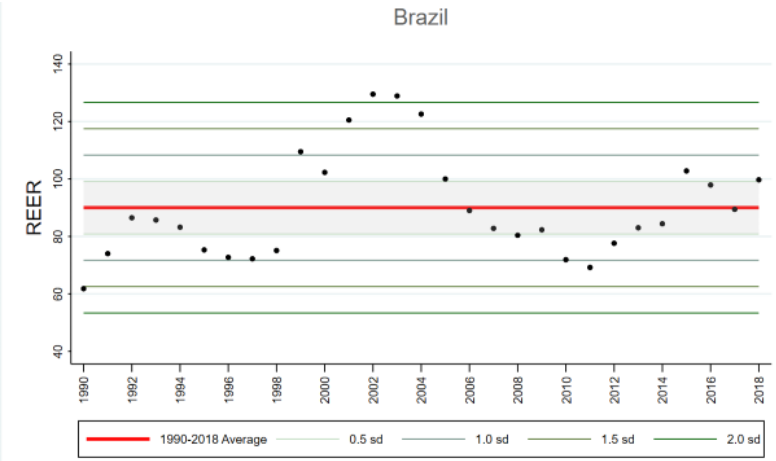
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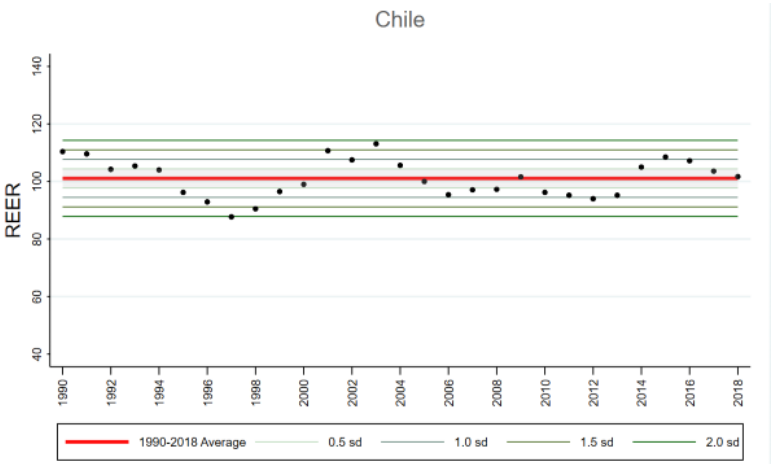
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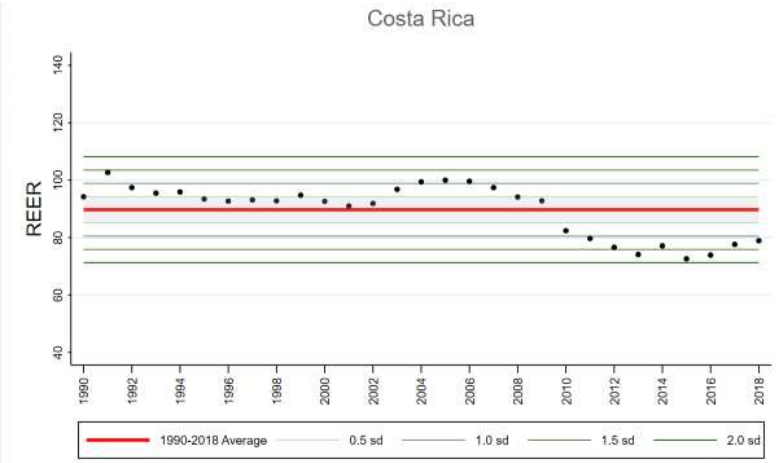
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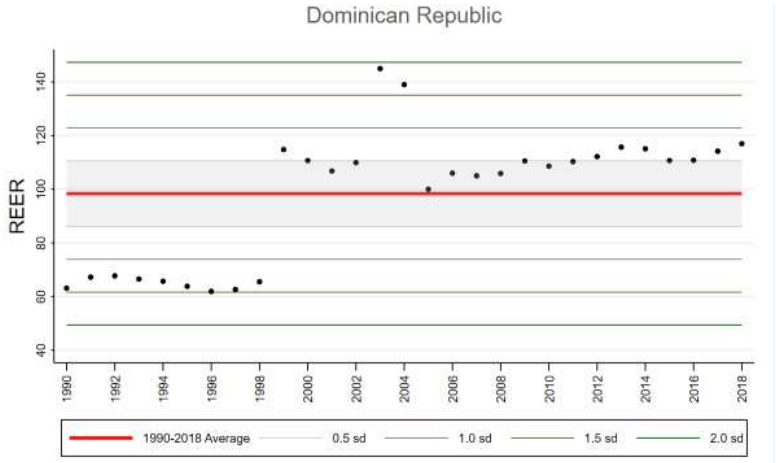
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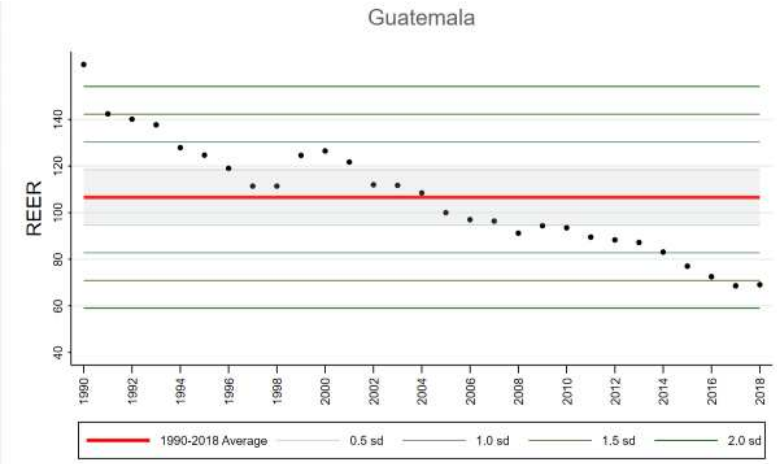
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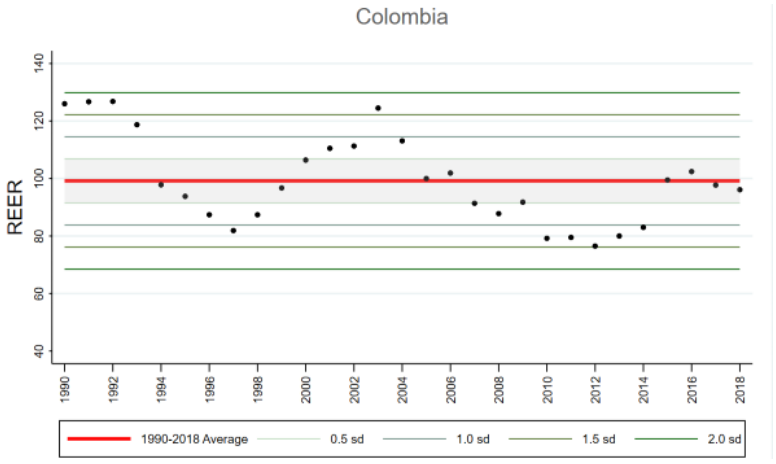
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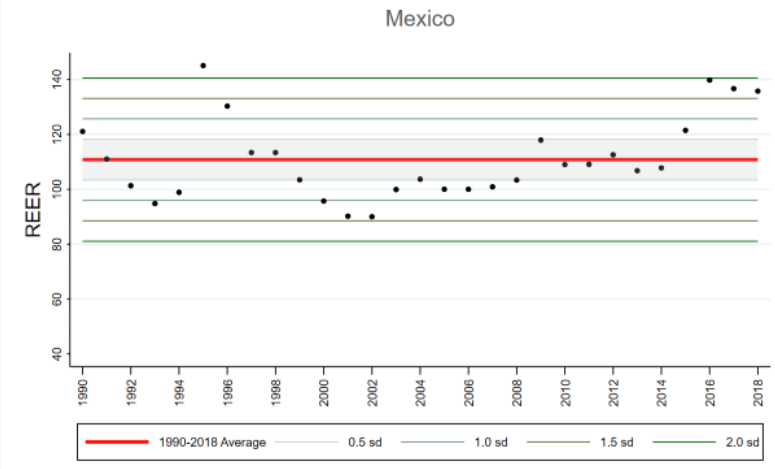
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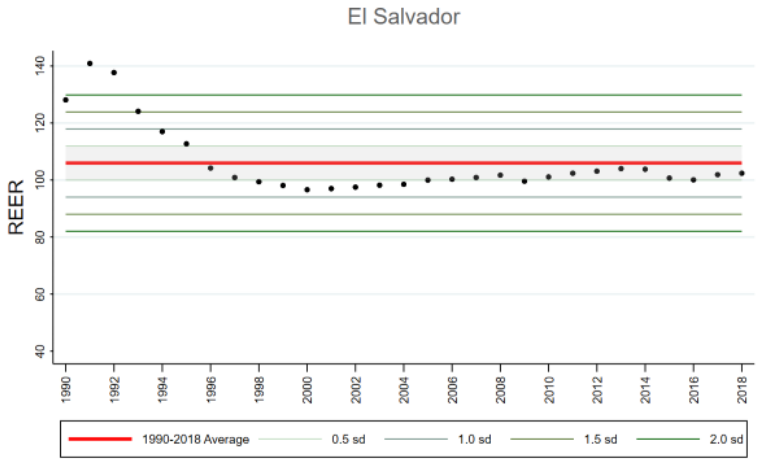
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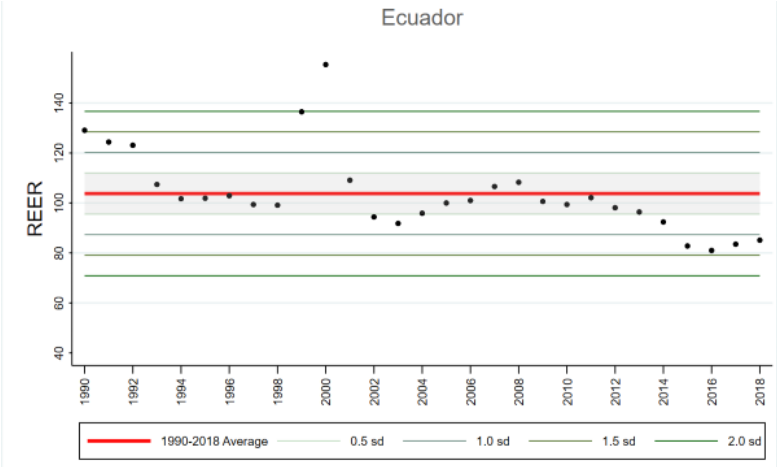
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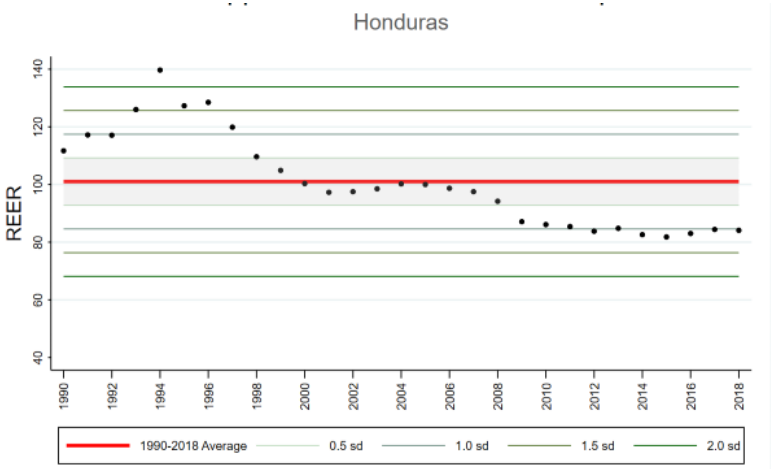
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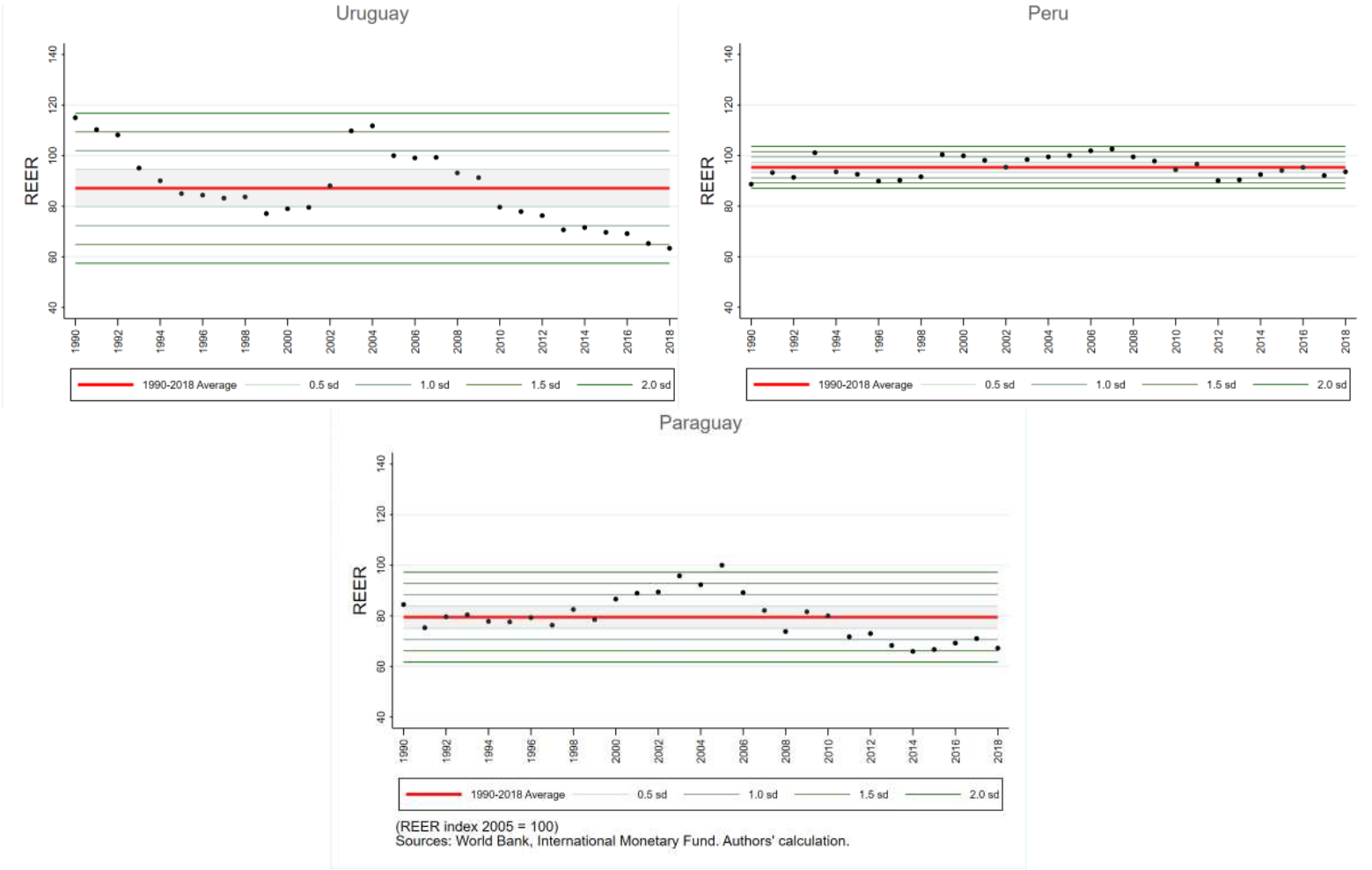

Figure A2. REER shocks by country.

Source: Own elaboration based on ECLAC-CEPALSTAT 2023

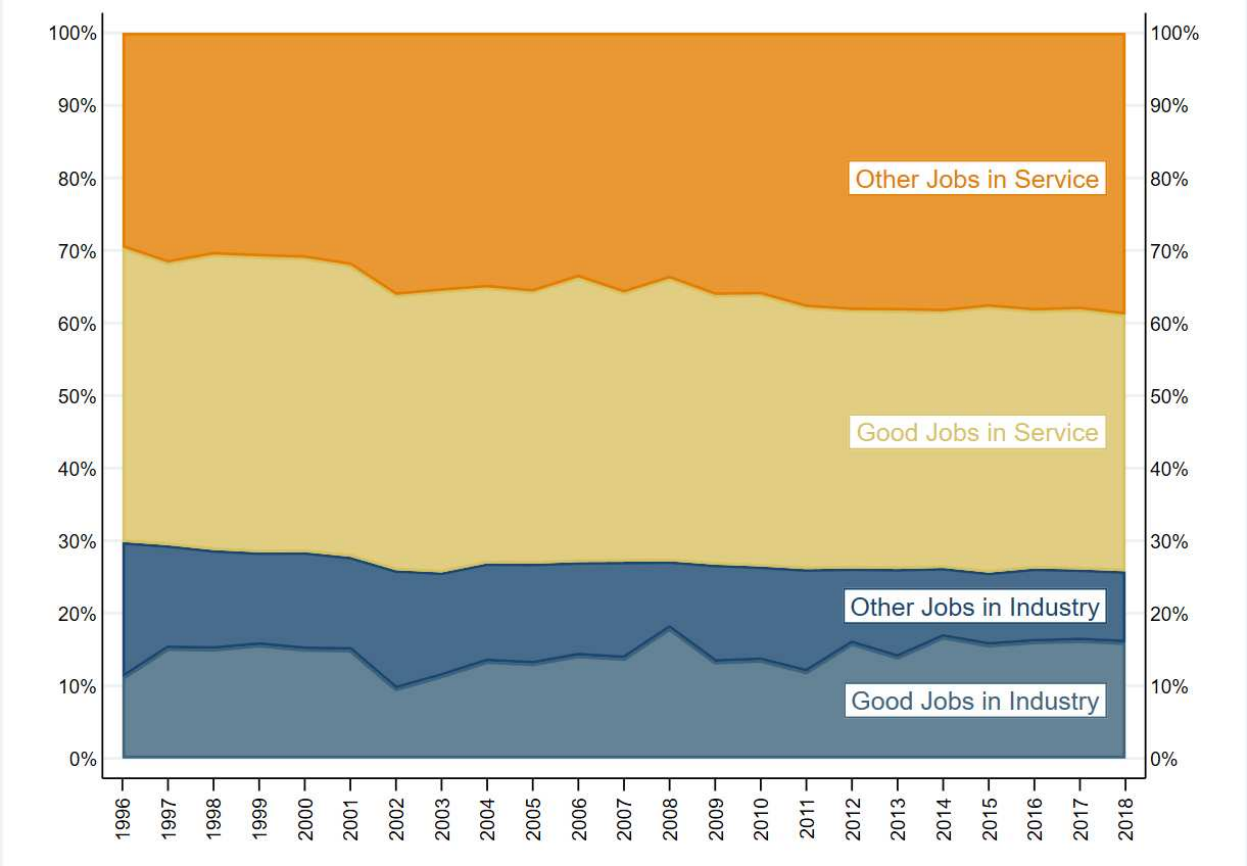

Figure A3. Distribution of Jobs in Latin America by Broad Sector and Quality, All Countries.

Source: Own elaboration based on Arora, Braunstein and Seguino (2023).

Note: Weighted average for Latin America based on the size of each country's labor force. "Good Jobs" are those within each sector that pay at least the national medium wage, as defined by Equation (1); "Other Jobs" are the remaining ones.

Figure A4. Total Number of Good Jobs by Gender in Latin America, All Countries.

Source: Own elaboration based on Arora, Braunstein and Seguino (2023).

Note: Weighted average for Latin America based on the size of each country's labor force. "Good Jobs" are those within each sector that pay at least the national medium wage, as defined by Equation (1)

APPENDIX B

Tables 1B: Models in Different Specifications with Different Control Groups.

Tables 1B.1 to 1B.6 are regressions with "contaminated" control groups. The treatment is either appreciation or depreciation, so the control group for appreciation shocks is no shock plus depreciation shocks observations, while the control group for depreciation shocks is no shock plus appreciation shocks observations. All shocks are continuous (meaning that the size of the dose matters). For practical purposes, we only report the coefficient of the shocks, and the controls used in each specification are reported on the table.

- Controls in parsimonious (basic) model:
    - Supply-side control: women's mean years of education as a proportion of men's
    - Demand-side controls:
        - Investment (gross fixed capital formation as a share of GDP)
        - International trade of manufacturing (manufacturing exports over manufacturing imports)
        - Industrial productivity (ratio between real industrial output and industrial employment)
        - Financial Openness Index (Chinn and Ito 2008)
- Additional supply-side controls (added to the supply model):
    - Average fertility
    - Women's labor force participation rate as a proportion of men's
- Additional demand-side controls (added to the demand model):
    - Productivity squared

    - Foreign investment (inward foreign direct investment as a proportion of gross fixed capital formational)
- The full model includes all controls.

Table 1B.7 shows that the results are quite consistent, indicating that the impact of REER shocks is robust even when the control group is not well defined—an important feature, since the nature of REER data doesn't allow us to identify periods with no REER shocks as pre-treatment trends.

Tables 1B.8 to 1B.10 show how the different model specifications behave when the treatment is defined as any shocks bigger than one standard deviation (instead of half of a standard deviation, as defined in the main model). Small REER shocks are never statistically significant and present very high variance in our sample. Table 1B.11 shows that the results of this model are consistent with the ones discussed in the paper.

Table 1B.1. Appreciation Shocks and Men's Good Job Share, Continuous REER.

	(1) Parsimonious	(2) Supply	(3) Demand	(4) Full	(5) Full no tFE
0.5 >= Appreciation < 1	-0.021	-0.001	-0.021	0.002	-0.006
	(0.022)	(0.020)	(0.021)	(0.019)	(0.015)
1 >= Appreciation < 1.5	-0.054***	-0.041**	-0.052***	-0.040**	-0.052***
	(0.014)	(0.018)	(0.015)	(0.018)	(0.015)
1.5 >= Appreciation < 2	-0.027*	-0.017	-0.023	-0.017	-0.020
	(0.014)	(0.012)	(0.014)	(0.012)	(0.012)
Appreciation >= 2	-0.010	-0.000	-0.004	0.000	0.004
	(0.008)	(0.008)	(0.009)	(0.010)	(0.007)
Country FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	No
Controls	Basic	Supply	Demand	Full	Full

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1B.2. Appreciation Shocks and Women's Good Job Share, Continuous REER.

	(1) Parsimonious	(2) Supply	(3) Demand	(4) Full	(5) Full no tFE
0.5 >= Appreciation < 1	0.009	0.014	0.007	0.012	0.012
	(0.009)	(0.010)	(0.010)	(0.010)	(0.010)
1 >= Appreciation < 1.5	0.005	0.007	0.006	0.007	0.002
	(0.011)	(0.011)	(0.011)	(0.011)	(0.009)
1.5 >= Appreciation < 2	0.010	0.013*	0.013*	0.014*	0.010*
	(0.006)	(0.006)	(0.007)	(0.007)	(0.005)
Appreciation >= 2	-0.005	-0.003	-0.000	-0.001	-0.005
	(0.006)	(0.006)	(0.005)	(0.006)	(0.004)
Country FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	No
Controls	Basic	Supply	Demand	Full	Full

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1B.3. Appreciation Shocks and Women's Relative Good Job Share (W/M), Continuous REER.

	(1) Parsimonious	(2) Supply	(3) Demand	(4) Full	(5) Full no tFE
0.5 >= Appreciation < 1	0.025	0.019	0.022	0.015	0.020
	(0.023)	(0.023)	(0.022)	(0.022)	(0.020)
1 >= Appreciation < 1.5	0.047**	0.040*	0.047**	0.040*	0.042**
	(0.018)	(0.020)	(0.018)	(0.021)	(0.017)
1.5 >= Appreciation < 2	0.032*	0.033*	0.033*	0.034*	0.031*
	(0.018)	(0.017)	(0.018)	(0.018)	(0.016)
Appreciation >= 2	-0.006	-0.006	-0.003	-0.004	-0.013
	(0.013)	(0.011)	(0.013)	(0.012)	(0.012)
Country FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	No
Controls	Basic	Supply	Demand	Full	Full

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1B.4. Depreciation Shocks and Men's Good Job Share, Continuous REER.

	(1) Parsimonious	(2) Supply	(3) Demand	(4) Full	(5) Full no tFE
0.5 >= Depreciation < 1	0.013	0.002	0.013	0.005	0.010
	(0.014)	(0.014)	(0.014)	(0.014)	(0.015)
1 >= Depreciation < 1.5	-0.026*	-0.027	-0.023*	-0.026	-0.017
	(0.014)	(0.016)	(0.013)	(0.015)	(0.014)
1.5 >= Depreciation < 2	-0.019**	-0.026**	-0.020**	-0.027**	-0.017
	(0.008)	(0.010)	(0.008)	(0.010)	(0.010)
Depreciation >= 2	-0.029**	-0.028**	-0.029**	-0.029**	-0.029***
	(0.012)	(0.010)	(0.012)	(0.011)	(0.009)
Country FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	No
Controls	Basic	Supply	Demand	Full	Full

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1B.5. Depreciation Shocks and Women's Good Job Share, Continuous REER.

	(1) Parsimonious	(2) Supply	(3) Demand	(4) Full	(5) Full no tFE
0.5 >= Depreciation < 1	-0.001	-0.003	-0.002	-0.002	-0.002
	(0.010)	(0.010)	(0.011)	(0.010)	(0.008)
1 >= Depreciation < 1.5	0.002	0.005	0.004	0.006	0.007*
	(0.006)	(0.007)	(0.005)	(0.007)	(0.004)
1.5 >= Depreciation < 2	-0.002	-0.002	-0.002	-0.001	0.000
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)
Depreciation >= 2	0.011**	0.011**	0.011**	0.011**	0.012***
	(0.005)	(0.004)	(0.005)	(0.004)	(0.003)
Country FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	No
Controls	Basic	Supply	Demand	Full	Full

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1B.6. Depreciation Shocks and Women's Relative Good Job Share (W/M), Continuous REER.

	(1) Parsimonious	(2) Supply	(3) Demand	(4) Full	(5) Full no tFE
0.5 >= Depreciation < 1	-0.015	-0.013	-0.014	-0.011	-0.014
	(0.020)	(0.023)	(0.019)	(0.022)	(0.021)
1 >= Depreciation < 1.5	0.020	0.027	0.022*	0.028*	0.023**
	(0.013)	(0.015)	(0.012)	(0.015)	(0.010)
1.5 >= Depreciation < 2	0.008	0.013	0.008	0.014	0.009
	(0.011)	(0.012)	(0.011)	(0.012)	(0.012)
Depreciation >= 2	0.044**	0.042***	0.044**	0.043***	0.045***
	(0.015)	(0.012)	(0.016)	(0.012)	(0.011)
Country FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	No
Controls	Basic	Supply	Demand	Full	Full

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1B.7. Comparison Between Main Model and Models with Contaminated Control Groups, Full Specification.

	(1) Men's Share	(2) Women's Share	(3) W/M Ratio	(4) Men's Share	(5) Women's Share	(6) W/M Ratio	(7) Men's Share	(8) Women's Share	(9) W/M Ratio
0.5 >= Depreciation < 1	0.005	-0.002	-0.011				-0.003	0.002	0.001
	(0.014)	(0.010)	(0.022)				(0.015)	(0.010)	(0.025)
1 >= Depreciation < 1.5	-0.026	0.006	0.028*				-0.029*	0.008	0.034*
	(0.015)	(0.007)	(0.015)				(0.015)	(0.008)	(0.016)
1.5 >= Depreciation < 2	-0.027**	-0.001	0.014				-0.028**	-0.000	0.016
	(0.010)	(0.005)	(0.012)				(0.010)	(0.005)	(0.013)
Depreciation >= 2	-0.029**	0.011**	0.043***				-0.028**	0.012***	0.043***
	(0.011)	(0.004)	(0.012)				(0.010)	(0.004)	(0.012)
0.5 >= Appreciation < 1				0.002	0.012	0.015	-0.004	0.014	0.022
				(0.019)	(0.010)	(0.022)	(0.016)	(0.011)	(0.023)
1 >= Appreciation < 1.5				-0.040**	0.007	0.040*	-0.041**	0.007	0.040*
				(0.018)	(0.011)	(0.021)	(0.018)	(0.011)	(0.021)
1.5 >= Appreciation < 2				-0.017	0.014*	0.034*	-0.019	0.014**	0.035*
				(0.012)	(0.007)	(0.018)	(0.012)	(0.006)	(0.018)
Appreciation >= 2				0.000	-0.001	-0.004	-0.000	-0.002	-0.005
				(0.010)	(0.006)	(0.012)	(0.009)	(0.005)	(0.011)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Full	Full	Full	Full	Full	Full	Full	Full	Full

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1B.8. REER Shocks >= 1 s.d. and Men's Good Job Share.

	(1) Parsimonious	(2) Supply	(3) Demand	(4) Full	(5) Full no tFE
1 >= Depreciation < 1.5	-0.029*	-0.028*	-0.027*	-0.028*	-0.021
	(0.014)	(0.016)	(0.014)	(0.015)	(0.013)
1.5 >= Depreciation < 2	-0.020**	-0.026**	-0.021**	-0.027**	-0.018*
	(0.008)	(0.010)	(0.008)	(0.010)	(0.009)
Depreciation >= 2	-0.027**	-0.027**	-0.028**	-0.028**	-0.028***
	(0.012)	(0.010)	(0.012)	(0.011)	(0.009)
1 >= Appreciation < 1.5	-0.048***	-0.039**	-0.047***	-0.040**	-0.051***
	(0.014)	(0.017)	(0.015)	(0.016)	(0.015)
1.5 >= Appreciation < 2	-0.028*	-0.019	-0.024	-0.019	-0.019
	(0.015)	(0.012)	(0.015)	(0.012)	(0.013)
Appreciation >= 2	-0.007	0.001	-0.002	0.001	0.006
	(0.008)	(0.008)	(0.008)	(0.009)	(0.007)
Country FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	No
Controls	Basic	Supply	Demand	Full	Full

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1B.9. REER Shocks >= 1 s.d. and Women's Good Job Share.

	(1) Parsimonious	(2) Supply	(3) Demand	(4) Full	(5) Full no tFE
1 >= Depreciation < 1.5	0.002	0.006	0.004	0.006	0.008
	(0.006)	(0.007)	(0.005)	(0.006)	(0.005)
1.5 >= Depreciation < 2	-0.002	-0.001	-0.002	-0.001	0.000
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)
Depreciation >= 2	0.011**	0.011**	0.011**	0.011**	0.012***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)
1 >= Appreciation < 1.5	0.003	0.003	0.005	0.004	-0.000
	(0.010)	(0.010)	(0.011)	(0.011)	(0.009)
1.5 >= Appreciation < 2	0.009	0.012*	0.012*	0.013*	0.008*
	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)
Appreciation >= 2	-0.006	-0.005	-0.002	-0.003	-0.007
	(0.006)	(0.006)	(0.005)	(0.006)	(0.004)
Country FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	No
Controls	Basic	Supply	Demand	Full	Full

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1B.10. REER Shocks >= 1 s.d. and Women's Relative Good Job Share (W/M).

	(1) Parsimonious	(2) Supply	(3) Demand	(4) Full	(5) Full no tFE
1 >= Depreciation < 1.5	0.024	0.030*	0.026*	0.032*	0.027**
	(0.015)	(0.016)	(0.014)	(0.016)	(0.011)
1.5 >= Depreciation < 2	0.010	0.015	0.010	0.015	0.011
	(0.011)	(0.011)	(0.011)	(0.012)	(0.012)
Depreciation >= 2	0.043**	0.042***	0.043**	0.043***	0.045***
	(0.015)	(0.013)	(0.015)	(0.013)	(0.011)
1 >= Appreciation < 1.5	0.040**	0.034*	0.041**	0.036*	0.038**
	(0.017)	(0.019)	(0.017)	(0.020)	(0.016)
1.5 >= Appreciation < 2	0.030*	0.032*	0.033*	0.034*	0.027
	(0.017)	(0.016)	(0.018)	(0.017)	(0.016)
Appreciation >= 2	-0.010	-0.011	-0.007	-0.008	-0.017
	(0.011)	(0.011)	(0.012)	(0.011)	(0.010)
Country FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	No
Controls	Basic	Supply	Demand	Full	Full

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1B.11. Comparison Between Models with Different Control Groups, Full Specification.

	(1) Men's Share	(2) Men's Share	(3) Women's Share	(4) Women's Share	(5) W/M	(6) W/M
0.5 >= Depreciation < 1		-0.003		0.002		0.001
		(0.015)		(0.010)		(0.025)
1 >= Depreciation < 1.5	-0.028*	-0.029*	0.006	0.008	0.032*	0.034*
	(0.015)	(0.015)	(0.006)	(0.008)	(0.016)	(0.016)
1.5 >= Depreciation < 2	-0.027**	-0.028**	-0.001	-0.000	0.015	0.016
	(0.010)	(0.010)	(0.005)	(0.005)	(0.012)	(0.013)
Depreciation >= 2	-0.028**	-0.028**	0.011**	0.012***	0.043***	0.043***
	(0.011)	(0.010)	(0.004)	(0.004)	(0.013)	(0.012)
0.5 >= Appreciation < 1		-0.004		0.014		0.022
		(0.016)		(0.011)		(0.023)
1 >= Appreciation < 1.5	-0.040**	-0.041**	0.004	0.007	0.036*	0.040*
	(0.016)	(0.018)	(0.011)	(0.011)	(0.020)	(0.021)
1.5 >= Appreciation < 2	-0.019	-0.019	0.013*	0.014**	0.034*	0.035*
	(0.012)	(0.012)	(0.006)	(0.006)	(0.017)	(0.018)
Appreciation >= 2	0.001	-0.000	-0.003	-0.002	-0.008	-0.005
	(0.009)	(0.009)	(0.006)	(0.005)	(0.011)	(0.011)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Full	Full	Full	Full	Full	Full

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Tables 2B: Models in Different Specifications with Discrete Appreciation or Depreciation Shock.

Table 2B.1. Discrete Appreciation or Depreciation Shock and Men's Good Job Share.

	(1) Parsimonious	(2) Supply	(3) Demand	(4) Full	(5) Full no tFE
Depreciation episode >= 1	-0.040**	-0.043**	-0.040**	-0.045**	-0.034**
	(0.016)	(0.017)	(0.015)	(0.016)	(0.014)
Appreciation episode >= 1	-0.054***	-0.042**	-0.052***	-0.043**	-0.054***
	(0.015)	(0.018)	(0.016)	(0.018)	(0.018)
Manufacturing X/M	-0.126	-0.082	-0.122	-0.090	-0.062
	(0.073)	(0.074)	(0.073)	(0.070)	(0.077)
GFCF/GDP	-0.001	-0.001	-0.001	-0.002	0.001
	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)
Industrial Productivity	0.000*	0.000*	0.000	0.001*	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Financial Openness	-0.112**	-0.121**	-0.121**	-0.125**	-0.084***
	(0.049)	(0.049)	(0.049)	(0.047)	(0.026)
W/M Education	-0.383	0.057	-0.276	0.013	0.046
	(0.554)	(0.446)	(0.642)	(0.455)	(0.567)
W/M LFPR		0.095		0.128	0.324**
		(0.193)		(0.205)	(0.149)
Fertility		0.105**		0.109**	0.076*
		(0.046)		(0.045)	(0.043)
Industrial Productivity 2			0.000	-0.000	-0.000
			(0.000)	(0.000)	(0.000)
Inward FDI/GFCF			0.078	0.034	0.032
			(0.049)	(0.038)	(0.043)
Country FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	No

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2B.2. Discrete Appreciation or Depreciation Shock and Women's Good Job Share.

	(1) Parsimonious	(2) Supply	(3) Demand	(4) Full	(5) Full no tFE
Depreciation episode >= 1	0.005	0.008	0.006	0.008	0.009*
	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)
Appreciation episode >= 1	0.006	0.007	0.008	0.007	0.002
	(0.011)	(0.012)	(0.012)	(0.013)	(0.010)
Manufacturing X/M	-0.006	-0.005	0.002	-0.003	-0.005
	(0.023)	(0.024)	(0.019)	(0.023)	(0.014)
GFCF/GDP	-0.002	-0.001	-0.001	-0.001	-0.000
	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)
Industrial Productivity	-0.000	-0.000	-0.000*	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Financial Openness	-0.017	-0.024	-0.022	-0.025	-0.019
	(0.031)	(0.030)	(0.031)	(0.030)	(0.029)
W/M Education	0.427**	0.678***	0.557***	0.699***	0.680***
	(0.159)	(0.219)	(0.181)	(0.218)	(0.173)
W/M LFPR		0.268**		0.222*	0.256**
		(0.095)		(0.120)	(0.106)
Fertility		0.023		0.018	-0.003
		(0.038)		(0.038)	(0.020)
Industrial Productivity 2			0.000*	0.000	0.000
			(0.000)	(0.000)	(0.000)
Inward FDI/GFCF			0.034**	0.021	0.033**
			(0.015)	(0.013)	(0.012)
Country FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	No

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2B.3. Discrete Appreciation or Depreciation Shock and Women's Relative Good Job Share (W/M)

	(1) Parsimonious	(2) Supply	(3) Demand	(4) Full	(5) Full no tFE
Depreciation episode >= 1	0.038**	0.044**	0.039**	0.046**	-0.034**
	(0.016)	(0.017)	(0.015)	(0.016)	(0.014)
Appreciation episode >= 1	0.047**	0.041*	0.049**	0.043*	-0.054***
	(0.020)	(0.023)	(0.020)	(0.023)	(0.018)
Manufacturing X/M	0.070	0.041	0.075	0.046	-0.062
	(0.079)	(0.081)	(0.078)	(0.078)	(0.077)
GFCF/GDP	-0.001	-0.001	-0.000	-0.001	0.001
	(0.004)	(0.004)	(0.004)	(0.005)	(0.003)
Industrial Productivity	-0.000	-0.000*	-0.001	-0.001	0.000
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Financial Openness	0.058	0.057	0.055	0.055	-0.084***
	(0.069)	(0.071)	(0.067)	(0.070)	(0.026)
W/M Education	0.836*	1.014	0.936*	1.068*	0.046
	(0.430)	(0.578)	(0.446)	(0.575)	(0.567)
W/M LFPR		0.395		0.316	0.324**
		(0.243)		(0.306)	(0.149)
Fertility		-0.029		-0.035	0.076*
		(0.083)		(0.079)	(0.043)
Industrial Productivity 2			0.000	0.000	-0.000
			(0.000)	(0.000)	(0.000)
Inward FDI/GFCF			0.019	0.030	0.032
			(0.041)	(0.028)	(0.043)
Country FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	No

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2B.4. Discrete Appreciation or Depreciation Shocks by Size and Men's Good Job Share.

	(1) Parsimonious	(2) Supply	(3) Demand	(4) Full	(5) Full no tFE
0.5 >= Appreciation < 1	-0.015	-0.000	-0.014	0.003	-0.003
	(0.014)	(0.013)	(0.015)	(0.012)	(0.010)
1 >= Appreciation < 1.5	-0.061***	-0.046*	-0.059***	-0.045*	-0.060***
	(0.018)	(0.022)	(0.019)	(0.022)	(0.019)
1.5 >= Appreciation < 2	-0.050*	-0.034	-0.043	-0.032	-0.034
	(0.027)	(0.022)	(0.026)	(0.021)	(0.022)
Appreciation > 2	-0.015	0.003	-0.003	0.004	0.012
	(0.015)	(0.018)	(0.016)	(0.019)	(0.015)
0.5 >= Depreciation < 1	-0.000	-0.002	0.000	-0.000	0.000
	(0.011)	(0.011)	(0.012)	(0.011)	(0.011)
1 >= Depreciation < 1.5	-0.037**	-0.034*	-0.035**	-0.034*	-0.024
	(0.017)	(0.018)	(0.016)	(0.018)	(0.017)
1.5 >= Depreciation < 2	-0.037**	-0.046**	-0.039**	-0.047**	-0.031
	(0.016)	(0.018)	(0.016)	(0.018)	(0.018)
Depreciation >= 2	-0.072**	-0.071**	-0.075**	-0.072**	-0.076***
	(0.030)	(0.025)	(0.030)	(0.026)	(0.023)
Country FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	No
Controls	Basic	Supply	Demand	Full	Full

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2B.5. Discrete Appreciation or Depreciation Shocks by Size and Women's Good Job Share.

	(1) Parsimonious	(2) Supply	(3) Demand	(4) Full	(5) Full no tFE
0.5 >= Appreciation < 1	0.005	0.008	0.003	0.006	0.007
	(0.009)	(0.008)	(0.009)	(0.008)	(0.009)
1 >= Appreciation < 1.5	0.006	0.008	0.007	0.008	0.003
	(0.013)	(0.013)	(0.013)	(0.013)	(0.011)
1.5 >= Appreciation < 2	0.016	0.023**	0.022*	0.024**	0.016*
	(0.011)	(0.010)	(0.011)	(0.011)	(0.008)
Appreciation > 2	-0.012	-0.008	-0.003	-0.006	-0.013
	(0.013)	(0.011)	(0.011)	(0.011)	(0.009)
0.5 >= Depreciation < 1	-0.000	-0.001	-0.001	-0.001	-0.002
	(0.009)	(0.008)	(0.009)	(0.008)	(0.007)
1 >= Depreciation < 1.5	0.004	0.009	0.006	0.009	0.011
	(0.009)	(0.010)	(0.008)	(0.009)	(0.007)
1.5 >= Depreciation < 2	-0.001	-0.000	-0.002	0.000	0.002
	(0.011)	(0.010)	(0.010)	(0.009)	(0.011)
Depreciation >= 2	0.029**	0.030***	0.029**	0.030***	0.031***
	(0.010)	(0.009)	(0.011)	(0.009)	(0.008)
Country FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	No
Controls	Basic	Supply	Demand	Full	Full

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2B.6. Discrete Appreciation or Depreciation Shocks by Size and Women's Relative Good Job Share (W/M).

	(1) Parsimonious	(2) Supply	(3) Demand	(4) Full	(5) Full no tFE
0.5 >= Appreciation < 1	0.014	0.009	0.011	0.005	0.009
	(0.018)	(0.017)	(0.018)	(0.017)	(0.016)
1 >= Appreciation < 1.5	0.052**	0.044*	0.052**	0.044*	0.047**
	(0.021)	(0.024)	(0.022)	(0.024)	(0.021)
1.5 >= Appreciation < 2	0.055	0.058*	0.058*	0.061*	0.050
	(0.031)	(0.029)	(0.032)	(0.030)	(0.029)
Appreciation > 2	-0.021	-0.022	-0.016	-0.017	-0.036
	(0.024)	(0.021)	(0.026)	(0.022)	(0.023)
0.5 >= Depreciation < 1	-0.004	-0.005	-0.004	-0.005	-0.006
	(0.017)	(0.019)	(0.017)	(0.018)	(0.016)
1 >= Depreciation < 1.5	0.032	0.038*	0.033*	0.038*	0.033**
	(0.019)	(0.020)	(0.018)	(0.020)	(0.015)
1.5 >= Depreciation < 2	0.021	0.027	0.021	0.028	0.020
	(0.021)	(0.023)	(0.020)	(0.022)	(0.022)
Depreciation >= 2	0.112***	0.109***	0.113**	0.110***	0.115***
	(0.037)	(0.030)	(0.038)	(0.030)	(0.029)
Country FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	No
Controls	Basic	Supply	Demand	Full	Full

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2B.7. Comparison Between Models with Continuous and Discrete Shocks by Size, Full Specification.

	(1) Men's Share	(2) Women's Share	(3) W/M	(4) Men's Share	(5) Women's Share	(6) W/M
0.5 >= Depreciation < 1				-0.003	0.002	0.001
				(0.015)	(0.010)	(0.025)
1 >= Depreciation < 1.5				-0.029*	0.008	0.034*
				(0.015)	(0.008)	(0.016)
1.5 >= Depreciation < 2				-0.028**	-0.000	0.016
				(0.010)	(0.005)	(0.013)
Depreciation >= 2				-0.028**	0.012***	0.043***
				(0.010)	(0.004)	(0.012)
0.5 >= Depreciation < 1	-0.000	-0.001	-0.005			
	(0.011)	(0.008)	(0.018)			
1 >= Depreciation < 1.5	-0.034*	0.009	0.038*			
	(0.018)	(0.009)	(0.020)			
1.5 >= Depreciation < 2	-0.047**	0.000	0.028			
	(0.018)	(0.009)	(0.022)			
Depreciation >= 2	-0.072**	0.030***	0.110***			
	(0.026)	(0.009)	(0.030)			
0.5 >= Appreciation < 1				-0.004	0.014	0.022
				(0.016)	(0.011)	(0.023)
1 >= Appreciation < 1.5				-0.041**	0.007	0.040*
				(0.018)	(0.011)	(0.021)
1.5 >= Appreciation < 2				-0.019	0.014**	0.035*
				(0.012)	(0.006)	(0.018)
Appreciation >= 2				-0.000	-0.002	-0.005
				(0.009)	(0.005)	(0.011)
0.5 >= Appreciation < 1	0.003	0.006	0.005			
	(0.012)	(0.008)	(0.017)			
1 >= Appreciation < 1.5	-0.045*	0.008	0.044*			
	(0.022)	(0.013)	(0.024)			
1.5 >= Appreciation < 2	-0.032	0.024**	0.061*			
	(0.021)	(0.011)	(0.030)			
Appreciation > 2	0.004	-0.006	-0.017			
	(0.019)	(0.011)	(0.022)			
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Shock	Discrete	Discrete	Discrete	Continuous	Continuous	Continuous

Tables 3B. Lead Models, Full Specification.

We run the main model from the main results in the paper (including all controls) but with lead shocks and lead controls (so the dependent variable is in time *t* and all independent variables are in time *t+1*). We expect these future variables to not impact our dependent variables on the same way that the contemporaneous shocks do, which is consistent with the result below.

Table 3B.1. Appreciation and Depreciation Shocks, Leads.

	(1) Men's Share	(2) Women's Share	(3) W/M Ratio
Depreciation episode >= 1 (t+1)	-0.017	0.016**	0.037**
	(0.020)	(0.006)	(0.017)
Appreciation episode >= 1 (t+1)	-0.025	0.021*	0.053**
	(0.015)	(0.011)	(0.021)
Manufacturing X/M (t+1)	-0.092	0.005	0.071
	(0.063)	(0.022)	(0.065)
GFCF/GDP (t+1)	0.000	-0.002	-0.003
	(0.003)	(0.001)	(0.003)
Industrial Productivity (t+1)	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.001)
Financial Openness (t+1)	-0.128**	-0.012	0.073
	(0.049)	(0.031)	(0.075)
W/M Education (t+1)	0.358	0.748***	0.755
	(0.546)	(0.227)	(0.540)
Industrial Productivity 2 (t+1)	0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)
Inward FDI/GFCF (t+1)	0.022	0.009	0.017
	(0.028)	(0.022)	(0.037)
W/M LFPR (t+1)	0.489*	0.090	-0.153
	(0.267)	(0.143)	(0.325)
Fertility (t+1)	0.058	0.051	0.043
	(0.047)	(0.036)	(0.075)
Country FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Controls	Full	Full	Full

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3B.2. Appreciation and Depreciation Shocks by Size, Leads.

	(1) Men's Share	(2) Women's Share	(3) W/M Ratio
0.5 >= Depreciation < 1 (t+1)	-0.021	0.015	0.039
	(0.017)	(0.013)	(0.027)
1 >= Depreciation < 1.5 (t+1)	-0.014	0.023**	0.046*
	(0.019)	(0.008)	(0.023)
1.5 >= Depreciation < 2 (t+1)	-0.015	0.002	0.011
	(0.014)	(0.007)	(0.013)
Depreciation >= 2 (t+1)	-0.018	0.012**	0.036*
	(0.014)	(0.005)	(0.019)
0.5 >= Appreciation < 1 (t+1)	-0.019	0.018	0.039
	(0.025)	(0.012)	(0.029)
1 >= Appreciation < 1.5 (t+1)	-0.025	0.020	0.050**
	(0.015)	(0.012)	(0.020)
1.5 >= Appreciation < 2 (t+1)	-0.013	0.022**	0.049
	(0.015)	(0.008)	(0.029)
Appreciation >= 2 (t+1)	-0.026*	0.013	0.035*
	(0.013)	(0.009)	(0.019)
Country FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Controls	Full	Full	Full

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Tables 4B. Lagged Models, Full Specification.

Table 4B.1. Appreciation and Depreciation Shocks, Lagged.

	(1) Men's Share	(2) Women's Share	(3) W/M Ratio
Depreciation episode >= 1 (t-1)	-0.037*	0.007	0.039**
	(0.018)	(0.006)	(0.018)
Appreciation episode >= 1 (t-1)	-0.026	0.016	0.051
	(0.020)	(0.013)	(0.032)
Manufacturing X/M (t-1)	-0.058	-0.017	-0.006
	(0.071)	(0.022)	(0.083)
GFCF/GDP (t-1)	0.000	-0.001	-0.002
	(0.004)	(0.001)	(0.004)
Industrial Productivity (t-1)	0.001	-0.000*	-0.001*
	(0.000)	(0.000)	(0.000)
Financial Openness (t-1)	-0.088*	-0.027	0.028
	(0.048)	(0.029)	(0.070)
W/M Education (t-1)	-0.080	0.531***	0.847*
	(0.384)	(0.133)	(0.436)
Industrial Productivity 2 (t-1)	-0.000	0.000*	0.000
	(0.000)	(0.000)	(0.000)
Inward FDI/GFCF (t-1)	-0.037	0.024*	0.078*
	(0.051)	(0.012)	(0.039)
W/M LFPR (t-1)	0.167	0.133	0.143
	(0.159)	(0.084)	(0.240)
Fertility (t-1)	0.114***	-0.009	-0.077
	(0.038)	(0.035)	(0.068)
Country FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Controls	Full	Full	Full

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4B.2. Appreciation and Depreciation Shocks by Size, Lagged.

	(1) Men's Share	(2) Women's Share	(3) W/M Ratio
0.5 >= Depreciation < 1 (t-1)	-0.019	0.001	0.014
	(0.017)	(0.006)	(0.018)
1 >= Depreciation < 1.5 (t-1)	-0.039*	0.006	0.036
	(0.018)	(0.007)	(0.025)
1.5 >= Depreciation < 2 (t-1)	-0.031**	0.003	0.025*
	(0.012)	(0.005)	(0.012)
Depreciation >= 2 (t-1)	-0.005	0.009*	0.017*
	(0.013)	(0.004)	(0.010)
0.5 >= Appreciation < 1 (t-1)	-0.036	0.013	0.067***
	(0.021)	(0.007)	(0.018)
1 >= Appreciation < 1.5 (t-1)	-0.032*	0.013	0.067***
	(0.016)	(0.013)	(0.023)
1.5 >= Appreciation < 2 (t-1)	-0.021	0.002	-0.001
	(0.019)	(0.011)	(0.026)
Appreciation >= 2 (t-1)	-0.023	0.002	0.020
	(0.013)	(0.010)	(0.012)
Country FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Controls	Full	Full	Full

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4B.3. Appreciation and Depreciation Shocks, Lagged and Contemporaneous.

	(1) Men's Share	(2) Women's Share	(3) W/M Ratio
Depreciation episode >= 1 (t-1)	-0.020	0.007	0.027
	(0.016)	(0.006)	(0.017)
Depreciation episode >= 1	-0.044***	0.000	0.032**
	(0.012)	(0.005)	(0.013)
Appreciation episode >= 1 (t-1)	-0.005	0.012	0.033
	(0.023)	(0.012)	(0.034)
Appreciation episode >= 1	-0.035**	0.006	0.031
	(0.016)	(0.007)	(0.020)
Manufacturing X/M (t-1)	-0.057	-0.016	-0.006
	(0.073)	(0.022)	(0.084)
GFCF/GDP (t-1)	0.000	-0.001	-0.002
	(0.004)	(0.001)	(0.004)
Industrial Productivity (t-1)	0.001	-0.000*	-0.001*
	(0.000)	(0.000)	(0.000)
Financial Openness (t-1)	-0.094*	-0.027	0.033
	(0.044)	(0.029)	(0.067)
W/M Education (t-1)	-0.044	0.528***	0.818*
	(0.360)	(0.133)	(0.424)
Industrial Productivity 2 (t-1)	-0.000	0.000*	0.000
	(0.000)	(0.000)	(0.000)
Inward FDI/GFCF (t-1)	-0.042	0.023*	0.082*
	(0.050)	(0.012)	(0.040)
W/M LFPR (t-1)	0.218	0.130	0.103
	(0.150)	(0.082)	(0.223)
Fertility (t-1)	0.103***	-0.008	-0.069
	(0.034)	(0.034)	(0.064)
Country FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Controls	Full	Full	Full

Table 4B.4. Appreciation and Depreciation Shocks by Size, Lagged and Contemporaneous.

	(1) Men's Share	(2) Women's Share	(3) W/M Ratio
0.5 >= Depreciation < 1 (t-1)	-0.009	0.003	0.014
	(0.020)	(0.005)	(0.017)
0.5 >= Depreciation < 1	0.002	-0.002	-0.008
	(0.022)	(0.015)	(0.029)
1 >= Depreciation < 1.5 (t-1)	-0.025	0.006	0.033
	(0.022)	(0.008)	(0.031)
1 >= Depreciation < 1.5	-0.031	-0.000	0.012
	(0.021)	(0.006)	(0.016)
1.5 >= Depreciation < 2 (t-1)	-0.018	0.001	0.014
	(0.013)	(0.005)	(0.008)
1.5 >= Depreciation < 2	-0.024***	0.002	0.009
	(0.008)	(0.006)	(0.015)
Depreciation >= 2 (t-1)	0.007	0.007	0.009
	(0.011)	(0.004)	(0.009)
Depreciation >= 2	-0.032***	0.012***	0.040***
	(0.010)	(0.003)	(0.009)
0.5 >= Appreciation < 1 (t-1)	-0.029	0.005	0.048*
	(0.023)	(0.007)	(0.024)
0.5 >= Appreciation < 1	0.007	0.015	0.021
	(0.015)	(0.009)	(0.017)
1 >= Appreciation < 1.5 (t-1)	-0.018	0.007	0.047**
	(0.019)	(0.009)	(0.022)
1 >= Appreciation < 1.5	-0.022	0.006	0.027
	(0.020)	(0.010)	(0.020)
1.5 >= Appreciation < 2 (t-1)	-0.023	-0.012	-0.006
	(0.020)	(0.016)	(0.032)
1.5 >= Appreciation < 2	-0.020	0.019	0.030
	(0.019)	(0.012)	(0.031)
Appreciation >= 2 (t-1)	-0.004	-0.014	-0.008
	(0.014)	(0.013)	(0.032)
Appreciation >= 2	0.006	0.017	0.003
	(0.019)	(0.014)	(0.046)
Country FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Controls	Full	Full	Full

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5B.1 Comparison Between 3-year and 5-year Moving Average, Full Specification.

	(1) Men's Share	(2) Men's Share	(3) Women's Share	(4) Women's Share	(5) W/M Ratio	(6) W/M Ratio
0.5 >= Depreciation < 1	-0.003	-0.009	0.002	0.005	0.001	0.005
	(0.015)	(0.047)	(0.010)	(0.009)	(0.025)	(0.025)
1 >= Depreciation < 1.5	-0.029*	0.049	0.008	0.010	0.034*	0.030*
	(0.015)	(0.032)	(0.008)	(0.008)	(0.016)	(0.017)
1.5 >= Depreciation < 2	-0.028**	0.022	-0.000	0.002	0.016	0.019
	(0.010)	(0.033)	(0.005)	(0.005)	(0.013)	(0.012)
Depreciation >= 2	-0.028**	-0.016	0.012***	0.011**	0.043***	0.040***
	(0.010)	(0.019)	(0.004)	(0.004)	(0.012)	(0.013)
0.5 >= Appreciation < 1	-0.004	-0.005	0.014	0.013	0.022	0.024
	(0.016)	(0.038)	(0.011)	(0.011)	(0.023)	(0.022)
1 >= Appreciation < 1.5	-0.041**	-0.032	0.007	0.006	0.040*	0.037*
	(0.018)	(0.025)	(0.011)	(0.010)	(0.021)	(0.020)
1.5 >= Appreciation < 2	-0.019	-0.053	0.014**	0.016**	0.035*	0.035*
	(0.012)	(0.045)	(0.006)	(0.006)	(0.018)	(0.018)
Appreciation >= 2	-0.000	-0.010	-0.002	-0.002	-0.005	-0.005
	(0.009)	(0.078)	(0.005)	(0.005)	(0.011)	(0.011)
N	277	281	277	281	277	281
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Full	Full	Full	Full	Full	Full
MA	3-year	5-year	3-year	5-year	3-year	5-year

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$ *** $p < 0.01$

Table 5B.2 Comparison Between All Years (1990-2018) and Selected Years (1996-2016) Samples, Full Specification.

	(1) Men's Share	(2) Men's Share	(3) Women's Share	(4) Women's Share	(5) W/M Ratio	(6) W/M Ratio
0.5 >= Depreciation < 1	-0.003	-0.001	0.002	0.006	0.001	0.004
	(0.015)	(0.016)	(0.010)	(0.011)	(0.025)	(0.025)
1 >= Depreciation < 1.5	-0.029*	-0.026*	0.008	0.007	0.034*	0.029*
	(0.015)	(0.015)	(0.008)	(0.007)	(0.016)	(0.016)
1.5 >= Depreciation < 2	-0.028**	-0.026**	-0.000	0.003	0.016	0.020
	(0.010)	(0.010)	(0.005)	(0.005)	(0.013)	(0.012)
Depreciation >= 2	-0.028**	-0.019**	0.012***	0.011***	0.043***	0.034**
	(0.010)	(0.009)	(0.004)	(0.004)	(0.012)	(0.011)
0.5 >= Appreciation < 1	-0.004	0.016	0.014	-0.000	0.022	-0.015
	(0.016)	(0.026)	(0.011)	(0.012)	(0.023)	(0.030)
1 >= Appreciation < 1.5	-0.041**	-0.030	0.007	-0.001	0.040*	0.022
	(0.018)	(0.022)	(0.011)	(0.008)	(0.021)	(0.020)
1.5 >= Appreciation < 2	-0.019	-0.014	0.014**	0.013*	0.035*	0.034*
	(0.012)	(0.013)	(0.006)	(0.006)	(0.018)	(0.016)
Appreciation >= 2	-0.000	0.017	-0.002	-0.003	-0.005	-0.023
	(0.009)	(0.011)	(0.005)	(0.006)	(0.011)	(0.015)
N	277	253	277	253	277	253
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Full	Full	Full	Full	Full	Full
Years	1990-2018	1996-2016	1990-2018	1996-2016	1990-2018	1996-2016

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$ *** $p < 0.01$

Table 6B. Main Results Dropping Domestic Workers from Sample.

	(1) Men's Share	(2) Women's Share	(3) W/M Ratio
0.5 >= Depreciation < 1	0.014	-0.002	-0.024
	(0.023)	(0.018)	(0.041)
1 >= Depreciation < 1.5	-0.027	0.007	0.028
	(0.024)	(0.013)	(0.032)
1.5 >= Depreciation < 2	-0.030**	0.001	0.021
	(0.014)	(0.007)	(0.021)
Depreciation >= 2	-0.020*	0.011	0.036**
	(0.010)	(0.007)	(0.015)
0.5 >= Appreciation < 1	-0.011	0.020	0.043
	(0.017)	(0.018)	(0.026)
1 >= Appreciation < 1.5	-0.038	-0.006	0.029
	(0.023)	(0.011)	(0.024)
1.5 >= Appreciation < 2	-0.009	0.019	0.033
	(0.024)	(0.012)	(0.029)
Appreciation >= 2	0.030	0.004	-0.025
	(0.021)	(0.009)	(0.033)
Manufacturing X/M	-0.070	-0.001	0.052
	(0.073)	(0.023)	(0.093)
GFCF/GDP	-0.004	-0.003*	-0.002
	(0.005)	(0.002)	(0.006)
Industrial Productivity	0.001*	-0.000*	-0.001**
	(0.000)	(0.000)	(0.001)
Financial Openness	-0.085**	-0.059	-0.018
	(0.037)	(0.042)	(0.074)
W/M Education	0.236	0.643**	1.024
	(0.574)	(0.216)	(0.596)
Industrial Productivity 2	-0.000*	0.000	0.000
	(0.000)	(0.000)	(0.000)
Inward FDI/GFCF	0.050	0.031	0.037
	(0.042)	(0.021)	(0.043)
W/M LFPR	0.221	0.283*	0.328
	(0.259)	(0.147)	(0.353)
Fertility	0.153***	-0.003	-0.088
	(0.051)	(0.027)	(0.065)
Country FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Controls	Full	Full	Full

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$ *** $p < 0.01$

APPENDIX C

Women paid work and dependence on forestry resources: the case of the Teçume da Floresta

Women from the Tupana River, located in the municipality of Careiro in Amazonas, are historically characterized by socioeconomic vulnerability. Careiro is locates in a regional where GDP grew approximately 210% between 2005 and 2014 but the high index of social vulnerability as measured by IPEA (IVS 0.543) and a low HDI (0.557) persisted. Most economic activity is linked to family farming and forest extractivism. For the same time frame, household income per capita was usually less than 50% of the minimum wage; 60% of the average family income came from government social programs. There were almost no activities aimed at women's health and well-being (there were only consultation with a gynecologist every 15 days in a city whose adult women population is approximately 8,000, for example). Despite the high levels of domestic violence, there was no specific location and no professionals capable of providing assistance in cases of violence against women.

In 2015, NGO Casa do Rio fought for resources to implement a project together with women from Careiro, seeking the promotion of local women's empowerment and socioeconomic emancipation. The first step was conducting a survey to identify the main problems of the community, which resulted in the following findings: devaluation of women as workers in the family unit; verbal, psychological and sexual violence/abuse; incest; exodus of young people to surrounding urban centers; decrease in family income; risk of extinction of traditional crafts. The survey also investigated the potentialities, and the possibility of rescuing and safeguarding manual knowledge, relying on the abundant raw materials form the forest, was brought with enthusiasm from the local women; project managers also considered the growing demand from the fashion

and design market for traditional, handmade products, with origin and purpose. Based on these premises, the action strategy was defined in 4 processes, taking inspiration from Paulo Freire's methodology to execute them: (1) Mobilization: aiming to modify the prevalent production framework, which was mostly for subsistence, the project proposed the production of goods maintaining practices and tradition, allowing women to work in their own homes. The process included informal meetings and visits to communities to identify the potential of artisanal production, which illuminated the identification of objects more suitable for artisanal production taking into account, above all, their cultural identity; (2) Training: several courses, workshops and meetings were proposed to exchange knowledge and experiences; (3) Marketing: first, there were meetings among women to choose the name of the brand, deciding for the name "Teçume". In 2017, it was renamed ˜Teçume da Floresta˜, which is also used to name the project and the collective of women artisans. It is worth noting that some of them did not know how to read or write; to cover this demand, another project aimed at literacy among adult women was carried out, called ROSAs (Regando os Saberes).

Since 2015, women who are part of the collective had a personal income increase of 200% on average, and all household were able to move above the extreme poverty line; further, all women became the main breadwinner of their households, and domestic violence indexes decreased. Overall, the project illuminates how women's dependence on forestry resources can be both a source of subsistence and of income. When efforts to avoid poverty traps are conducted build form and to the local population and relying on the resources and expertise of other members of society, relying on forestry resources for income increase without promoting higher deforestation is achievable. More information about the project can be found here (Portuguese only).

Figure C.1. Women and children in the production of hats, bags, and jewelry using forestry resources in the Teçume da Floresta collective.

Figure C.2. Woman artisan holding sign "I made this purse", in the Teçume da Floresta atelier

Figure C.3. Fashion magazine advertising Teçume da Floresta's products

Table C.1. Summary statistics for men and women subgroups.

			Women		
	mean	sd	max	min	count
Unpaid care work hours	25.07	14.31	98	1	63,816
Paid work hours	25.26	15.28	98	1	32,931
HH Size	4.93	2.29	19	1	88,910
Education (years)	5.03	4.05	17	1	89,023
HH wage bracket	2.18	1.20	7	0	88,928
Deforestation (km2)	17.4432	18.2936	73.9250	0.2396	89,023
Deforestation (%)	0.0080	0.0089	0.0401	0.0002	89,023
			Men		
	mean	sd	max	min	count
Unpaid care work hours	10.17	7.23	98	1	40,051
Paid work hours	38.10	13.87	99	1	61,535
HH Size	4.84	2.37	19	1	101,381
Education (years)	4.54	3.73	17	1	101,488
HH wage bracket	2.25	1.23	7	0	101,386
Deforestation (km2)	17.4224	18.2552	73.9250	0.2396	101,488
Deforestation (%)	0.0079	0.0088	0.0401	0.0002	101,488

Table C.2. Deforestation (%) and time of unpaid domestic work (ln) for women, various specifications

	(1) Random Effects	(2) Year FE	(3) Regional FE, Clustered	(4) Regional FE, Robust	(5) Mother	(6) Mother or Daughter
Deforestation (%)	-3.103***	-4.875***	-4.875**	-4.875***	-3.539***	-4.913***
	(0.424)	(0.723)	(1.824)	(0.736)	(1.012)	(0.736)
Gender (W=1)	0.875***	0.842***	0.842***	0.842***	0.815***	0.833***
	(0.006)	(0.009)	(0.037)	(0.009)	(0.012)	(0.009)
Deforestation*Gender	6.599***	4.337***	4.337*	4.337***	2.757***	4.396***
	(0.527)	(0.689)	(1.887)	(0.723)	(0.969)	(0.723)
HH Size	-0.035***	-0.014***	-0.014***	-0.014***	-0.004*	-0.013***
	(0.001)	(0.001)	(0.003)	(0.001)	(0.002)	(0.002)
Cooking fuel (Firewood=1)	0.007	-0.004	-0.004	-0.004	-0.005	-0.003
	(0.006)	(0.008)	(0.012)	(0.008)	(0.011)	(0.008)
HH Income (ln)	-0.001*	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Co-living mother (Y=1)					-0.195***	
					(0.014)	
Co-living mother or daughter (Y=1)						-0.056***
						(0.008)
SE	-	-	Clustered	Robust	Robust	Robust
Time FE	No	Yes	Yes	Yes	Yes	Yes
Regional FE	No	No	Yes	Yes	Yes	Yes
Intercept	Yes	Yes	Yes	Yes	Yes	Yes
N	102,569	102,569	102,569	102,569	75,455	102,569

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table C.3. Deforestation (%) and time of unpaid domestic work (ln) for men, various specifications

	(1) Random Effects	(2) Year FE	(3) Regional FE, Clustered	(4) Regional FE, Robust	(5) Mother	(6) Mother or Daughter
Deforestation (%)	3.496***	-0.539	-0.539	-0.539	-0.782	-0.518
	(0.337)	(0.630)	(1.352)	(0.609)	(0.792)	(0.609)
Gender (M=1)	-0.875***	-0.842***	-0.842***	-0.842***	-0.815***	-0.833***
	(0.006)	(0.009)	(0.037)	(0.009)	(0.012)	(0.009)
Deforestation*Gender	-6.599***	-4.337***	-4.337*	-4.337***	-2.757***	-4.396***
	(0.527)	(0.689)	(1.887)	(0.723)	(0.969)	(0.723)
HH Size	-0.035***	-0.014***	-0.014***	-0.014***	-0.004*	-0.013***
	(0.001)	(0.001)	(0.003)	(0.001)	(0.002)	(0.002)
Cooking fuel (Firewood=1)	0.007	-0.004	-0.004	-0.004	-0.005	-0.003
	(0.006)	(0.008)	(0.012)	(0.008)	(0.011)	(0.008)
HH Income (ln)	-0.001*	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Co-living mother (Y=1)					-0.195***	
					(0.014)	
Co-living mother or daughter (Y=1)						-0.056***
						(0.008)
SE	-	-	Clustered	Robust	Robust	Robust
Time FE	No	Yes	Yes	Yes	Yes	Yes
Regional FE	No	No	Yes	Yes	Yes	Yes
Intercept	Yes	Yes	Yes	Yes	Yes	Yes
N	102,569	102,569	102,569	102,569	75,455	102,569

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table C.4. Deforestation (%) and time of paid work (ln) for women, various specifications

	(1) Random Effects	(2) Year FE	(3) Regional FE, Clustered	(4) Regional FE, Robust	(5) Mother	(6) Mother or Daughter
Deforestation	1.805***	2.195***	2.195*	0.496**	1.307*	2.167***
	(0.299)	(0.562)	(1.045)	(0.233)	(0.673)	(0.505)
Gender (W=1)	-0.322***	-0.311***	-0.311***	-0.038***	-0.262***	-0.321***
	(0.007)	(0.010)	(0.032)	(0.005)	(0.014)	(0.011)
Deforestation*Gender	-3.826***	-2.829***	-2.829	0.699**	-2.231**	-2.765***
	(0.480)	(0.622)	(2.492)	(0.324)	(0.899)	(0.701)
HH Size	-0.015***	0.002	0.002	0.000	-0.003**	0.002*
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
Cooking fuel (Firewood=1)	-0.112***	-0.060***	-0.060***	-0.003	-0.058***	-0.059***
	(0.005)	(0.007)	(0.016)	(0.004)	(0.011)	(0.008)
HH Income	0.001	0.000	0.000	-0.000	0.003***	0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
Unpaid carework hours	-0.010***	-0.010***	-0.010***	-0.002***	-0.010***	-0.010***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Paid work hours				0.038***		
				(0.000)		
Co-living mother (Y=1)					0.010	
					(0.014)	
Co-living mother or daughter (Y=1)						-0.052***
						(0.013)
SE	-	-	Clustered	Robust	Robust	Robust
Time FE	No	Yes	Yes	Yes	Yes	Yes
Regional FE	No	No	Yes	Yes	Yes	Yes
Intercept	Yes	Yes	Yes	Yes	Yes	Yes
N	93,468	93,468	93,468	93,468	66,811	93,468

Table C.5. Impact of deforestation (%) on time of paid work (ln) for men, various specifications

	(1) Random Effects	(2) Year FE	(3) Regional FE, Clustered	(4) Regional FE, Robust	(5) Mother	(6) Mother or Daughter
Deforestation (%)	-3.106***	-0.821	-0.821	-0.821	-0.981	-0.788
	(0.397)	(0.658)	(2.658)	(0.760)	(0.992)	(0.760)
Gender (M=1)	0.489***	0.470***	0.470***	0.470***	0.426***	0.480***
	(0.006)	(0.009)	(0.049)	(0.010)	(0.013)	(0.010)
Deforestation*Gender	5.194***	3.674***	3.674	3.674***	2.955***	3.615***
	(0.485)	(0.630)	(2.302)	(0.718)	(0.926)	(0.718)
HH Size	-0.010***	0.006***	0.006**	0.006***	-0.000	0.007***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
Cooking fuel (Firewood=1)	-0.120***	-0.063***	-0.063***	-0.063***	-0.062***	-0.063***
	(0.005)	(0.008)	(0.017)	(0.008)	(0.011)	(0.008)
HH Income (ln)	0.001**	0.000	0.000	0.000	0.004***	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Co-living mother (Y=1)					0.037**	
					(0.014)	
Co-living mother or daughter (Y=1)						-0.048***
						(0.013)
SE	-	-	Clustered	Robust	Robust	Robust
Time FE	No	Yes	Yes	Yes	Yes	Yes
Regional FE	No	No	Yes	Yes	Yes	Yes
Intercept	Yes	Yes	Yes	Yes	Yes	Yes
N	93,468	93,468	93,468	93,468	66,811	93,468