The Public Debt Crisis in Argentina and the Role of the IMF: Investigating the Causal Effect of Austerity Measures on Female Labour Force Participation

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Abstract

This study examines the causal impact of austerity on female labour force participation in Argentina, following both the 2001 and 2018 public debt crisis. Employing a quasi-experimental framework that integrated regression discontinuity design and utilising IMF lending as an instrumental variable in two-stage least squares estimation. While prior literature highlights the gendered consequences of fiscal consolidation, these results do not find a consistent, statistically significant effect of austerity on FLFP. However, the analysis uncovers suggestive evidence of an added worker effect in the context of Argentina. The findings highlight the complexity of labour market responses to fiscal consolidation. While the overall effect is limited, the research highlights the value of applying gender-sensitive analysis to macroeconomic policy making. Understanding the gendered dimensions of austerity remains essential for designing resilient recovery strategies in times of crisis and fostering economic growth.

AI Statement

I acknowledge the use of generative AI in drafting in this paper. However, the work reported remains my own.

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1. Introduction and Background

"Women's economic empowerment has been shown, many times, to be the best available weapon against poverty"

-Linda Scott

The statement underscores a foundational truth in development economics, gender inequality is not just a social injustice, but a structural inefficiency that depresses national prosperity. The idea behind this study stemmed from reading *The Cost of Sexism* by Linda Scott which powerfully illustrates the ongoing issues of gender inequality and argues economies, specifically in developing countries, would experience significant growth and prosperity by economically empowering women. Despite decades of progress, women are still disadvantaged in every corner of the world and continue to face structural barriers to education, employment, and financial independence. The ongoing Third World Debt Crisis, illustrated by Argentina's repeated recourse to bailouts from the International Monetary Fund, offers a compelling case to assess how fiscal consolidation affects female economic participation. This study examines the causal impact of austerity on female labour force participation in Argentina following the 2001 and 2018 debt crisis, combining instrumental variable methods and regression discontinuity in econometric analysis. In doing so, this study aims to contribute to growing literature on the gendered dimensions of macroeconomic policy and highlight the urgent need for inclusive policy frameworks in crisis response.

1.2 Contextualising IMF Austerity in Argentina: Historical and Economic Overview

Austerity measures are economic policies, typically involving spending cuts or increases in taxation, aimed at controlling public sector debt. Such policies are implemented by a federal government when their public debt is so immense that the risk of default becomes a serious threat. Default risk can escalate rapidly, as government expenditure continues and national debt accumulates, lenders demand higher rates of returns on future loans, and it becomes increasingly challenging for

borrowers to secure capital. This creates a perpetual cycle of increasing debt and rising borrowing costs, making repayments more difficult and increasing the likelihood of future deficits, creating 'default traps' (Catão et al., 2009). By demonstrating a commitment to fiscal discipline through austerity, governments hope to restore the confidence of financial markets, leading to lower interest rates and borrowing costs from creditors. Thereby consolidating public finances, increasing the attractiveness of foreign investment, and restoring fiscal sustainability in the long run to improve financial health. It is within the context of fiscal constraint and the pursuit of market credibility that global financial institutions such as the International Monetary Fund (IMF) have played a central role, particularly in Argentina.

The IMF is an international lending institution, comprised of 191 member countries, designed to promote sustainable economic growth, reduce poverty, and facilitate international trade. Argentina joined the IMF in 1956, and over the decades to follow received a total of twenty-two loans to fight spiralling inflation and stabilise the economy. In late 2001, Argentina suffered a profound economic crisis marked by a sovereign default, the collapse of its banking system, and a sharp devaluation of the peso. The years leading up to the default were characterised by weak fiscal performance, largely stemming from the prolonged recession between 1991 and 2001 and the growing costs of servicing existing debt. These costs were exacerbated by heightened volatility in emerging markets and increasing risk aversion among investors, particularly given Argentina's commitment to a rigid exchange rate regime. Public debt, which stood at "approximately 54% of GDP in 2001, surged to over 140% in the aftermath of the 2002 crisis". The social consequences were severe, with the national poverty rate exceeding 50% that same year (Braun, 2006). The crisis was a product of a vicious cycle of prolonged economic stagnation that undermined both presidential authority and fiscal capacity, eroding the government's ability to coordinate discipline across political actors. In

this sense, Argentina's crisis was not only economic, but also a failure of collective political restraint.

The IMF's role in Argentina's economic crisis has been widely criticised for imposing rigid, procyclical conditionalities that exacerbated the country's downturn. Despite the recession, the IMF continued to demand fiscal austerity, prioritising deficit reduction over economic recovery. Its support for the fixed exchange rate regime, pegging the peso to the dollar, prolonged an overvalued currency, eroding export competitiveness and stifling growth. The fund has been criticised for applying a "one-size-fits-all" approach, replicating policies suited to independent contexts, such as Mexico's 1994 crisis, without adapting to Argentina's recessionary conditions (Paddock, 2002). These actions were compounded by a lack of transparency and limited domestic cooperation which resulted in the IMF programme having a contractionary effect on output.

In 2018, Argentina secured a $57.1 billion agreement with the IMF, marking the largest loan in the institution's history (Goni, 2018). In the years preceding this, Argentina under President Macri, faced mounting economic pressures from unsustainable debt accumulation, rapid currency depreciation, and a deepening recession. Between 2016 and mid-2018, the government issued $56 billion in external debt, leaving the economy highly vulnerable to global shocks. Capital flight intensified as U.S. interest rates rose, a severe drought undermined agricultural exports, and investor confidence deteriorated amid concerns over central bank independence (Nelson, 2020). The peso collapsed, significantly increasing the real burden of dollar-denominated debt. In response, the Macri administration turned to the IMF for assistance, signing another loan contingent on strict austerity measures. Subsidies for essential goods such as electricity and gas were eliminated, leading to further price increases for consumers. A 25% cap in annual nominal wage rises was imposed, despite the high inflation rate, further impacting worker's purchasing power (Öncü, 2025). This agreement triggered nationwide strikes to protest economic turmoil, reflecting widespread public resistance to

the social costs of fiscal consolidation. Despite these efforts, macroeconomic conditions worsened. By the end of 2019, inflation had reached 54%, GDP contracted by 2.2%, and poverty escalated (Nelson, 2020). These outcomes, combined with the social cost of austerity, contributed to Macri's electoral defeat. The Fernández government initiated debt restructuring, but Argentina defaulted again in May 2020. These episodes have exposed persistent flaws in IMF conditionality and highlighted the risks of imposing procyclical fiscal tightening in economic downturns.

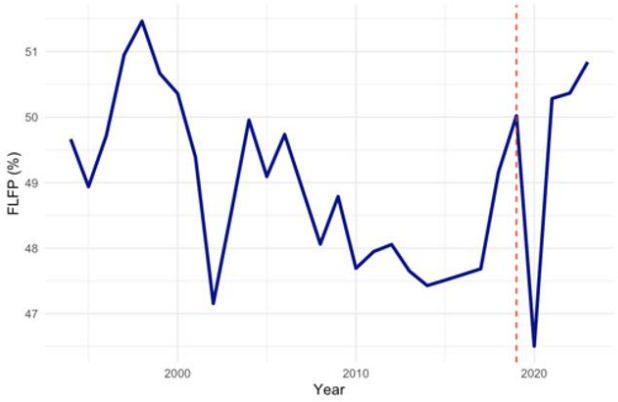
1.2 Gendered Labour Market Dynamics: Female Participation in Times of Fiscal Adjustment

During the 1990's and early 2000's, Argentina implemented a series of austerity measures underpinned by neoliberal reforms and IMF-backed fiscal adjustment programmes. These included wage freezes, public sector and pension cuts, elimination of social assistance programmes, and the imposition of a "zero-deficit" rule in 2001 (Felder, 2011). Repeated rounds of budget consolidation also targeted labour costs through reductions in employer contributions and attempts to restructure pension and healthcare systems. Far from restoring stability, these measures deepened the recession, fuelling social unrest (Felder, 2011). Argentina's labour market was radically transformed, intensifying job insecurity and catalysing the emergence of resistance movements. The rise of the piquetero movement "united impoverished workers in an effort to secure a sustainable livelihood in Argentina". In doing so, it challenged both neoliberal state policy and the marginalisation of informal workers from traditional union representation, highlighting the "profound regional struggle against unjust economic policies" (Birss, 2005). Many of these dynamics have resurfaced in the past decade, as successive governments have reintroduced austerity measures replicating similar patterns of IMF involvement, social backlash, and adverse effects on employment and income security.

Figure 1 reveals noticeable fluctuations in FLFP during the sample period, with a particularly sharp decline around 2002, a consequence of Argentina's financial crisis. The smaller dip around 2008 is

likely a result of the 2008 global financial crisis, where FLFP did not begin to increase steadily again until around 2016. The second sharp decline occurs around the 2019 threshold, although the dynamics observed most likely reflect economic disruption caused by the COVID-19 pandemic.

Figure 1: Percentage of Women in the Labour Force, Argentina 1994-2023



While neoclassical growth models such as Solow (1956) emphasize the role of capital accumulation and labour in driving long-run output, this study examines how IMF induced austerity can disrupts these growth channels. Augmented versions of the Solow model, such as the one developed by Erdem and Yücel (2016), explicitly incorporate gender by including both male and female inputs in the production function. Their model demonstrates that increasing the share of women in the labour force raises steady-state income per capita. Highlighting that beyond equity concerns, women's participation in the labour market plays a vital role in enhancing productive capacity and fostering long-term economic growth. Therefore, investigating how austerity measures may suppress FLFP, in an economy as turbulent as Argentina's, could produce particularly interesting results.

In developing countries, stricter austerity has been "associated with greater income inequality for up to two years", primarily by concentrating income among the ten percent of earners. Austerity has also been linked to higher poverty headcounts and wider poverty gaps, intensifying social exclusion (Stubbs, et al., 2021). Austerity measures disproportionately harm women by cutting public sector jobs and services, areas where women represent a large share of employment and have historically

provided protected, quality jobs essential for their economic integration. Since World War II, public sector and social transfers have been key to women's labour market participation, thus austerity driven cuts to these areas pose a major challenge for gender inequality. These policies not only reduce demand for female labour but also limit access to critical support services, forcing women to increase unpaid domestic work. As a result, austerity "undermines women's progress towards equity in paid work and economic independence" and threatens to revise hard-won gains on employment and social welfare protections (Karamessini, 2014).

While initial employment shocks during the financial crisis narrowed gender gaps due to male job losses, subsequent austerity has reversed this trend, eroding women's financial security (Karamessini, 2014). This selective impact exposes structural vulnerabilities and highlights the need for gender-sensitive crisis response frameworks. Beyond employment, austerity also reinforces persistent and overlapping poverty traps. High inflation and fiscal imbalance in Argentina's volatile context undermine allocative efficiency and disproportionately impact low-income households, a result of persistent regional and generational inequalities. These socioeconomic weaknesses are intensified by rising climate risks, where low-income populations have limited access and reduced capacity for recovery. In this context, austerity-driven reductions in social spending not only fail to address these structural barriers but may actively reinforce them, limiting social mobility and deepening cycles of deprivation (World Bank, 2024)

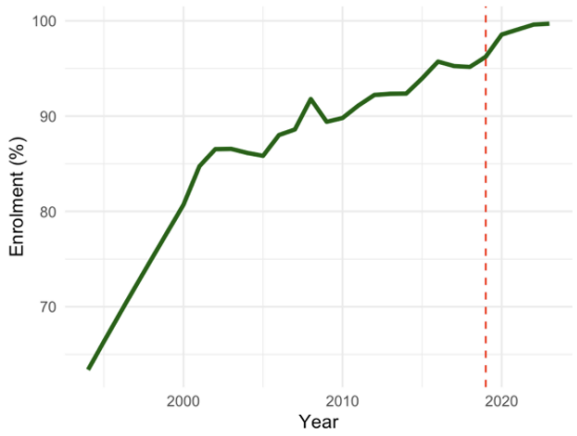
Such drastic increases in income inequality, unemployment, and reduced economic growth, trigger household level coping strategies. One key response is the Added Worker Effect (AWE), which refers to the tendency of secondary household members to enter the labour market when the primary earner experiences income loss or unemployment. The AWE is often contrasted with the Discouraged Worker Effect (DWE), which suggests individuals may withdraw from the labour

market altogether when job prospects are poor. While the DWE tends to dominate in aggregate data during widespread downturns, the AWE may still operate meaningfully in the absence of robust social safety nets (Martinoty, 2015).

1.3 The Socioeconomic Links Between Austerity, Child Marriage, and Educational Attainment

Access to education is a crucial pathway to women's economic empowerment, with far-reaching social and economic opportunities. However, in almost every developing country, young females receive considerably less education that males (Todaro, 2000). Due to the significant underinvestment in women's education, there is an enormous gender gap in the provision of educational opportunities. Educational discrimination against women hinders economic development in addition to reinforcing social inequality (Todaro, 2000). The World Bank estimated that keeping girls in school through the twelfth grade would save poorer countries between US$15-$30 trillion in lost lifetime productivity and earnings (Thirlwall, 2011). In Argentina, significant educational reform in the 1990's aimed to bridge this gap. The 1993 Federal Law of Education, completely restructured and decentralised the education system, shifting administrative responsibility from national to provincial governments (Gorostiaga, 2003). Despite the positive impact of these reforms, deep regional inequalities remained. In 1991, net enrolment in the city of Buenos Aires reached around 72%, although remained at around 38% in the less-developed northeastern province of Chaco, reflecting ongoing disparities (Tiramonti, 1995). This is a result of many provinces having inadequate financial resources to fully achieve various aspects of the reforms, such as the doubling of education budgets (Gorostiaga, 2003). The 2002 economic crisis further constrained educational resources, and although Figure 2 shows a steady increase in female secondary enrolment from 1994 to 2023, it remains important to consider the persistence of subnational disparities.

Figure 2: Female Upper-Secondary Enrolment, Argentina 1994-2023



The traditional view that women's education yields low economic returns is becoming increasingly challenged. The production function approach to measure the contribution of education to economic growth is typically calculated as the rate of growth of education, multiplied by the elasticity of output with respect to the education variable, γ (Thirlwall, 2011):

$$\frac{\Delta Y}{\Delta E} = \gamma \frac{\bar{Y}}{\bar{E}}$$

This underestimate is possibly due to lower foregone earnings, higher labour force re-entry among educated women, and their access to occupations with equal pay. Consequentially, rate-of-return analysis often omits non-monetary and non-market returns, despite that education enhances productivity in unpaid work such as childcare. The belief that female education if unprofitable is misguided, and when indirect benefits are considered, returns may even surpass those of men (Woodhall, 1973). This reinforces the need for policies that address structural barriers to education and unemployment and challenge the underutilisation of women's human capital.

Additionally, another widespread barrier to female empowerment and human capital development is the prevenance of child marriage, with approximately one in three girls married before the age of 18 (McCleary-Sills, et al., 2015). However, there is little research linking austerity to child marriage in Latin America. It could be interesting to compare the findings from Argentina to regions that have

been heavily researched such as Bangladesh. Here, where dowry cultures prevail, child marriage rates are obscene. Unlike the 'bride price' seen in many regions in Africa, the burden of a dowry means there is a strong incentive to marry girls off early to reduce the financial burden of child-rearing. Research into child marriage and FLFP is fundamental in recognising the disproportionate opportunities women persistently face. Additionally, the violence and disparity women are subject to, not just in developing countries but extensively across all variations of societies, cultures, social class, and religions. The economic impacts and costs of child marriage are high for girls, their families, communities, and society, contributing to relentless intergenerational transmissions of poverty (Parsons, et al., 2015). It is therefore essential to examine the mechanisms into why women are subject to such infringement and to identify concrete policy measures that can raise FLFP and eliminate the systematic barriers that continue to undermine women's economic autonomy.

2. *Literature Review:*

There has been considerable research into factors affecting FLFP, austerity measures and their gendered economic impact, child marriage, and educational attainment. However, these areas have all been researched separately with large regional focuses in Asia and sub-Saharan Africa. In recent years more detailed research has gone into attempting to understand the causes behind the increasing economic vulnerability of women in developing countries and the effectiveness of policies that promote economic empowerment. The first study we will discuss, investigates the cyclical behaviour of FLFP in Latin America which can help us understand how pre-existing economic conditions may influence the proportion of women in the labour force. The second uses micro-level data from eight diverse economies to answer the question: 'What drives female labour force participation?' This is extremely relevant to my research question as it discusses the complex, non-linear relationship

between the chosen variables and makes detailed cross-country comparisons which can be applied to wider research.

Maridueña-Larrea (2023) explored ‘subtracted’ and ‘encouraged’ worker effects by examining how women’s participation in the labour market responded to changes in the economic cycle. This is relevant to my dissertation topic as it provides important insights and context into the potential effects of austerity measures and other economic policies on female labour force participation. It has led to me consider that the implications of austerity measures may differ due to pre-existing economic conditions and my findings may not be consistent across all areas of the economic cycle. The researchers were motivated by the realisation that previous research on this topic for Latin America was limited and thus aimed to test the added and discouraged worker hypothesis to explore potential asymmetries in FLFP between recessions and expansions.

Klasen (2020) used microdata from 2000-2014 to investigate the drivers of changes in FLFP over time and analyse cross-country differences in a diverse group of varying economies. The findings emphasize the importance of country specific contexts and challenge the idea of a comprehensive relationship between education, income, fertility, and FLFP. The study importantly highlights the complexity of labour market interactions, and the varied impact of factors previously thought to be universal determinants of FLFP such as education and income. The study also gives supporting evidence to the notion that the relationship between education and FLFP is non-linear, addressing issues with previous studies that oversimplify these obscure interactions. The examination of interplay between economic development, fertility, and cultural norms provides a framework for understanding the relevance of the independent variables used in my study. The researchers were motivated by the limitations of earlier macro-level literature and their failure in substantially explaining FLFP. Despite rising female education, declining fertility, and substantial economic

growth, FLFP rates have not increased as expected in many developing countries. So, the study explored the importance of cultural, religious, and social norms in determining FLFP.

Maridueña-Larrea (2023) used a threshold regression which contributed largely to the understanding of the relationship between labour market dynamics and economic cycles. It also addressed a gap in pre-existing literature and provided recommendations which could be helpful in designing macroeconomic policies to empower women in the workforce. However, the researchers faced some data challenges and introduced sample bias into their analysis by choosing countries with richer data availability, this is something I will need to address in my own research. In addition, the main cyclical indicator used was male employment which may not fully capture the complexity of the labour market or diverse experiences of women. However, the use of male employment rates effectively addressed endogeneity concerns that arose when using female unemployment to explain FLFP. The researchers also acknowledged the possibility of spurious regression and non-stationarity in using time-series data. To correct for this, researchers utilized unit root tests to confirm the variables were integrated to the same order and differenced variables to achieve stationarity, a method I will likely follow in my research.

Klasen (2020) utilised a unified empirical framework that allowed for direct comparisons of countries over time and a consistent profit model which enhanced comparability and generalisability of their findings. The study also uses rich data and micro-level analysis which addressed limitations of prior macro-level studies which relied on aggregated data and concealed important variations and heterogeneities. However, as discussed above, this study excluded rural areas due to data availability concerns so may limit the generalisability of the findings in countries with large rural populations. The study also faced concerns of selection bias potentially related to marriage and settlement in urban areas, an issue my research may face, but sensitivity analyses were performed to determine the

significance of the biases. Some econometric challenges faced by researchers were endogeneity concerns from omitted variable bias and reverse causality, and regional variations. Potential endogeneity issues were addressed by using a reduced-form approach to control for various individual and household characteristics. To overcome the challenges that arose from using survey data, the researchers used 'high-quality large-scale household surveys and harmonised variables to ensure accurate comparability. The study controlled for sectoral composition of male employment at the regional level and addressed labour demand conditions by using regional fixed effects.

My research question aims to find a causal relationship between IMF-induced austerity, educational attainment, child marriage, and female labour force participation. Education is arguably a strong determinant of long-term economic empowerment. In Argentina, educational reforms over the past 20 years have aimed to reduce inequality but austerity measures often lead to budget cuts which overly affect girls' education. Austerity policies have been found to disproportionately affect women through exacerbating gender inequalities and reducing their economic opportunities for, particularly in rural or low-income areas. There is a lack of research on topic in Argentina's specific context, therefore I plan to investigate how the country's financial crisis and austerity has affected the FLFP. In addition, much research focuses on the short-term impacts of austerity thus there is a gap in pre-existing literature on the long-term impacts that public spending cuts have on women's ability to both enter and then remain in the workforce.

Austerity measures create unique economic conditions and austerity driven recessions may disproportionately impact certain sectors, leading to stronger 'discouraged worker' effects as female become disincentivised to work due to cuts. My econometric framework with the inclusion of instrumental variables will allow me to consider potential asymmetries in FLFP responses during austerity driven recessions and isolate their effects and the consequences of IMF loans. Cerrutti

(2000) found evidence for the added worker hypothesis for women in Buenos Aires, Argentina during the 1990s. However, during economic expansions, Maridueña-Larrea, et al., identified 'subtracted worker effects' in Peru, where women leave the labour force when male unemployment falls. These conflicting results for regions in Latin America illustrate the complex relationship between economic fluctuations and women's participation in the labour force. By focusing on Argentina, I can contribute to the existing body of knowledge with an updated data set and hopefully generalize my findings from 2018 to the recent economic turmoil that has arose from President Milei's aggressive policies to try to stabilize the economy.

3. Methodology

3.1 Data Description

This study examines the causal effects of austerity measures on FLFP in Argentina between 1994 and 2023, focusing on the potential mediating effects of child marriage and educational attainment. IMF loans are proxied by the Cyclically Adjusted Primary Balance (CAPB) as a percentage of GDP. The CAPB serves as a measure of underlying fiscal effort, adjusted for the business cycle, and is prominently used in empirical assessments of IMF conditionality and fiscal stance. Also sourced from the IMF Fiscal Monitor, austerity is captured through Net Lending/Borrowing as a percentage of GDP. This variable reflects the overall fiscal balance and is used to address the intensity and direction of fiscal consolidation policies. Child marriage measures as the percentage of women ages 20-24 who were married or in union before the age of 18. Data for this variable were sourced from ChildMarriageData.org, which compiles data primarily from UNICEF and national household surveys, offering cross-country comparability over time. Educational attainment is represented by the female upper secondary enrolment rate, expressed a as percentage of women eligible to be in the labour force. This data was collected from the World Bank, and this indicator reflects access to and retention in secondary school education. Finally, FLFP is defined as the proportion of women ages

15 and older that are economically active. This variable is sourced from OurWorldInData.org, which compiles data primarily from the International Labour Organisation (ILO). Given the time-series nature of the data, this methodology begins with stationarity testing to ensure the validity of all subsequent estimations.

Table 1: Summary Statistics of Main Variables

Variable	Mean	SD	Min	Max	Median
Austerity	-2.65	2.95	-8.67	3.97	-2.91
FLFP	49.00	1.31	46.51	51.46	49.02
Child Marriage	15.77	1.20	13.50	18.70	15.77
Education	87.45	9.95	63.38	99.70	89.60

Figure 3: Net Lending / Borrowing as a Percentage of GDP, Argentina 1994-2023

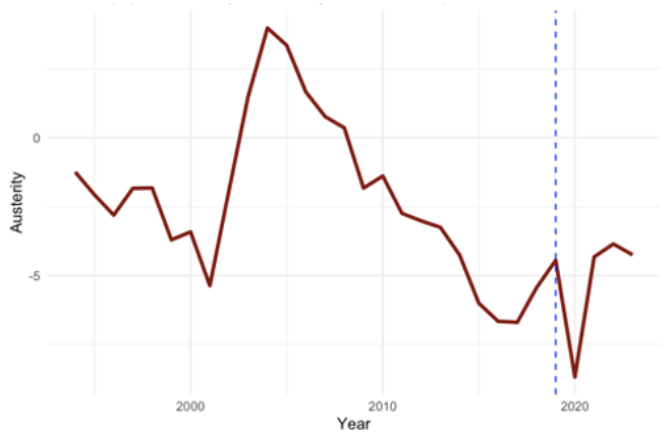


Figure 3 shows Argentina's fiscal position over time, where negative values reflect government deficits. In the early 2000's Argentina experienced deep fiscal and economic instability resulting in the 2001-2002 financial crisis, after which the government was able to run fiscal surpluses. However, in the late 2000's fiscal balances worsened again and under the Macri administration in 2015-2019. We then observe the impacts Argentina's $57 billion loan, combined with the COVID-19 pandemic in 2020, and the volatility following this reflects stimulus efforts and subsequent readjustments.

3.2 Time Series Diagnostics: Unit Root Testing

Time series data often exhibits trends that may lead to spurious regression if the variables are non-stationary, that is they drift over time rather than reverting to a stable mean. If an OLS or IV

regression is run on a non-stationary series, the results could produce high R^2 values or statistically significant t-tests, resulting in an observed relationship due to sharp trends not a causal effect. To address this, Augmented Dickey-Fuller (Cheung, Y & Lai, K.S, 1995) tests were applied to the main variables; FLFP, Educational enrolment, Child Marriage prevalence, and Austerity.

$$ADF: y_t = c + \beta_t + \alpha y_{t-1} + \phi_1 \Delta Y_{t-1} + \phi_2 \Delta Y_{t-2} + \ldots \phi_p \Delta Y_{t-p} + \varepsilon_t$$

This was crucial not only for the validity of the IV regressions but also to ensure that the RDD estimates were not being driven by non-stationary trends. The results indicated that all four main variables contained a unit root. Thus, to address non-stationarity, all model specifications contained a one-period lag of FLFP to difference out the trend component, thereby mitigating the risk of spurious regression results. This inclusion should also control for dynamic persistence in FLFP by absorbing some of the non-stationary structure and serial correlation.

3.3 Identification Strategy

The central empirical challenge in estimating the causal effect of austerity measures on FLFP lies in the issue of endogeneity. Austerity is not randomly assigned; thus, endogeneity may arise if austerity is influenced by unobserved economic conditions that also directly affect labour market outcomes, potentially biasing estimates from a simple Ordinary Least Squares regression. To address this, this study employs a combination of three econometric methods:

1. Regression Discontinuity Design (RDD), centred on the implementation of austerity measures in 2019
2. Lagged effect models to account for any delayed effects of fiscal policies.
3. Instrumental Variable (IV) regression, using IMF loans as an instrument for austerity and the mediators, as well as conducting mediation analysis to explore both the direct and indirect effects on FLFP.

Instrumental Variable (IV) estimation and Regression Discontinuity (RDD) were employed in tandem to strengthen causal inference and capture different dimensions of the relationship between austerity and FLFP. RDD offers a clean estimate of the short-term impact of a clearly identified policy shock. The IV addresses endogeneity and broader effects over time, then mediation analysis provided insight into the channels of influence, offering a more comprehensive understanding of how austerity policies shape women's labour market outcomes in Argentina.

3.4 Model Specifications

3.4.1 OLS:

As a baseline, Ordinary Least Squares (OLS) regression was employed to estimate the association between austerity and FLFP. This provided a preliminary understanding of the magnitude and direction of the relationship, and which variables were potentially significant predictors. Whilst OLS does not correct for endogeneity or dynamic structure, it serves as an important diagnostic step and benchmark for later analysis. Child Marriage and Education were included as regressors, despite being potential mediators, to assess the robustness of the direction of austerity on FLFP. Their inclusion allowed for a distinction between the direct effect of austerity and the portion potentially mediated through these channels, which is a particularly valuable step in verifying the plausibility of the formal IV mediation analysis.

$H_0: \beta_1 = 0, \;\; H_1: \beta_1 \neq 0$

$$FLFP_t = \beta_0 + \beta_1 \cdot Austerity_t + \beta_2 \cdot Child\ Marriage_t + \beta_3 \cdot Education_t + \beta_4 \cdot FLFP_{t-1} + \varepsilon_t$$

3.4.2 RDD

A sharp Regression Discontinuity Design (RDD) was employed to estimate the local causal effect of the implementation of austerity measures on FLFP. In this study, the treatment corresponds to the implementation of austerity policies linked to the IMF loan agreement signed in June 2018. While

the agreement marked the beginning of fiscal consolidation, the full extent of the spending cuts, particularly those affecting education, social welfare, and labour market programmes, did not come into effect until 2019. Therefore, the year 2019 is used as the running variable in the RDD framework, exploiting the policy shift that occurred following the loan's conditionalities. Where the treatment dummy is 1 $if\ year\ \geq 2019$, and 0 otherwise, the model estimates a conditional local average treatment effect. This setup allows for identification of the immediate and localised impact of austerity on the outcomes of interest, assuming continuity in all other determinants around the threshold. This design was chosen based on the assumption that, in the absence of the 2019 austerity measures, trends in Female Labour Force Participation would have continued along a smooth trajectory. A sharp RDD is justified in this context due to the magnitude of the IMF loan and the nature of its conditionalities, which resulted in a clear policy break.

H_0: $There\ is\ no\ significant\ change\ in\ FLFP\ at\ the\ 2019\ cutoff$

H_1: $There\ is\ a\ significant\ change\ (increase\ of\ decrease)\ in\ FLFP\ at\ the\ 2019\ cutoff$

$$FLFP_t = \beta_0 + \beta_1 \cdot Treatment_t + \beta_2 \cdot Running\ Var_t + \beta_3(Treatment_t \times RunningVar_t) + \beta_4 \cdot FLFP_{t-1} + \varepsilon_t$$

3.4.3 Lagged Effects Model

To account for the possibility that the effects of austerity on FLFP may not be immediate, a lagged effects model was employed to capture any persistence. The rationale is that structural policy changes may take time to influence labour market behaviour, specifically among women. This approach allows for the examination of whether the impact of austerity intensifies or changes direction over time, beyond the immediate effects captured by the RDD.

H_0: $\beta_1 = \beta_2 = 0$, H_1: $\beta_1 \neq 0\ or\ \beta_2 \neq 0$

$$FLFP_t = \alpha + \beta_0 + \beta_1 \cdot Austerity_{t-1} + \varepsilon_t$$

$$FLFP_t = \alpha + \beta_0 + \beta_1 \cdot Austerity_{t-2} + \varepsilon_t$$

$$FLFP_t = \alpha + \beta_0 + \beta_1 \cdot Austerity_{t-1} + \beta_2 \cdot Austerity_{t-2} + \varepsilon_t$$

3.4.4 Instrumental Variable Estimation

In the Two-Stage Least Squares (2SLS) Instrumental Variable (IV) estimation strategy the instrument employed was IMF loan agreements, operationalised as the Cyclically Adjusted Primary Balance as a percentage of GDP. These agreements typically come with strict fiscal conditions, requiring recipient governments to implement austerity policies such as public sector cuts, subsidy reductions, and fiscal consolidation. As these loan conditions originate externally and are not directly influenced by Argentina's short-term labour market dynamics, they serve as a source of exogenous variation in austerity. The IV estimation precedes in two stages. In the first stage, austerity is regressed on the instrument. This stage tests the relevance of the instrument. The resulting F-statistic was 47.89, which exceeds the conventional threshold of 10, indicating that the instrument is not weak and is a strong predictor of austerity. In the second stage, the predicted values of austerity from the first stage are used to estimate its effects on FLFP. Under the assumption that the instrument is valid, identifies the causal effect of austerity on FLFP.

$H_0: \beta_1 = 0$, $H_1: \beta_1 \neq 0$

$$\textit{Stage 1: } Austerity_t = \pi_0 + \pi_1 IMF_t + \pi_2 FLFP_{t-1} + u_t$$

$$\textit{Stage 2: } FLFP_t = \beta_0 + \beta_1 \cdot \widehat{Austerity}_t + \beta_2 \cdot FLFP_{t-1} + \varepsilon_t$$

Following the main IV estimation, a mediation analysis was conducted to explore whether the effect of austerity on FLFP operates indirectly through two mediating variables: (1) the prevalence of child marriage and (2) female upper-secondary education. Using IMF loans as an instrument, the same 2SLS strategy was employed. In the first mediation stage, the instrument was used to estimate the effects of IMF loan-induced austerity on the mediators. In the second stage, FLFP was regressed on the instrumented values of the mediators.

Stage 1:

$H_0: \alpha_1 = 0, and\ \delta_1 = 0\ (IMF\ loans\ have\ no\ effect\ on\ the\ mediators)$

$H_1: \alpha_1 \neq 0\ or\ \delta_1 \neq 0\ (IMF\ loans\ significantly\ affect\ child\ marriage\ and\ or\ education)$

$$M1:\ Child\ Marriage_t = \alpha_0 + \alpha_1 \widehat{Austerity}_t + \alpha_2 FLFP_{t-1} + \varepsilon_t$$

$$M2: Education_t = \delta_0 + \delta_1 \widehat{Austerity}_t + \delta_2 FLFP_{t-1} + \varepsilon_t$$

Stage 2:

$H_0: \theta_1 = 0, and\ \theta_2 = 0\ (The\ mediators\ have\ no\ causal\ effect\ on\ FLFP)$

$H_1: \theta_1 \neq 0\ or\ \theta_2 \neq 0\ (At\ least\ one\ mediator\ causally\ affects\ FLFP)$

$$FLFP_t = \theta_0 + \theta_1 \cdot \widehat{M1}(Child\ Marriage) + \theta_2 \cdot \widehat{M2}(Educational\ Attainment) + \varepsilon_t$$

This approach allowed for the estimation of the indirect effects of austerity on FLFP via its influence on child marriage and educational attainment, while still addressing potential endogeneity in both the treatment and the mediators. A significant reduction in the direct effect of austerity on FLFP, once the instrumented mediators are included, would suggest the presence of meaningful mediation pathways. Together, the IV estimation and mediation analysis provide a more nuanced understanding of how externally imposed fiscal policy can shape female labour market outcomes both directly and through its broader social impacts.

3.5 Estimation and Inference

Diagnostic tests were conducted to assess autocorrelation and heteroskedasticity in the data. The Breusch-Godfrey (BG), Durbin-Watson (DW), and Breusch-Pagan (BP) were employed across all models. To ensure valid inference, Newey-West HAC standard errors were used to correct for both heteroskedasticity and autocorrelation (Newey & West, 1987). The Newey-West estimator adjusts

the variance-covariance matrix of the OLS coefficients by estimating serial correlation in the residuals and weighting the autocovariances to produce a consistent estimate of the true standard errors.

To further enhance the credibility of RDD estimates, a bandwidth sensitivity analysis was conducted. Since RDD results are local to the cutoff (2019), estimates sensitive to the choice of bandwidth can be used to define the neighbourhood of the threshold, helping to assess the robustness of causal inference to alternative specifications of the running variable window. By combining robust inference techniques with sensitivity checks around the RDD cutoff, this study reinforces the internal validity of the causal estimates while acknowledging model-specific limitations.

3.6 Limitations of the Empirical Strategy

The empirical strategies employed in this study are designed to address key identification challenges, however it is important to acknowledge the limitations associated with each method and the dataset as a whole. These limitations inform the interpretation of results and provide transparency regarding the strength of the causal claims. Firstly, the annual frequency of the data restricts the number of observations available for econometric analysis. This is especially relevant for RDD, where the statistical power depends on the density of observations near the cutoff. Secondly, while the CAPB is a widely accepted proxy for IMF loan conditionality, it may not fully capture the timing or intensity of austerity measures and could instead reflect broader policy trends. Additionally, time-series data may be prone to issues of autocorrelation and non-stationarity, which are addressed through unit root testing, but still pose a potential risk to causal inference.

Due to restricted data availability, the educational attainment variable may not fully capture the true scope of female education in Argentina. While female upper secondary enrolment rates provide a

useful insight of educational attainment, this variable only captures a limited aspect of women's overall educational experiences. High enrolment may not correspond to meaningful outcomes, as it overlooks regional disparities, which can be particularly pronounced in rural or economically disadvantaged areas. A more precise measure of educational attainment would include data on primary education, completion rates, or even progression to tertiary education; regrettably, this study was unable to incorporate these more detailed measures. In addition, child marriage prevalence and educational attainment data, although highly relevant as mediators, are derived from household surveys which could introduce measurement error. Finally, Argentina's macroeconomic volatility during the study period, such as inflation shocks, political transactions, and external crisis, could introduce confounding variation that is difficult to isolate using aggregate national-level data alone.

Moreover, the sharp RDD estimates are local to the threshold, and thus only capture the immediate effects of austerity, not its long-term of cumulative impacts. To capture the delayed responses to austerity, lagged variables were included in some specifications. However, selecting the appropriate number of lags is difficult, particularly in a time-series. Overfitting can occur with too many lags, while underfitting risks omitting important dynamic effects. In addition, introducing a lagged dependent variable introduces potential dynamic endogeneity, where the lag of the outcome variable can be correlated with the error term, potentially biasing estimates. Additionally, the RDD framework relies on the assumption that no other structural changes occurred around the cutoff. Given Argentina's highly volatile economic environment, this assumption may be difficult to fully validate, which presents a challenge for causal inference in a macroeconomic context.

The use of IMF loan agreements as an instrument is grounded in the assumption that the loans satisfy the exclusion restriction. That is, IMF loans are assumed to influence FLFP only through their effect on domestic austerity policies. While the instrument demonstrates strong relevance, the exclusion

restriction cannot be directly tested. Hence, the validity rests on economic reasoning, institutional context, and prior evidence, not on statistical testing. Thus, if IMF loans affect labour force participation through unobserved channels unrelated to austerity, such as investor confidence or broader macroeconomic shifts, the model will not capture this. Furthermore, IV estimates reflect the Local Average Treatment, that is, the effect on units whose treatment status is influenced by the instrument, which may not be generalisable to all periods or contexts. Additionally, the mediation analysis requires similar assumptions regarding instrument validity. If unobserved factors simultaneously influence the mediators and FLFP, or if the instrument affects the mediators through other channels, the indirect effects may be biased. Moreover, the smaller sample size in time-series data limits the power of this analysis and could increase sensitivity to specification choices.

4. Results

4.1 Diagnostic Tests

Table 2: Durbin-Watson and Breusch-Godfrey Test for Autocorrelation

Model	DW.Stat	DW.p.value	DW.Sig.	BG.Stat	BG.p.value	BG.Sig.
OLS	1.587	0.040	**	2.996	0.083	*
RDD	1.929	0.215		0.069	0.792	
Lagged	1.096	0.003	***	5.569	0.018	**
IV	1.586	0.027	**	3.101	0.078	*

Table 3: Breusch-Pagan Test for Heteroskedasticity

Model	BP.Stat	BP.df	BP.p.value	BP.Sig.
OLS	2.558	4	0.634	
RDD	9.482	4	0.050	*
Lagged	3.665	2	0.160	
IV	5.674	5	0.339	

In the OLS model, there was evidence of positive autocorrelation ($p = 0.0405$ and $DW = 1.59$), however the BP test detected no significant heteroskedasticity. The RDD specification did not exhibit significant autocorrelation, supported by a DW statistic of 1.929, whilst the BP test indicated borderline heteroskedasticity. The Lagged Austerity model showed no evidence of heteroskedasticity

(p = 0.16) but exhibited clear signs of positive autocorrelation (DW = 1.096; BG = 5.569). Finally, in the IV model, heteroskedasticity was present (p = 0.027), and both tests suggested mild autocorrelation.

4.2 Augmented Dickey Fuller (ADF) Tests: Stationarity

Table 4: ADF Test for Unit Roots Trend Specification

Variable	TestStatistic	CriticalValue_1pct	CriticalValue_5pct	CriticalValue_10pct	Stationary_10pct
Austerity	-1.607	-4.15	-3.5	-3.18	No
Child Marriage	-1.992	-4.15	-3.5	-3.18	No
Education	-2.931	-4.15	-3.5	-3.18	No
FLFP	-1.866	-4.15	-3.5	-3.18	No

The test statistics for Austerity (-1.607), Child Marriage (-1.992), Education (-2.931), and FLFP (-1.866) all fell above the 10% critical value threshold of -3.18, indicating that none of the variables were stationary even at the most lenient conventional level. Thus, we fail to reject the null hypothesis of a unit root in each case. To account for autocreation, all models included a one-period lag of the dependent variable FLFP. This approach will ideally address issues related to non-stationarity by controlling for persistence in the time-series.

4.3 Baseline Model: Ordinary Least Squares

Table 5: OLS Regression Results

Variable	Estimate	NW.Std..Error	Significance
(Intercept)	48.152	16.304	**
FLFP_lag	0.248	0.231	
Austerity	0.354	0.168	*
`Child Marriage`	-0.891	0.476	.
Education	0.042	0.043	

The OLS model showed that Austerity has a positive and statistically significant relationship with FLFP, as holding other variables constant, a 1-unit increase in austerity was associated with a 0.35 pp increase in FLFP. This suggests that fiscal consolidation may push more women into the labour force due to declining household support. The coefficient for Child Marriage was negatively and marginally significant at the 10% level (-0.89, SE = 0.48), implying a 1% pp increase in child marriage is associated with a 0.89 pp decrease in FLFP, suggesting a higher prevalence of child

marriage may reduce FLFP. The effect off female education was positive but not statistically significant, and the lagged FLFP also lacked significance, although its positive coefficient suggests some inertia in FLFP patterns. The R-Squared of 0.495 indicates the model explained about 50% of the variation in FLFP, suggesting there are possibly other external factors affecting women's participation in the labour force. This test produced an F-stat of 5.88 with a corresponding p-value of 0.001, so we reject the null hypothesis at the 1% level and conclude there is a statistically significant relationship between austerity and the explanatory variables. Overall, this provides suggestive evidence that austerity policies may have contributed to increased female economic activity, while structural factors such as early marriage continue to act as constraints.

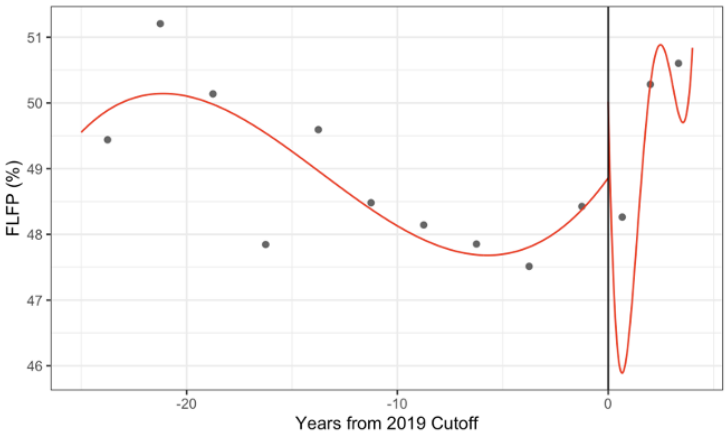
4.4 Sharp RDD

Table 6: RDD Model Results

Variable	Estimate (NW SE)
(Intercept)	41.55*** (10.265)
treatment	0.963 (0.684)
running_var	-0.104** (0.042)
FLFP_lag	0.123 (0.218)
treatment:running_var	0.621* (0.348)

In the sharp RDD the running variable was negative and statistically significant at the 5% level, highlighting that FLFP was decreasing over time before 2019. The coefficient on the treatment indicator, post-2019, was positive but statistically insignificant (0.96, SE = 0.68), suggesting there was no statistically significant change in FLFP following the onset of austerity measures. However, the interaction between the running variable and treatment was marginally significant at the 10% level (0.62, SE = 0.34), indicating a possible change in trend after the policy implementation. Specifically, while FLFP was declining steadily by approximately 0.1 percentage points prior to 2019, the post treatment period saw a reversal in this trend, with participation rates raising over time. Overall, the findings point to a dynamic response to austerity, though there was no short-term impact on FLFP levels, the policy shift appears to have prompted a gradual increase in FLFP in the years that followed.

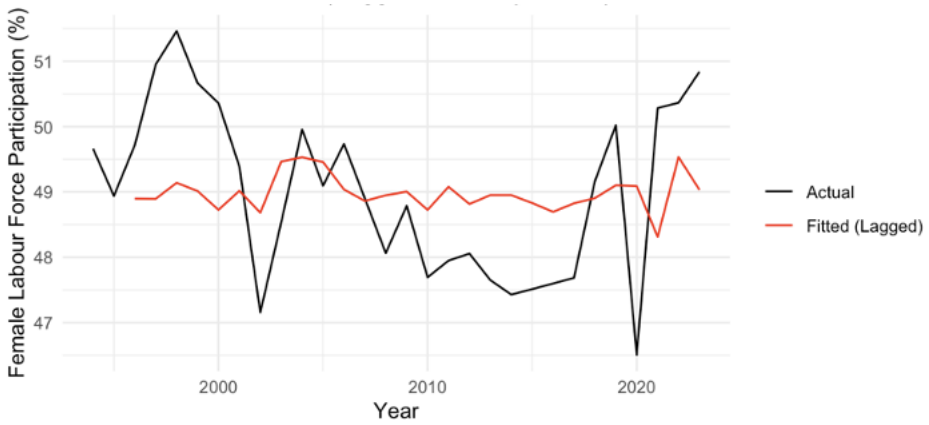
Figure 4: RDD Plot Female Labour Force Participation



4.5 Lagged Effects Model

Across all three models, lagged austerity did not show significant effects on FLFP. The effect of a 1-year lagged austerity on FLFP was positive but very small 0.045. There is additionally no evidence that 2-year lag of austerity had a meaningful delayed effect on FLFP as the very small coefficient was also very far from significance. With the inclusion of both lags in the model, the 2-year lag remains negative and insignificant, suggesting no clear evidence of any delayed effects, one or two years after austerity policies. These lags will still be included in robustness checks to demonstrate any findings are not driven by a delayed response. However, the contemporaneous effect, as seen in the earlier OLS model appears to be more significant.

Figure 5: Actual versus Fitted, Lagged Austerity Model



4.6 IV Estimation

TABLE: IV REGRESSION NEWEY WEST STANDARD ERRORS:

Model	(Intercept)	Austerity	lag(FLFP)	Austerity_hat	lag_FLFP
OLS	24.884** (11.706)	0.089 (0.053)	0.497** (0.238)	NA	NA
IV (IMF Loans)	24.755** (11.944)	NA	NA	0.079 (0.052)	0.499* (0.244)

Using IMF loans as an exogenous instrument, the second stage results revealed that $\widehat{Austerity}$ had a positive but statistically insignificant effect on FLFP, indicated by the p-value of 0.356. This suggested that once instrumented, austerity measures did not have a significant direct effect on FLFP. In contrast, the lagged value of FLFP was positive and statistically significant, p = 0.008, indicating strong persistence in women's labour market participation over time. The overall model was statistically significant, supporting the evidence of the included predictors in explaining FLFP. While the direct effect of austerity appears limited, the lag variable highlights the inertia in labour market outcomes and the importance of past participation trends.

4.7 Mediation Analysis

Table 7: IV Mediation Model with Newey West Standard Errors

Variable	Estimate	NW.Std.Error	t value	p value	Significance
(Intercept)	65.600	7.657	8.567	0.000	***
ChildMarriage_hat	-0.211	0.275	-0.766	0.450	
Education_hat	-0.151	0.049	-3.065	0.005	**

The second stage regression of the mediation analysis suggested that only one of the mediating pathways is statistically significant. $\widehat{Education}$ had a significant negative impact on FLFP (-0.15, SE = 0.049), suggesting that austerity may affect FLFP through its impact on education, although the direction of the result is very unexpected. Rather than enhancing labour market participation, higher levels of upper secondary education, instrumented via austerity exposure are associated with reduced FLFP. This may reflect delayed market entry among better educated women, or limited employment opportunities, especially during periods of fiscal contraction. In contrast, $\widehat{Child\ Marriage}$ was statistically insignificant, although the negative coefficient suggests that a decrease in child marriage

is associated with an increase in FLFP. However, there is no robust evidence that changes in child marriage mediate the relationship between austerity and FLFP in this setting. Overall, the findings provide suggestive evidence that among the proposed social pathways, educational attainment appears to partially mediate austerity's impact on FLFP, in a direction that suggests delayed or reduced participation rather than empowerment through skills. These results highlight the complex and sometimes unintended short-term consequences of externally driven fiscal policy on gendered labour market outcomes.

5. *Analysis and Discussion*

The results indicate a complex relationship between austerity and FLFP in Argentina. While OLS estimates suggest austerity may increase FLFP, this effect weakens when using IMF loans as an instrument. This indicates that simple correlation may overstate the effect of fiscal consolidation on labour market outcomes. Moreover, the lagged models found no delayed effects of austerity, suggesting labour market responses may occur contemporaneously, possibly driven by immediate household income shocks. However, it is necessary to exercise caution when drawing causal inferences from these results due to the inherent complexity of the relationships and the possibility of other unmeasured factors influencing the outcomes. The limited explanatory power in some stages of the analysis also suggests that some models dis not capture all relevant dynamics.

The RDD results showed no significant immediate change in FLFP post-2019 but revealed a reversal in the declining trend of participation, indicating a possible dynamic adjustment over time. However, caution is warranted in interpreting these results, as the cutoff year (2019) closely preceded the onset of the COVID-19 pandemic. Given the widespread labour market disruptions associated with the pandemic, it is difficult to fully disentangle the effect of austerity measures from coinciding shocks during the post-treatment period.

The observed short-term increase in FLFP can be interpreted through the lens of the added worker effect. This finding mirrors the dynamics observed in the 2001 crisis, where despite limited changes in aggregate female participation, the AWE was strong among lower-income and less-educated households (Martinoty, 2015). These patterns reflect the diverse nature of the response to austerity, whereby the burden of adjustment often falls on women in informal employment. Contrary to initial expectations that fiscal tightening would reduce FLFP through public sector job losses and care infrastructure cuts, these results suggest that economic crisis during periods of recession may temporarily override structural barriers to women's labour force entry in Argentina.

The mediation analysis reveals that the pathways through education and child marriage are not straightforward. Notably, higher educational attainment appears to delay women's entry into the labour market rather than enhance immediate participation. This could reflect limited job opportunities or the postponement of labour market engagement among higher educated women. This counterintuitive finding indicates education does not automatically translate into economic empowerment, particularly during periods of fiscal restraint. In addition, while empirical evidence has linked austerity to child marriage, there was no statistically significant evidence to support this pathway in the Argentine context. However, regional disparities could indicate that such effects may be masked in national averages, with rural provinces potentially bearing a disproportionate burden. Thus, further research, incorporating panel data, could be conducted to investigate these possible domestic imbalances. These findings underscore the importance of understanding social dynamics while assessing the developmental consequences of austerity. Investment in human capital is widely recognised as being just as crucial as physical capital in driving development outcomes in low- and middle-income countries (Thirlwall, 2011). Ultimately, while the results highlight that austerity may

prompt a short-term rise in women's labour market activity, its broader social implications risk undermining historical progress on gender equality and inclusive growth.

Despite persistent backlash and the evidently negative social costs associated with austerity, Argentina continues to rely heavily on the International Monetary Fund. In March 2022, an extended fund facility for $44 billion was approved, reaffirming the country's dependence on external finance to stabilise its economy. Since assuming office in December 2023, President Javier Milei has implemented a far right, free-market agenda marked, intensifying fiscal consolidation. These measures have achieved some short-term macroeconomic gains, reducing monthly inflation from 26% to just 4% by June 2024, yet annal inflation remains at a staggering 220% (Statista, 2025). This progressive route to stabilisation has come at the cost of deepening concerns about the distributive effects of austerity, particularly its implications for aggravating poverty and inequality. Argentina's repeated return to IMF bailout, despite the adverse social impacts, raises important questions about the structural constraints facing debtor countries.

Is this cycle of dependency driven by an absence of viable alternatives, or by deeper political and economic constrains that restrict Argentina's ability to pursue more autonomous and socially inclusive fiscal strategies? These dynamics highlight the urgency of restructuring how fiscal policy is designed and evaluated, particularly in terms of its social and gendered consequences.

Understanding the gendered economic impact of austerity is essential for informing future policy design in the Global South. As women's integration into employment has expanded over recent decades, traditional frameworks for analysing recessions must be updated to reflect evolving gender constraints and the differentiated effects of fiscal adjustment. Social and public sector cuts threaten to reverse decades of progress in gender equality by eroding access to jobs, welfare protections, and

care infrastructure, while simultaneously increasing unpaid domestic labour. Furthermore, such measures risk reinforcing traditional gender roles and triggering ideological backlashes against gender equality (Karamessini, 2014). Empirical research demonstrates that women's participation in the labour force correlates with higher GDP per capita in developed countries such as Sweden, the UK, and the USA (Scott, 2022). Education in particular, yields high economic returns, especially when considering increased labour force participation, the value of non-market work, and intergenerational equity (Woodhall, 1973). Replicating these conditions in countries such as Argentina could potentially increase women's educational attainment and reduce child marriage rates, contributing to broader economic and social development. Future policy must therefore incorporate gender mainstreaming as a core design principal, rather than an afterthought to ensure equitable outcomes. Embedding gender-sensitive analysis into fiscal policymaking is not only a corrective to past neglect but a necessary foundation for building inclusive and sustainable economies.

To conclude, this study reveals a nuanced and complex relationship between austerity and female labour force participation in Argentina. While austerity could prompt a short-term rise in women's labour market activity, its broader social and gendered effects remain ambiguous and potentially harmful. The finding's caution against simplistic interpretations of fiscal consolidation's impact, highlighting the need for gender-sensitive policy frameworks that address both economic and social disparities. As Argentina continues to navigate the public debt crisis amid deep structural challenges, future fiscal strategies must prioritise inclusivity and female economic empowerment to foster sustainable development.

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