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IMF Standby Agreements and Inequality: The Role of Informality

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Abstract

In this paper we investigate the response of two inequality metrics to different IMF programs. To this end, we use a relatively large annual (unbalanced) cross-country panel dataset that includes the Gini index and the Estimated Household Income Inequality as the two relevant inequality metrics and covers the period from 1950 to 2016 in an annual basis for 159 countries. Our empirical analysis indicates that in countries where the informal sector size (as percentage of GDP) is relatively larger, the extent of income inequality increases after different IMF programs, but particularly so after standby arrangements. However, we also show that the opposite is true, when informal sector size is small, i.e., inequality declines after different IMF programs.

Keywords: Inequality, Informal Sector, Structural Reforms, IMF, Panel Data
JEL Classification: D63; E26; O17; P11

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1 Introduction

The Stand-By Agreements represent the most prevalent accords suggested by the IMF to assist nations in addressing their immediate balance of payment challenges. Typically spanning one to two years, these programs, backed by substantial IMF resources, exert an influence on domestic institutions due to their reliance on the implementation of specific policy reforms. These reforms aim at reducing budget deficits, liberalizing trade and the capital account, curbing inflation, and executing currency devaluation. Mitigating budget deficits often involves heightened taxation and/or reductions in social expenditures, facilitated by public sector contraction and privatization. This comprehensive policy framework additionally encompasses pension adjustments or freezes, cuts to the minimum wage, and a stance against unionization and collective bargaining, all of which are anticipated to impact income inequality.

The informal sector constitutes another crucial facet intertwined with income inequality. Various definitions of the informal economy exist in the literature. One prevalent interpretation characterizes the informal economy as all economic activities contributing to the officially calculated national income but remaining unregistered (Schneider and Enste, 2000). The International Labour Organization (ILO) defines the informal economy as economic activities not adequately covered by formal arrangements in law or practice (ILO 2002:4). Although distinctions like informal sector and informal employment are frequently used, we prefer using them interchangeably throughout this paper, acknowledging that around 85 percent of informal employment occurs within the informal sector, with the remainder distributed across the formal sector and households (ILO, 2018).

The theoretical literature proposes various pathways through which the informalization of the labor market might impact income inequality (Schneider and Enste, 2000; Mishra and Ray 2010). Simultaneously, feedback effects of income inequality on the size of the informal sector are evident (Elgin and Elveren, 2019). The empirical literature generally aligns with

the view that a larger informal sector correlates with higher income inequality (Elgin and Elveren, 2019).

Furthermore, literature posits that trade and capital account liberalization are likely contributors to increased inequality. The impact of lower inflation on income distribution depends on the responsiveness of different groups to changes in prices (Lang 2018). Currency devaluation, affecting the price ratio of non-tradable to tradable goods, can either alleviate or exacerbate income inequality depending on factors such as the economic activities of the poor. Notably, existing empirical studies suggest an association between IMF programs and heightened income inequality (Lang, 2018 and Oberdabernig, 2010).

To the best of our knowledge, there is no existing empirical research that specifically examines the influence of IMF policies on income inequality, particularly focusing on the informal economy. In this study, we explore the impact of IMF standby agreements on two inequality metrics, utilizing a comprehensive annual cross-country panel dataset covering the period from 1950 to 2018 for 159 countries, including the Gini index and the Estimated Household Income Inequality. Our analysis reveals a significant interaction between the presence of an informal sector and the relationship between IMF standby agreements and income inequality. In countries where the informal sector constitutes a larger percentage of GDP, the extent of income inequality tends to increase following IMF standby arrangements. Conversely, when the informal sector size is relatively smaller, the opposite trend is observed.

The remainder of this paper is structured as follows: The subsequent section offers an in-depth literature review, emphasizing the distinctive contributions of our study. Section three provides an overview of our data and methods. Section four presents the empirical analysis results, and the concluding section offers final remarks.

2 A Brief Literature Review

Pay and income inequality has increased both between and within countries from 1980 through 2000 (Galbraith 2007; 2019) while wealth inequality has increased since the 1980s

consistently (Piketty and Saez 2014). Pay inequality has increased both with respect to manufacturing subsectors and geographic regions (Galbraith 2019). Since the 2000s, overall inequality has remained relatively stable (Milanovic 2020). There are some exceptions and turning points in the pattern of income inequality. Notably, India and China serve as major exceptions as well as Iran who were not part of global financial system and Scandinavian countries with advanced welfare states. When particularly China is considered, the narrative of increasing inequality between nations is no longer valid (Galbraith 2007, 2019; Milanovic 2005). Galbraith notes that turning points occurred around the years of 1971, 1980, and 2000. In each instance, these align with significant changes in the global financial system: the collapse of Bretton Woods, the emergence of the global debt crisis, and the subsequent return to low interest rates and increasing commodity prices after the NASDAQ downturn and the 9/11 attacks, coinciding with China's ascension in global trade (Galbraith 2019). In essence, according to Galbraith, the primary driving force of inequality is not the mainstream education/skilled bias technological change, but financialization.

IMF has played a key role in the increase in income inequality through financial liberalization and other policy suggestions. Fiscal consolidation policies, commonly known as austerity, involve a combination of cuts in public spending and increases in taxation. These policies constitute a core component of IMF structural adjustment programs. The detrimental impact of fiscal consolidation on income distribution has been observed, even when implemented independently, rather than as part of an IMF program (Forster et al 2019: 84). Focusing on different time periods and employing various methods, several studies have shown that the IMF programs have deteriorated various measures of income distribution (Pastor 1987; Garuda 2000; Vreeland 2002; Ball et al. 2013; Oberdabernig 2013; Forster et al. 2019; Lang 2021; Stubbs et al. 2022). The Fund acknowledged its role through structural adjustment programs in the last four decades (Mariotti et al. 2017), and it has positioned itself as a proponent of achieving Sustainable Development Goals related to diminishing poverty and addressing inequalities (IMF 2020). Furthermore, the institution has published some research

papers to show that inequality adversely affects economic growth, highlighting that neoliberal policies have played a role in exacerbating this growing inequality (Dabla-Norris et al. 2015; Ostry et al. 2014; Ostry et al. 2016; IMF 2017; Mariotti et al. 2017). The IMF started acknowledging its direct involvement in the rise of inequality more explicitly when Christine Lagarde assumed the role of Managing Director in 2011 (Mariotti et al. 2017). However, there is a valid criticism that there remains a gap between the IMF's discourse on inequality and its actions to address it (Nun and White 2016; Mariotti et al. 2017).

2.1 The Impact of IMF programs on Inequality

IMF programs to address balance-of-payment crises and associated macroeconomic and structural problems have potentially income distribution deteriorating effects such as aggregate demand management, cuts to public spending, labor market reforms, financial reforms, and trade and capital account liberalization (Kentikelenis, Stubbs and King 2016; Bird et al 2020). Therefore, the Fund programs impact income inequality through reduction in the budget deficit, currency devaluation, and changes in growth rate and inflation rate.

IMF stabilization programs often require limitations on credit to the governments and the acquisition of new foreign debt. Therefore, the governments aim to increase their revenue and/or decrease their expenditures to reduce their budget deficits. Privatization of state-owned enterprises or restructuring tax systems are two main ways to increase revenue. The former reduces public employment, particularly low-level government employees. This has disproportional negative effects on the poor's income as their income mainly consists of the wage. The latter is also likely to worsen income distribution as they are mostly reform income taxes rather than wealth. IMF programs frequently require an increase in value-added taxes, imposing a heavier financial burden on the poor (Reinsberg et al., 2020; Stubbs et al., 2022). Furthermore, the conditions involve reductions in pension benefits, erosion in employment protection, and more flexible labor market arrangements with less social security, so-called flexicurity. These are likely to exacerbate income distribution. Moreover, IMF programs

may require the reduction of food subsidies, potentially impacting the urban poor more significantly while having fewer adverse effects on individuals in rural areas (Bird et al. 2020).

A key objective of stabilization programs is to decrease the price ratio of non-tradable to tradable goods, often achieved through currency devaluation. For rural farmers exporting goods, devaluation can boost the value of agricultural goods in domestic currency, potentially reducing poverty and improving income distribution. However, for urban consumers or rural farmers producing for domestic consumption, income distribution may worsen. Due to the existence of labor-intensive industries in both sectors, making generalizations is complex (Pastor 1987; Garuda 2000; Oberdaberning 2013). When central banks raise interest rates, creditors benefit, often exacerbating inequalities, as the poor are more likely to be debtors. Unequal access to financial services in developing countries means gains from lower inflation or improved investor confidence disproportionately benefit the rich (Foster et al. 2019). The impact of inflation on income distribution depends on how quickly different groups adjust, with a higher inflation rate potentially raising income inequality for poorer individuals facing longer adjustment lags (Garuda 2000).

Finally, in terms of external sector policy reforms, the IMF advocates for fewer restrictions on goods and capital flows, particularly in labor-abundant developing countries. Trade liberalization advocates contend that removing barriers lowers income inequality; however, this is contingent on the terms of trade faced by different population groups (Rodrik, 2011). A sizable literature suggests that financial development and capital account liberalization often worsen income inequality (see Foster et al. 2019). Furthermore, the requirement for financial and trade liberalization accompanies the deregulation of the labor market, weakening workers' rights and increasing deunionization, which in turn leads to higher pay and income inequality (Tongur and Elveren 2014; Card et al. 2022).

Numerous empirical studies have delved into the effects of IMF programs on income inequality. With only a couple of exceptions, these studies reveal that the programs are likely to increase income inequality. Pastor (1987), employing nonparametric methods, focused on

18 Latin American countries from 1965 to 1981, revealing a decline in the labor share of income in the final year of the program compared to the pre-program year. Garuda (2000) examined 58 IMF programs spanning 1975-1991, finding that income distribution and the incomes of the poor worsened in countries engaged in Fund programs, particularly when pre-program external imbalances were severe. Vreeland (2001) used the labor share of income as a proxy for income inequality across 110 countries from 1961 to 1993, demonstrating the negative impact of IMF programs. Conversely, Oberdabernig (2013) explored 86 low- and middle-income countries from 1982 to 2009, suggesting that while IMF agreements initially worsen income inequality, improvements are observed after 2000. Ball et al. (2013) investigated fiscal consolidation episodes in 17 OECD countries from 1978 to 2009, finding notable distributional impacts such as increased inequality, reduced wage income shares, and elevated long-term unemployment. Forster et al. (2019) extended the analysis to 135 low- and middle-income countries from 1980 to 2014, detailing how fiscal, external sector, and financial sector reforms play a significant role in income distribution. Lang (2021) examined 155 countries spanning 1973-2013, highlighting that IMF programs increase inequality, particularly in democracies. The effect is most pronounced three years after the program year and persists for about five years, driven by decreasing absolute incomes for the poor. Covering 135 developing countries from 1970 to 2015, Chletsos and Sintos (2022) showed that IMF programs are associated with increased income inequality for up to five years, with non-concessional programs having a more significant detrimental effect. Stubbs et al. (2022), covering 79 countries from 2002 to 2018, found that stricter austerity measures are linked to increased income inequality for up to two years, driven by income concentration among the top 10% of earners.

Remarkably, two studies reported positive impacts of IMF programs on income distribution. Gunduz et al. (2013), studying 75 low-income countries from 1986 to 2010, found that longer-term IMF engagement is associated with significantly greater reductions in income inequality. In a more recent study, Bird et al. (2020) explored 48 low-income countries from 1990 to 2015, finding no evidence that IMF programs are associated with increasing income

inequality, and in some cases, they are linked to lower inequality. It is essential to note that studies employing propensity score matching methods, such as Gunduz et al. (2013) and Bird et al. (2020), face limitations, including their inability to address selection bias arising from unobservable factors like political will (Stubbs et al. 2022).

2.2 The Impact of Informality on Inequality

Trade liberalization has led to the creation of low-wage positions, particularly in developing nations where firms are compelled to cut costs, resulting in an overall decrease in wages and an escalation of income inequality. Various channels through which the informalization of the labor market may impact income inequality have been explored by researchers (Elgin and Elveren 2021; Dell'Anno, 2016a; Mishra and Ray, 2010; Schneider and Enste, 2000).

On one hand, firms in the informal sector hire low-skilled or unskilled workers, providing income to the poor and excluded, thus improving income distribution. On the other hand, the expansion of the informal sector heightens income inequality by reducing tax revenue that could have been utilized for progressive income redistribution. This, in turn, creates a feedback loop where higher income inequality contributes to informality through reduced human and physical capital accumulation and increased demand for informal sector products.

The growth of the informal sector diminishes tax revenues and social security payments, limiting government funds for income redistribution initiatives such as infrastructure investment, public education, and welfare programs. This reduction in tax and social security bases leads to higher budget deficits and increased tax rates (Mishra and Ray, 2010; Schneider and Enste, 2000; Elgin, 2021). Governments are then forced to increase tax rates to address revenue leaks, creating a cycle where higher tax rates encourage firms and individuals to remain in or switch to the informal economy. The informal economy also contributes to a lack of trust in government and institutions, fostering corruption and illegal activities among disgruntled citizens.

Conversely, the informal economy has some positive impacts on income distribution. It predominantly employs individuals who struggle to secure formal sector jobs, providing a source of income for low or unskilled workers and acting as a safety net during periods of high unemployment. Moreover, the sector enhances workers' skill levels, contributing to human capital accumulation in the broader economy. Thus, by offering job opportunities to low-income workers, the informal economy may, to some extent, contribute to improved income distribution.

A substantial body of empirical research has explored the intricate relationship between income inequality and the informal sector, yielding diverse findings (Elgin and Elveren 2021). Rosser et al. (2000, 2003); Ahmed et al. (2007), Chong and Gradstein (2007); Dell'Anno (2008), Mishra and Ray's (2010), Berdiev and Saunoris (2019), Saha et al. (2021), Amarante and Arim (2023), and David et al. (2023) identified a positive relationship between the informal economy and income inequality for different country groups and time periods. Some country case studies also support this positive association (Winkelried 2005; Krstic and Sanfey 2007, 2011; Amarante and Arim 2015; Amarante et al. 2016; Binelli 2016; Elveren and Ozgur 2016; Zuo 2016; Ariza and Montes-Rojas 2017, Esaku 2021).

However, divergent findings have been reported by other studies, revealing either insignificant or even negative relationships between inequality and informality, for different time periods and country groups (Eilat and Zinnes 2002; Gutierrez-Romero 2007; Dell'Anno and Solomon 2014; Dell'Anno 2016b; Huynh and Nguyen 2020). Yap et al. (2018) found a distinctive pattern: in OECD countries, there exists a noteworthy inverted-N relationship between income inequality and the shadow economy, whereas in developing countries, the association takes on the form of an inverted-U relationship. Finally, the works of Elgin and Elveren (2019) and Elgin et al. (2020), spanning 125 countries for 1963-2018 and 86 countries for 1960-2016, respectively, demonstrated that the association between informality and inequality is more likely to be negative in developed countries and positive in developing ones.

2.3 The IMF programs and Informality

IMF programs have also indirect impact on income distribution through their impact on economic growth, where the size of informal sector plays a crucial role. When governments reduce their expenditures to address the program requirements, the level of economic activities declines, lower both employment and salaries. The magnitude of change depends on the size of fiscal multiplier, which is significantly affected by the presence of informal sector. For instance, alterations to social assistance programs can yield varied effects. General reductions in social benefits may not significantly affect the disposable income of individuals in the informal sector, but they can have a noticeable impact on workers in the formal sector (Stubbs et al. 2022).

Colombo et al. (2022) reviews studies that show the impact of informality on the magnitude of fiscal multipliers. For instance, Lemaire (2020) discovers that fiscal multipliers tend to be larger in countries with a low degree of informality, while nations characterized by high levels of informality exhibit a subdued response of official GDP to the consolidation shock. Pappa et al. (2015) present evidence indicating that spending cuts prompt a reallocation of production towards the formal sector. On the other hand, Dellas et al. (2017) demonstrate that the substantial forecast errors linked to fiscal consolidation in Greece during the Euro area debt crisis can be primarily attributed to the common modeling practice of neglecting the informal sector. They argue that the fiscal consolidation initiated since the onset of the crisis has led to a significant expansion of the Greek shadow economy. In the case of Italy, Basile et al. (2016) illustrate that fiscal expansions result in a reduction in the share of unreported income. Lastly, Colombo et al. (2022), focusing on 141 developed and developing countries, reveal that high informality correlates with a decrease in the size of the public expenditure multiplier. Nevertheless, Ari et al. (2022) found that during the 2020 pandemic, fiscal policies proved more effective in developing countries with a larger informal sector. The authors suggest that this effectiveness is likely a result of the relatively weak enforcement of pandemic containment measures in these regions. Furthermore, the IMF programs may

affect the size of informal sector directly. Blanton et al. (2018) demonstrate, using a panel of 145 countries spanning 1971-2012, a significant association between IMF programs and a larger informal economy. Firstly, the structural changes mandated by the IMF may have an adverse effect on state capacity, leading to a reduction in bureaucratic quality. The inability to hire skilled personnel and prolonged bureaucratic processes act as disincentives for conducting business in the formal sector. Secondly, IMF conditions limit the benefits available to workers in the formal sector, including cuts in social benefits and a decline in worker rights, thereby diminishing the advantages of formal employment. In a recent study, Adam and Moutos (2023) presented a similarly significant finding based on all IMF conditionality programs spanning from 1990 to 2018. The findings suggest that IMF programs that lead to public sector dismissal cause a significant shift from formal sector activities in the private sector to its informal counterpart. This is due to the expansion of the private sector workforce resulting from public sector dismissals, which, in turn, exerts downward pressure on wages for informal sector workers, thereby increasing informal employment. Consequently, a decline in the informal wage rate stimulates demand for low-quality goods at the expense of their high-quality counterparts, leading to a boost in the output of the informal sector at the expense of the formal sector's output. Finally, based on a DSGE model of Brazil, Costa Junior et al. (2020) demonstrate that, in the case of fiscal consolidation, a high level of informality serves as a shock absorber, improving public debt sustainability and preventing an austerity-induced recession. However, if the level of informality is relatively low, these positive impacts are not very substantial, and the effect is not long-lasting.

In conclusion, the literature on income inequality reveals a complex interplay of factors contributing to its evolution over the past few decades. From the overarching trend of increasing income inequality globally, particularly between and within countries, to nuanced exceptions such as the divergent paths taken by China and Scandinavia, this review underscores the multifaceted nature of the issue. Notably, the role of the International Monetary Fund (IMF) emerges as a significant driver of income inequality through its policy prescrip-

tions and structural adjustment programs. The IMF's influence is seen in the form of fiscal consolidation policies, which include austerity measures, contributing to a decline in public spending and exacerbating income distribution. The impact of IMF programs extends beyond borders, affecting not only economic growth but also the informal sector, where the size and dynamics play a pivotal role in shaping income distribution. Critically, the literature presents a spectrum of outcomes regarding the effects of IMF programs on income inequality, with studies highlighting both positive and negative associations. The contention between the IMF's discourse on inequality and its actions, as well as the acknowledgment of its role in exacerbating inequality, points to the need for a more coherent and effective approach to address these issues. The link between trade liberalization, the informal sector, and income inequality further complicates the narrative, demonstrating that the consequences of economic policies are intertwined and often unpredictable. Ultimately, this literature review underscores the importance of a comprehensive understanding of income inequality that goes beyond conventional economic factors. It calls for a reevaluation of policy approaches, particularly those advocated by international financial institutions, to ensure that they align with the goal of reducing inequality and promoting sustainable development. As the global community grapples with the challenges posed by income inequality, it becomes imperative to consider the nuanced interactions among economic policies, global financial systems, and the intricate dynamics of the informal sector to pave the way for more equitable and inclusive societies.

3 Data and Methods

3.1 Data

We employ two alternative measures of income inequality: the Estimated Household Income Inequality (EHII) and the Standardized World Income Inequality Database (SWIID). We prefer to use EHII data set provided by the University of Texas Inequality Project (UTIP)

as the primary inequality variable. EHII is the combination of the industrial pay inequality index calculated using Theil T Statistic and Deininger and Squire (1996) datasets, based on some econometric methods (Galbraith and Conceicao 2001; Galbraith and Kum 2005). Dataset covers 150 countries from 1963 to 2015, providing the highest number of observations (approximately 4000) compared to other databases without interpolation. We also use SWIID complied by Sold (2019). The SWIID offers Gini coefficients for 196 countries covering the time frame from 1960 to the present day. SWIID relies on EHII as one of the source datasets. SWIID owes its expanded coverage to extensive interpolation and imputation, which becomes problematic in countries with sparse surveys (Galbraith et al. 2016; Galbraith and Choi 2020). However, we do not hesitate to use it as an alternative variable to take advantage of its wide coverage to robustness check.

Some other major datasets are also available, each with its own set of pros and cons. Galbraith et al. (2016) provide a comprehensive analysis of these datasets. For instance, the Luxembourg Income Study provides a fully-consistent dataset based on surveys, but it covers only relatively small number of mostly high-income countries. The World Bank inequality index relies on member countries' official data, providing extensive coverage but suffering from inconsistency as countries' surveys are not comparable. The World Inequality Database (WID), provided by Piketty and his colleagues, is based on tax information. It offers valuable information about top incomes, but it has sparse coverage, weak comparability among countries, and faces continuity issues due to changes in tax laws. Therefore, Galbraith et al. (2016) note that WID is the least consistent dataset among major income inequality databases. The main disadvantage of Milanovic's (2005, 2016) dataset is that it basically depends on between-country comparisons based on PPP estimates. Therefore, it reflects not genuine within-country inequalities but rather inequalities based on estimated differences in country-average household income.

Additionally, we use a novel data set on the size of informal economy provided by Elgin et al. (2019), based on the two-sector dynamic general equilibrium (DGE) model of Elgin and Oztunali (2012). This panel dataset covers 161 countries from1950 to 2018[1].

Table 1: Descriptive Summary Statistics of the Complete Dataset

Variable	Mean	Median	Std. Dev.	Min	Max
EHII	43.69	44.76	6.37	20.97	62.85
Gini	39.59	38.00	9.99	15.90	74.30
Stand-by (dummy)	0.06	0.00	0.23	0.00	1.00
Informal Sector (% GDP)	38.25	37.25	14.97	7.92	75.34
Low-Income (dummy)	0.13	0..00	0.34	0.00	1.00
Lower-Middle Income (dummy)	0.25	0.00	0.43	0.00	1.00
Upper-Middle Income (dummy)	0.31	0.00	0.46	0.00	1.00
Trade Openness (% GDP	41.54	28.73	41.78	0.01	189.73
Real GDP per-capita (000 USD)	10.80	5.90	16.89	0.16	85.25
GDP Growth (%)	3.86	4.08	5.99	-13.58	18.84
Government Spending (% GDP)	18.95	17.06	9.74	1.51	53.20

Table 1 presents descriptive summary statistics (mean, median, standard deviation, minimum and maximum values) of all variables used in the empirical analysis. The presented data aims to offer a comprehensive overview of the dataset's key characteristics, facilitating a deeper understanding of the variables under consideration. At the top panel, we present the relevant statistics of the two income inequality metrics. At the bottom panel, we illustrate the statistics for all the explanatory variables, including all the control variables. Standby agreement years are obtained from the IMF. Moreover, in addition to the informal sector size and the stand-by agreement we use trade openness (defined as the percentage of the sum of exports and imports to GDP), real GDP per-capita, real GDP growth (in %) and government spending (as % GDP) as well dummies for low-income, lower-middle income and upper-middle income countries as classified by the World Bank. Data for all the control variables are obtained from the World Development Indicators of the World Bank.

[1]We also have estimated all the equations with the shadow economy size (again % GDP) series provided by Medina and Schneider (2018) obtain strikingly similar results, which are available upon request from the corresponding author.

3.2 Methods

In our empirical analysis, we undertake a twofold approach to thoroughly examine the dynamics of inequality surrounding a generic IMF standby agreement. Firstly, we present a detailed account of the evolution of inequality both before, during, and after the implementation of the agreement. This allows for a visual representation of the raw data trends over time. Subsequently, we employ a more sophisticated statistical analysis through a series of least-square regressions. These regressions incorporate year fixed effects, regional dummies, and various control variables to discern the nuanced relationships between inequality and pertinent factors. To enhance the depth of our analysis, we incrementally introduce explanatory variables to the right-hand side of the regression, facilitating a comprehensive understanding of their individual and collective impacts. Additionally, we extend our analysis by conducting two instrumental variable (IV) regressions. In these regressions, we utilize lagged values of the independent variables as instruments for their contemporaneous levels. This instrumental variable approach helps address potential endogeneity concerns and enhances the robustness of our findings. Alongside these IV regressions, we present the results of essential diagnostic tests, including the J-test, a test for under-identification, and the F-test of the first stage of the IV regression. These diagnostic tests serve to assess the validity and reliability of the instrumental variable strategy employed in our analysis.

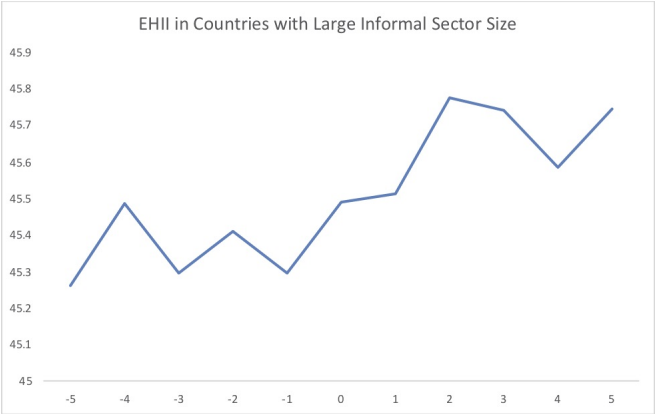
4 Results

4.1 First Look at the Plain Data

Figures 1 and 2 illustrate the behavior of the two inequality metrics through an IMF standby agreement. In both figures, time 0 indicates the year when the IMF standby agreement starts to be implemented and in the figures we report the evolutions of medians of the samples five years before and after the agreement comes into effect. To draw these figures,

Figure 1: EHII and IMF Standby

(a) Large



(b) Small

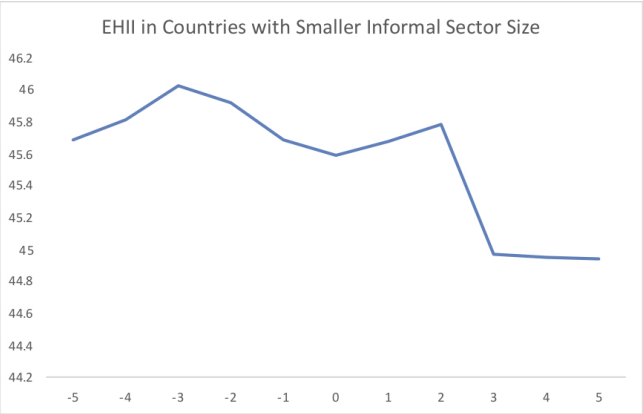
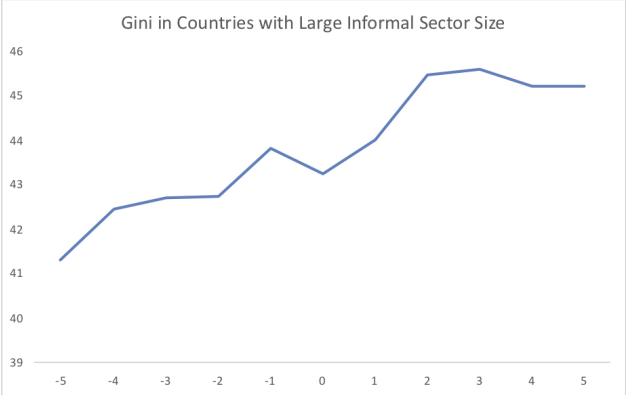
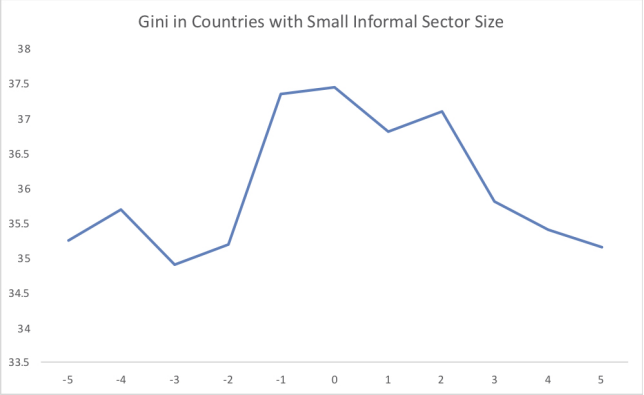


Figure 2: Gini and IMF Standby

(a) Large



(b) Small



we first calculate the median informal sector size across countries in the world and then draw figures for countries below and above this median values separately.

Here, we visually observe the striking difference between countries with relatively larger and smaller informal sector size. That is, through a generic IMF standby agreement, in countries where informal sector size above the median of the world, income inequality rises after the agreement, whereas the opposite is true for countries having a below median informal sector size. This observation is true for both of our inequality metrics.

Table 2: Benchmark OLS Regressions of Estimated Household Income Inequality

Variable	OLS	OLS	OLS	OLS	OLS	OLS	OLS	IV
IMF Stand-by	-2.41**	-2.49***	-1.41**	-1.42**	-1.43**	-1.37**	-1.34**	-6.40***
	(0.99)	(0.76)	(0.67)	(0.61)	(0.61)	(0.61)	(0.62)	(2.11)
IMF Stand-by· Informality	9.17***	8.49***	4.79***	4.91***	4.80***	4.58***	4.52***	22.11***
	(2.05)	(1.63)	(1.45)	(1.32)	(1.32)	(1.32)	(1.32)	(4.30)
Upper-Middle		5.87***	3.85***	3.70***	3.63***	3.63***	3.36***	9.32***
		(0.16)	(0.16)	(0.16)	(0.16)	(0.16)	(0.15)	(3.11)
Lower-Middle		8.68***	6.56***	6.72***	6.73***	6.72***	6.49***	-0.04
		(0.14)	(0.19)	(0.19)	(0.19)	(0.19)	(0.19)	(1.30)
Low-Income		9.20***	6.29***	6.43***	6.49***	6.75***	6.20***	12.99***
		(0.22)	(0.29)	(0.27)	(0.27)	(0.27)	(0.28)	(1.70)
Gov. Sp.(%)					-6.05***	-6.09***	-4.88***	
					(1.30)	(1.30)	(1.31)	
GDP per-capita (000 USD)						0.001***	0.01*	
						(0.0004)	(0.007)	
Trade Openness (% GDP)							-1.54***	
							(0.14)	
Growth (%)							6.40***	
							(1.50)	
Region Dummies	NO	NO	YES	YES	YES	YES	YES	
Year Fixed Effects	NO	NO	NO	YES	YES	YES	YES	
Observations	6425	6425	6425	6425	6425	6425	6417	6017
R-squared	0.01	0.38	0.51	0.56	0.57	0.57	0.58	
J-Test								0.19
Under-identification								0.00
F-Test (1st stage)								0.00

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

4.2 Regression Results

Next, in Table 2 we present the regressions of the EHII. The table presents the results of least square regressions and IV analysis examining the relationship between various economic factors and estimated household income inequality. The first set of coefficients pertains to the variable IMF Stand-by, indicating the impact of countries entering into an IMF Stand-by agreement on income inequality. The coefficients are consistently negative and statistically significant at the 1% level across all OLS specifications, suggesting that being under an IMF Stand-by agreement (without considering the presence of informality into account) is associated with a reduction in household income inequality. The IV coefficient for the same variable is even more substantial in magnitude, indicating a potentially stronger effect when using instrumental variables. However, the interaction term between informality and IMF

agreements demonstrates a positive and statistically significant relationship with income inequality in all OLS and IV specifications. This implies that the impact of IMF Stand-by on income inequality significantly interacts with informality and therefore its nature changes in economies characterized by higher informality. That is, when informal sector size increases, the negative association between IMF Stand-by agreements and inequality rises (or decreases in magnitude) and even can become positive in countries with large informal sector size. This observation is in line with Figure 1.

Moreover, the coefficients for Upper-Middle, Lower-Middle, and Low-Income dummies represent the income levels of countries relative to a base category of high-income countries. These coefficients are positive and statistically significant, indicating that relative to high-income countries, across these categories, low-, lower-middle and upper-middle income countries tend to have higher household income inequality. However, the coefficient for "Lower-Middle" in the IV specification is negative but statistically insignificant, suggesting caution in interpreting this particular result. For the other control variables the results show that higher government spending as a percentage of GDP is associated with lower income inequality, while higher GDP per capita is positively related to income inequality. Trade openness and economic growth also exhibit significant relationships with income inequality. The inclusion of region dummies and year fixed effects addresses potential omitted variable bias and time-specific trends, respectively. The R-squared values increase from 0.01 in the first specification to 0.58 in the final specification, indicating an improvement in explanatory power. Additionally, the J-test and under-identification test results suggest that the instruments used in the IV analysis are valid. In summary, the results highlight the nuanced relationship between various economic factors and household income inequality, emphasizing the importance of considering both direct effects and interactions in understanding these dynamics.

Next, Table 3 illustrates the regressions of the Gini Index. The results overall align well with the findings in the previous table related to household income inequality. The IV

Table 3: Benchmark OLS Regressions of Gini Index

Variable	OLS	OLS	OLS	OLS	OLS	OLS	OLS	IV
IMF Stand-by	-6.06***	-6.36***	-3.39***	-3.41***	-3.44***	-3.57***	-3.56***	-9.11***
	(1.93)	(1.72)	(1.14)	(1.15)	(1.14)	(1.11)	(1.14)	(2.01)
IMF Stand-by· Informality	20.54***	20.04***	11.69***	11.43***	11.52***	11.98***	12.50***	39.40***
	(4.70)	(4.29)	(2.89)	(2.87)	(2.87)	(2.81)	(2.89)	(6.72)
Upper-Middle		9.32***	3.70***	3.62***	3.62***	3.42***	3.35***	21.32***
		(0.36)	(0.29)	(0.29)	(0.29)	(0.29)	(0.31)	(1.17)
Lower-Middle		5.30***	1.74***	1.43***	1.45***	1.65***	0.87**	16.07***
		(0.41)	(0.32)	(0.32)	(0.32)	(0.32)	(0.37)	(1.10)
Low-Income		6.63***	-1.25	2.26**	2.33***	2.03**	3.02***	12.72***
		(0.71)	(0.88)	(0.89)	(0.90)	(0.90)	(0.94)	(1.38)
Gov. Sp.(%)					-2.64	2.45	-4.55**	
					(1.74)	(1.81)	(2.79)	
GDP per-capita (000 USD)						-0.06***	-0.01***	
						(0.02)	(0.003)	
Trade Openness (% GDP)							0.33	
							(0.36)	
Growth (%)							2.84	
							(2.38)	
Region Dummies	NO	NO	YES	YES	YES	YES	YES	
Year Fixed Effects	NO	NO	NO	YES	YES	YES	YES	
Observations	3485	3485	3485	3485	3485	3485	3458	3158
R-squared	0.01	0.17	0.61	0.64	0.64	0.66	0.64	
J-Test								0.23
Under-identification								0.00
F-Test (1st stage)								0.00

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

coefficient is more pronounced in magnitude, suggesting a stronger association when using instrumental variables. The positive and significant coefficient for the interaction term implies that the impact of IMF Stand-by on the Gini Index is more substantial in economies characterized by higher informality. This result is also very much in line with what we observe in Figure 2. The positive coefficients for the income level dummies (Upper-Middle, Lower-Middle, and Low-Income) indicate that relative to high-income countries, low-, lower-middle and upper-middle income economies tend to have higher Gini indices, reflecting higher income inequality. This is consistent with the patterns observed in the previous table, reinforcing the idea that economic development often correlates with increased income inequality.

As for the other control variables the results are somewhat different than in Table 2. First, trade openness and GDP growth are now not significant. The estimated coefficient of GDP

per-capita is now negative, contrary to this coefficient in the previous table. The coefficient of government spending is only significantly negative in the last regression. Moreover, similar to the previous table, the inclusion of region dummies and year fixed effects enhances the robustness of the results. The high R-squared values and satisfactory results in the J-test and under-identification test provide confidence in the validity of the regression analysis. In summary, the Gini Index regression results reaffirm some of the findings from the household income inequality regression. Countries under IMF Stand-by agreements tend to experience lower income inequality, and the relationship is more pronounced in economies with higher informality. Income levels, government spending, and trade openness also play significant roles in shaping income distribution, highlighting the complex interplay of economic factors.

Overall, the negative coefficients for the MF Stand-by across all specifications along with the positive and significant coefficient for the interaction term indicates that the impact of IMF Stand-by on income inequality is more pronounced in economies with higher informality. This could be because IMF programs may have differential effects in informal economies, potentially exacerbating inequality through their impact on formal sectors or social safety nets. In summary, the results suggest that policy measures such as IMF Stand-by agreements, government spending, and trade policies play crucial roles in shaping household income inequality. The nuanced interactions and varying effects across income levels and informal economies underscore the importance of tailoring economic policies to address specific challenges in different contexts.

Our results indicate that IMF Stand-by agreements have a less pronounced negative (i.e. reducing) impact on income inequality when the size of informal sector is larger. According to the estimates presented in both tables, this negative correlation turns to positive one when the size of informal sector reaches the range of 25-30% in different regressions. That is the marginal effect of the IMF Stand-by on inequality is becomes definitely positive above 30% of informal sector size and even at lower levels of informality in some regressions. In essence, the interaction between informality and IMF programs plays a key role in determining

their ultimate impact on income inequality. This finding aligns with existing literature and adds some more valuable insights. First, the ultimate positive relationship between IMF programs and income inequality is in line with the findings of the literature on the effect of IMF programs on income inequality (Pastor 1987; Garuda 2000; Vreeland 2002; Ball et al. 2013; Oberdabernig 2013; Forster et al. 2019; Lang 2021; Stubbs et al. 2022). However, other strands of literature suggest complex interlinked mechanisms regarding the dynamics of informality and inequality during fiscal consolidation. For instance, as discussed above, Lemaire (2020) and Colombo et al. (2022) argue that higher informality is associated with lower fiscal expenditure multiplier, suggesting that fiscal consolidation may have a relatively smaller negative impact on growth and, consequently, a lower increase in income inequality. This mechanism implies that the negative impact of IMF programs on income distribution might be milder at higher levels of informality, as the informal sector serves as a shock absorber, as indicated by findings in the context of Brazil (Costa Junior et al. 2020). However, contrary to this result, our findings suggests that IMF Stand-by agreements are likely to increase income inequality if the share of informal sector is higher. Our result is in line with a sizeable literature showing that higher informality is linked to increased pay and income inequality across different set of countries, different development levels, and time periods (inter alia Rosser et al. 2000, 2003; Ahmed et al. 2007; Chong and Gradstein 2007; Dell'Anno 2008; Elgin and Elveren 2019; and Elgin et al. 2020). Informality's impact on income inequality is attributed to its effect on shrinking tax revenues and social security payments, leaving fewer funds for the government to redistribute income and improve the economic conditions of the poor. Additionally, higher informality exacerbates income inequality by creating a vicious cycle: declining tax revenues and social security payments lead to budget deficits, forcing governments to raise tax rates to compensate for the revenue decline, thereby making the informal sector more appealing.

The empirical analysis results presented in Tables 2 and 3 shed light on the intricate relationship between IMF programs, informality, and household income inequality. The em-

pirical findings contribute depth to this understanding by showcasing that the influence of IMF programs on income distribution is not uniform but varies depending on the level of informality in an economy. Moreover, the results echo the complexity of factors influencing income distribution, as discussed in the literature review. The positive coefficients for income level dummies (Upper-Middle, Lower-Middle, and Low-Income) suggest that, relative to high-income countries, economies at different income levels tend to exhibit varying levels of household income inequality. This finding resonates with the literature's emphasis on the diverse global patterns of income inequality. In summary, the empirical results build a bridge between the extensive literature review and the specific findings of this study. The nuanced interactions and varying effects across income levels and informal economies underscore the importance of context-specific policy measures. The negative coefficients for IMF Stand-by agreements and their interaction with informality emphasize the need for careful consideration of the implications of such programs on income inequality, particularly in economies with higher informality. These findings contribute to the ongoing discourse on the role of international financial institutions and economic policies in shaping income distribution dynamics.

5 Concluding Remarks

This paper has explored the relationship between IMF Standby Agreements and income inequality, with a particular focus on the role of the informal sector. Our analysis, based on a comprehensive cross-country panel dataset spanning from 1950 to 2018 for 159 countries, reveals important insights into the dynamics of income inequality in the context of IMF programs. To summarize our findings, we observe a nuanced relationship between IMF standby arrangements and income inequality, contingent upon the size of the informal sector in a given country. In countries where the informal sector constitutes a larger share of the GDP, we find that income inequality tends to increase after the implementation of IMF standby agreements. Conversely, in countries with a relatively smaller informal sector, the opposite trend emerges, and income inequality shows a decline following such agreements.

These results underscore the importance of considering the heterogeneity of economic structures when analyzing the impact of IMF programs on income distribution. The presence of an informal sector, which often involves vulnerable and marginalized groups, interacts with the policy measures imposed by the IMF, influencing the overall inequality outcomes. Policymakers and international institutions need to recognize these differential effects to design more targeted and effective interventions that consider the specific characteristics of each economy.

Looking ahead, our findings suggest that future studies on the relationship between IMF programs and income inequality should incorporate the dimension of informality for a more nuanced understanding. Additionally, exploring the channels through which informalization affects income distribution and how policy measures can be tailored to address these dynamics would be a fruitful avenue for future research. However, it is crucial to acknowledge the limitations of our study. The empirical analysis relies on aggregated data, and causality cannot be firmly established due to the observational nature of the study. Moreover, the specific policy mechanisms within IMF standby agreements that drive the observed effects on income inequality remain an area for further investigation.

In conclusion, our research contributes to the ongoing discourse on the social implications of economic policies by highlighting the intricate interplay between IMF programs, informality, and income inequality. Recognizing the diverse impact of these programs across different economic contexts is essential for designing policies that promote not only economic stability but also equitable and inclusive development.

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