

The Relationship Between Population Age and Economic Informality

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Abstract

This paper empirically explores the relationship between informal sector size and population dynamics. Through linear regressions using data from 180 countries over the span of 67 years, this work proves the association and contributes a new perspective to the literature. Furthermore, this paper provides and examines three theoretical frameworks that could be an explanation for the observed phenomenon: Institutional strength in the context of economic informality, retirement & general employment in older countries, and the interaction between the demographic dividend and job spillover. Finally, this paper discusses how the notion that older populations are correlated with smaller informal sectors could affect future policies, as well as provides thoughts on future research in the subject. The main question this paper seeks to answer is whether or not the age of a given population has any correlation with the informal sector size of the country it belongs to.

Keywords: Informality; Population; Age Distribution; Shadow Economy

1. Introduction

There is a growing and wide array of literature on the diverse factors which may affect informality in a country, excluding the age of population. Many commonly researched factors include gender, poverty levels, societal inequality, and education rates. This paper aims to close this gap in the literature and answer the question of whether or not population age is related to the informal sector size of a country, and how?

In order to do this, this paper utilizes data from the World Bank and linear regressions to empirically prove a negative correlation. In addition, it proposes three conceptual ideas as to why this occurs: increased federal and institutional strength as a mechanism of countries with aging constituents, decreased general economic activity in older populations, and the existence of a labor force surplus in younger states.

1.1. Economic Development

1.1.1. National Development Level

Most principally, economic informality is much more present in low-income than high-income states, and decreases with economic growth (La Porta, Shleifer 2014)(1). On a regional scale, informality is primarily concentrated in the urban poor communities of advanced, post-industrial economies (Bonnet & Venkatesh, 2016)(2). It makes frequent appearances in concentrated areas of disenfranchised, underprivileged, and unemployed peoples, who are in the absence of Fordist job methodology. In fact, the Dualist school of thought of economic informality surmises that poverty is the sole determinant and promoter of the shadow economy. This fact makes another contribution to a growing wage gap (between classes of people rather than genders).

1.1.2. Income Inequality

Income inequality has been empirically proven to be a determinant of informal sector size within a country. This relation can be explained by the following: As economic inequality increases, so does the disparity in access to resources for lower-income peoples and firms. Unable to afford costs of compliance nor access to certain opportunities (i.e. taxes, licensing, and regulations), constituents are incentivized to engage in the informal economy which does not have such roadblocks (Chong & Gradstein, 2007)(3). Take, for example, the economies of

Mexico and Brazil in the 21st century. Mexico, with a GINI coefficient ¹ of 0.49, has a mean (1950-2017) IS/Y² of 0.3518 and median 0.3314. In contrast, Brazil, which has a higher GINI coefficient of 0.57 has a mean (1950-2017) IS/Y of 0.4327 and a median 0.4012 (Amendolara, 2022)(4) (**also our spreadsheet—not sure how to cite). This is a notable percentage point increase by roughly 8%.

1.2. Gender

The informal economy contains a notably higher proportion of female workers than male workers. Nearly 80% positions intended for females are informal, compared to a male 66% (Torkington, 2024)(5). In recent decades, the share of female involvement in the informal sector has increased, particularly in East Asia and Latin America. This disproportionate informal opportunity manifested in 58% of all employed women being a part of the informal sector (Bonnet, Vanek, Chen, 2019)(6). While a regional analysis of continents such as Africa would suggest differing –or even decreasing– degrees of female informal labor force, overall global rates show an upward trend (Sethuraman, 1998)(7).

1.3. Educational Level

A lack of education is continually causing an increase in informality, particularly for women. Access to formal and upper education has a negative correlation with involvement in the informal economy, as it increases access to formal labor (Sethuraman, 1998)(7). Therefore, a lack of education in countries would correlate to a higher presence of informality. Methods of tackling social inequality other than increasing educational levels have also shown to have some effect (Ela, 2013)(8).

¹ Producing a digit between 0-1 –0 representing perfect inequality–, the GINI coefficient was derived from a Lorenz Curve in 1912 and has since been utilized as a tool to evaluate income disparity and institution quality.

² The IS/Y represents the informal sector size as a fraction of formal sector size, within a given country. A high figure indicates low formal sector dependency and high informal activity, and vice versa.

1.4. Economic Policy

Countries with strong policies regarding tax compliance, inclusive social protection systems, and business growth have low levels of informality (Oviedo, Thomas, Karakurum-Ozdemir, 2009)(7). In addition, a focused study on Colombia, found that the country's weak social security program which subsidized solely people in extreme poverty promoted the national informal economy as well as lowered wages and worsened working conditions (Saavedra-Caballero, Ospina Londoño, 2018)(8).

1.5. In Review

While literature on gender, development level, social institution quality/access, and economic policies is well developed, research on population age is not. This paper aims to answer this question: How does an aging population affect the informality of a nation?

2. Data & Methods

2.1. Methods

In order to provide a deeper understanding of this theoretical correlation, this section empirically investigates data from over 180 countries over the time span of 1950-2017. Eight linear regressions with & without country and time dummies were run to examine the mathematical association between informal sector size (IS/Y) and the following: population percentage above the age of 65, population above age of 85, male population above the age of 80, and female population above the age of 80. Extracted from the World Bank, IS/Y vs. GDP per capita is also examined in the regression tables.

2.2. Data

Table 2. Population above 65

	Coefficient	std. err.	t	P> t	[95% conf. interval]
% above 65	-.005022	.0003154	-15.92	0.000	-.0056404 -.0044037
gdp/cap	-2.76e-06	7.68e-08	-35.90	0.000	-2.91e-06 -2.61e-06
_cons	.4137355	.0024364	169.81	0.000	.4089589 .4185121

Table 3. Population Above 65 (with dummies)

	Coefficient	std. err.	t	P> t	[95% conf. interval]
% above 65	-.0037392	.0008624	-4.34	0.000	-.0054299 -.0020485
gdp/cap	-2.90e-06	1.62e-07	-17.90	0.000	-3.22e-06 -2.58e-06
_cons	.4708653	.0075408	62.44	0.000	.4560813 .4856493

Table 2 & 3 describe a linear regression run between economic informality and population percentage above 65. Table 2 is done without dummies, while Table 3 is done with time and country dummies³, so as to acknowledge the separate countries and time periods within the calculations. Both tables show a clear negative correlation between the IS/Y of a country and the percent of its population above the age of 65.

Table 4. Population above 85

	Coefficient	std. err.	t	P> t	[95% conf. interval]
% above 85	-.010897	.0005694	-19.14	0.000	-.0120132 -.0097807
gdp/cap	-2.59e-06	7.50e-08	-34.49	0.000	-2.73e-06 -2.44e-06
_cons	.4054271	.0021742	186.47	0.000	.4011646 .4096896

Table 5. Population above 85 (with dummies)

³ Dummy variables are used in regression analyses to represent categorical subgroups within the data. They take on the binary value of either 0 or 1 in order to indicate such data, which can help account for a possible shift in value.

	Coefficient	std. err.	t	P> t	[95% conf. interval]
% above 85	-.0059852	.0013303	-4.50	0.000	-.0085933 -.0033771
gdp/cap	-2.87e-06	1.69e-07	-16.94	0.000	-3.20e-06 -2.54e-06
_cons	.4491552	.0084498	53.16	0.000	.4325891 .4657214

Table 4 and 5 represent the results of a linear regression run between IS/Y and percentage of a given population aged above 85. Table 5 is done with time and country dummies, Table 4 is without. Just as Table 2 and 3 did, these two show a clear negative correlation between informal sector size and population age.

Table 6. Male population above 80

	Coefficient	std. err.	t	P> t	[95% conf. interval]
above 80 male	-.0315713	.0015977	-19.76	0.000	-.0347036 -.0284389
gdp/cap	-2.60e-06	7.40e-08	-35.08	0.000	-2.74e-06 -2.45e-06
_cons	.4066243	.0022069	184.25	0.000	.4022977 .4109509

Table 7. Male population above 80 (with dummies)

	Coefficient	std. err.	t	P> t	[95% conf. interval]
above 80 male	-.0160393	.0031811	-5.04	0.000	-.0222759 -.0098028
gdp/cap	-2.89e-06	1.68e-07	-17.17	0.000	-3.22e-06 -2.56e-06
_cons	.4488022	.0083304	53.88	0.000	.4324702 .4651342

Table 6 and 7 represent linear regressions between IS/Y and male population above 80 years, without and with dummies (time and country), respectively.

Table 8. Female population above 80

	Coefficient	std. err.	t	P> t	[95% conf. interval]
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above 80 female	-.0160366	.0008806	-18.21	0.000	-.017763	-.0143102
gdp/cap	-2.61e-06	7.61e-08	-34.26	0.000	-2.75e-06	-2.46e-06
_cons	.4041475	.0021543	187.60	0.000	.3999241	.408371

Table 9. Female population above 80 (with dummies)

	Coefficient	std. err.	t	P> t	[95% conf. interval]
above 80 female	-.0090293	.0021789	-4.14	0.000	-.0133011 - .0047576
gdp/cap	-2.88e-06	1.72e-07	-16.76	0.000	-3.21e-06 -2.54e-06
_cons	.4501044	.0084568	53.22	0.000	.4335246 .4666842

Table 8 and 9 represent linear regressions between IS/Y and female population above 80 years, again, without and with dummies (time and country), respectively.

As noted in earlier studies, economic informality has a particular skew toward females. Notably, these regressions display this disparity; The effect of increasing the percentage of women above 80 has a less negative correlation to informal sector size than males. Regardless, all 8 of the linear regression results empirically prove a negative correlation between population age and informal sector size, making the analysis robust.

3. Conceptual/Theoretical Framework

There are several possible explanations for this correlation. This section of the paper seeks to explore the three most plausible and analyze their legitimacy and likelihood of being.

3.1. Institutional Strength as a Factor of Informality

Firstly, the observed association between aging population and lower levels of economic informality could be explained by a factor of social services. States with old populations have social services: Countries with older populations –if they have adequate funding– provide more

federal social services than younger ones (Harper 2014)(11). This is because elderly populations require a substantial amount of support from governmental mechanisms such as pension programs, health care, and health insurance. As the amount of elderly dependents increases within a state, its respective government must respond with a strengthening of these facilities. These federal services often benefit not just the elderly constituents, but populations as a whole. More specifically, federal social programs such as welfare and pensions strengthen institutions. This, in turn, decreases the disparities between constituents due to better enforcement of laws as well as federal support (Chong, Alberto, Gradstein, 2007)(3).

Furthermore, the absence of economic inequality is thought to obstruct the usefulness, demand, and also growth of the informal economy. This is because a state's economic inequality not only obfuscates the benefit of economic growth for the poor, but it also limits their financial mobility and investment opportunities (Wodon, Yitzhaki 2002)(12). This disadvantage and lack of opportunity often implores constituents to turn to the informal economy.

Government-provided assistance through the form of strengthened social institutions fulfills the constituents' needs, henceforth removing their incentive to do informal work.

3.2. Retirement Age and Informal Employment

Another possible explanation is that older adults of/past retirement age are less likely to work in the informal sector. As individuals grow older, both their physical and cognitive abilities begin to decline. which challenges their ability to be employed. Neuron connection slowing – which has a positive correlation with aging– contributes to a lessened ability to do complete tasks (Shlisky 2017)(13). In addition, the informal sector often offers jobs with minimal security, large physical demands, and a lack of the same benefits that can be found in the formal sector. Empirically, jobs offered by Indonesia's informal sector, although not monolithically inferior, are often of lower quality than formal sector jobs, due to a lack of regulation (Ablaza 2021)(14).

Additionally, as individuals reach retirement age, they often qualify for and utilize governmental mechanisms such as pensions and familial financial support. Many older adults

become financially reliant on pensions, social security benefits, or familial assistance, which allows them to meet their financial needs without the requirement to participate in the labor market.

Consequently, the increased reliance on pensions and family support systems, coupled with the physical limitations of aging, culminates in older adults being less probable to participate in the informal economy. Therefore, states with a large 65+ age cohort in both genders are significantly less likely to have an expansive informal economy.

Another alternative economic mechanism that could account for this trend is that states with a large youth/ large working age population have surplus labor that can not be fulfilled with the formal sector.

3.3. The Interaction Between the Demographic Dividend and Informal Employment

A key economic concept that can aid in the explanation of this phenomenon is the Demographic Dividend. The Demographic Dividend refers to the period in a nation's demographic transition when the working-age population (ages 15-64) constitutes a larger share of the total population, while the dependent population (children and elderly) is relatively smaller. This shift often results in an economic boom, as seen in India in the 20th century, growing their population from 448 million to 1.21 billion (Paul, Babu 2017)(15).

This increase in constituents also often leads to an issue of surplus labor. In many cases, even in states experiencing a demographic dividend, the formal sector reaches capacity and is unable to absorb the full extent of this new labor force. The excess workforce often turns to the informal sector for employment, making it a vital buffer for the youth/working age population.

As a result, states with a large youth population often experience a strong informal economy. Therefore, states with a larger portion of dependent, elderly population would logically correlate with a smaller share of the informal economy.

For instance, observe a comparison between Italy and Türkiye. Eurostat 2024 confirms that Italy has the oldest European population, and Türkiye the youngest.

Table 1. Italy vs. Türkiye

		IS/Y	GDP per capita, PPP (constant 2021 international \$)	% above 65	% Population ages 80 and above, male (% of male population)	% Population ages 80 and above, female (% of female population)
Italy	Mean	0.3441	48437.7082	15.3333	2.4329	4.4139
Italy	Median	0.3105	48659.4741	14.4039	2.0335	4.0095
Türkiye	Mean	0.4305	17868.5768	5.1838	0.6069	1.1470
Türkiye	Median	0.4147	16088.5584	4.7802	0.5819	1.0850

According to Table 1 Türkiye has a larger average share in the informal economy, having a 0.0868 higher mean and 0.1042 higher median share.

4. Conclusion

4.1. Overview

This paper sought to examine the relationship between economic informality and population age on a global scale. The empirical analysis found that the two factors have a strong, robust correlation within any context. This study contributes to the literature regarding economic informality and the factors which contribute to it by suggesting a new model for predicting the informal sector size of a state, based on the age of its population. Practically, the result suggests that federal policies affecting population age/birth rate may have an impact on economic informality. One limitation of the study, however, is that all data is

collected and analyzed in retrospect, making it impossible to prove causation as well as leaving the analysis susceptible to confounding variables. In summation, this paper demonstrates the critical association between population age and economic informality.

4.2. Ideas for Future Research

Future research could narrow in on the correlation between the two factors through prospective observational study rather than retrospective. To provide a more comprehensive understanding of this association, future researchers could also analyze IS/Y and population age on a regional scale across a certain continent/world region or throughout time.

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