

Informal Economy and Spending Shares

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ABSTRACT: This paper conducts an empirical analysis to understand the relationship between the size of the informal economy and the composition of GDP in the form of its spending shares. I use comparable cross-country panel data from Penn World Tables and regression to model the relationship. The results suggest that the spending shares of consumption, investment, government consumption, exports, and imports have different yet interrelated relationships with informality (measured as a share of GDP). Investment, exports, and imports result in significant negative covariances, and consumption in significant positive covariance. The paper proceeds to analyze the possible hidden explanatory variables underlying these relationships, endeavoring to understand how different expenditure compositions of GDP across time and political geography can be applied to understand informality.

KEYWORDS: Behavioral and social sciences. Shadow economy; informal sector; consumption; investment; government spending.

■ Introduction

This paper studies the relationship between the degree of informality with the constituents of the expenditure side of GDP. Commensurate cross-country panel data from the Penn World Tables and comprehensive estimates of informality based on a deterministic DGE model from Elgin's *The Informal Economy* are used with regression to model the relationship.^{1,2} The spending shares of GDP have distinct yet connected relationships with the informal economy (as a share of GDP). The results indicate that while the consumption share has a positive covariance, investment, exports, and imports have a significant inverse relationship with informality. Possible channels of action resulting in these relationships are analyzed by discussing likely hidden explanatory variables.

Studying informality is one necessity for inclusive growth and development for large proportions of the world. An ILO report estimated that more than 60% of the world's population made their living in the informal sector in 2018,³ with a likely increase due to the countercyclical safety net-like features of the informal sector as a result of COVID; it only gains importance. Expanding our understanding can aid in effective policymaking and interventions, and this paper hopes to contribute to developing the frontier of this understanding by the humblest bit more.

With Amartya Sen's seminal conception of development,⁴ in "the enhancement of freedoms that allow people to lead lives that they have reason to live," inclusive growth expands opportunity. It provides this safety net, especially for those that are most vulnerable. The informal sector is an essential contributor to this, cushioning the economy during downturns and employing assets and firms that could not operate in the formal sector due to obstacles to involvement, discrimination, and lack of resources, both knowledge and skill-based, and financial.

The literature on informality has developed considerably in the recent era, with various contending models emerging. Al-

ternate definitions are a key feature of the discourse, with the alternate problem componentization playing a key role in developing policies. We establish the context for analysis through a non-exhaustive list of key publications.

When characterizing definitions of informality, we must look at its ontology. In his pioneering work, anthropologist Keith Hart put forth the informal economy as a term.⁵ Through the development of the literature, there are many indicators for the determination of the boundaries of the informal sector ranging from the size of firms, registration status, the legality of form, entitlements, and property rights, as well as terms of employment and social protections.

In "Informality and Development," La Porta and Shleifer support the dual view of informality consistent with Lewis,^{6,7} seeing the formal and informal as segregated in serving different customers by producing other products and using different inputs. This is supported by demand constraints modeling due to the differences in consumer income. This is further added to supply-side constraint modeling through a lack of managerial human capital, which tends to produce a much more significant effect than the human capital stock of workers. However, Ulyssea, through the own work of the author and the literature, shows the coexistence of formal/informal firms in industries contradicting the dualistic model with the lack of a missing middle in firm productivity distributions.⁸ The author discusses that endogenous variables, conditional on skill and self-selection, can largely explain the wage gap between formal and informal workers. Loayza defines informality as the set of firms, workers, and activities outside legal frameworks with indications of noncompliance and precariousness of agent situations.⁹

When looking at the determinants of informality, through empirical analysis of Korea, Chile, and Peru, La Porta and Shleifer suggest that the growth of output largely drives the increase of formalization in the process of economic growth through formal firms and stagnation of informal firms.⁶ La-

bor force growth has an associated negative covariance to formalization. Loayza marks the causes of the informal sector as inefficiencies in the production and delivery of government services, with excessive regulation causing non-compliance.⁹

E. Dabla-Norris *et al.* point to the inverse relationship between the quality of the legal system and the degree of informality in the economy.¹⁰ The quality of the legal system is shown to reduce the elasticity of informality to regulatory burdens. Preliminary findings link the importance of private contracting institutions to reducing informality compared to constraints on the legal executive. A model is developed to understand decision-making for agents in choosing between running firms in the formal or informal sector or seeking employment in the same. Financial development, as a whole, is found to be statistically insignificant in being correlated to informality.

Friedman *et al.* show that overregulation is a key indicator of a larger informal economy due to the excess burden imposed on firms in addition to taxation.¹¹ Tax rates themselves, controlled for GDP per capita, do not seem to affect the size of the informal economy, possibly because while higher tax rates would encourage informal production, the better legal and supportive environment they may provide with increased public resources may incentivize official production. Corruption and weaker institutions were shown to be correlated positively to the size of the informal economy, with a perceived lack of delivery of public goods by the government and excess burdens encouraging the entrepreneur to shift production to the informal economy, further reducing revenue and hurting delivery of public goods in a vicious cycle.

In discussing interventions to increase formalization, La Porta and Shleifer suggest that an addition to the magnitude of the costs of informality through taxation and regulation of informal firms can have net adverse effects on the economy.⁶ This explanation is based on a characterization of informal firms as lacking human capital with inherent low productivity, making growth and survival unsustainable for them in a competitive formal sector. Such policies would, hence, more likely drive them out of business, leading to the net effects of greater poverty.

Meanwhile, Ulyssea divides the policy interventions to deal with informality as increasing the costs of informality or reducing the costs of formality (or increasing its benefits).⁸ The author analyzes that reducing entry costs, applicable to De Soto's view,¹² has the least effect on formalization. A greater effect is observed for lowering costs of staying formal, not only for entry, and intensifying government crackdown on informality. The author differentiates between the extensive margin of firm compliance and the intensive margin of the degree of social protection of employment. The paper observes that interventions on the extensive margin are more effective in creating productivity and output effects than the intensive margin, which could produce adverse effects.

Loayza suggests a homage to Danish flexicurity with labor market flexibility and social protection combined with tax rationalization and an efficient regulatory and judicial environment.⁹ The paper recommends using both punishments

on informality and emphasizing the benefits of formality in specific comprehensive plans adjusted per country based on political considerations of economic and social costs.

While spending shares have been studied with regard to economic growth, this paper is unique in exploring the linkages of informality with the composition of GDP in the form of the spending shares of the interaction of its actors. This paper helps expand the understanding of the determinants of informality through their action through the channel of structural differences in the composition of GDP. It can lead to the development of the composition of GDP as a key proxy for identifying specific actions of the determinants.

The rest of the paper is organized as follows: In the next section, I will discuss the empirical methods used in the paper, before which I present the data used, discussing its sources and descriptive statistics. Then in section III, I apply these methods and show the results I obtained. Finally, I provide some concluding remarks and discussion in the last section.

■ Methods

Data and Conceptual Framework:

The data about spending shares as a proportion of GDP is obtained from the latest edition of Penn World Tables 10.0 prepared by the Groningen Growth and Development Centre.¹ Data used is the spending shares as a proportion of CGDP_o, calculated at the output side at the current purchasing power parity, enabling us to understand relative productive capacities across nations at different periods of time by holding prices constant, giving it centrality in the analysis. Finally, the author thanks Elgin for the informal sector (as a percent of the GDP) series), calculated based on a deterministic dynamic general equilibrium model.² After data adjustment to remove outlier values and ensure the availability of complete data for all observations, we have 7791 observations across 154 countries. These range from the years 1950 to 2017, depending on availability.

The underlying data for spending shares are most popularly known for estimating Gross Domestic Product through the expenditure method, wherein the summation of spending by different economic actors takes place. However, they can shed light on other key parts of the economy. In terms of GDP being classified as Y , as a monetary measure of output produced within the territorial boundary of a nation within a given year, spending shares are defined using the following system of equations:

$$Y = C + I + G + X - M$$

that is, Gross Domestic Product = consumption expenditures + investment expenditures + government expenditures + exports – imports

Hence, we define the spending shares of GDP in the following manner. These are real shares of GDP to control for differences in relative price levels between the sectors where expenditure is measured. Such a method finds basis in earlier work studying the relationship of constituents of GDP with other factors such as productivity.¹³

C/Y: Consumption Share:

This is also known as the share of household finance consumption expenditure (HFCE) or private final consumption expenditure (PFCE). It refers to the expenditure undertaken by private actors to satisfy needs or wants.¹⁴ All included goods and services are considered consumed in the given year and not stored, regardless of status as durable goods like cars and electronics. It is important to note that this includes transactions covered in whole or partly by unilateral transfers from the state. Therefore, it consists of the amounts spent by the household on activities such as healthcare, education, and housing, after subsidization by the government. These transfer payments are not taken to be part of the Government's final consumption expenditure due to actual spending of goods and services happening through the households. Households will include in their consumption expenditure remuneration received in kind from their employers.¹⁴ The value of goods produced for self-consumption, such as the imputed value of rent from owner-occupied housing, will be included in the same.

It has largely remained stable around the 70% mark for the United States over the past decade, pre-pandemic, and averages around the 60% mark for India in the same period. The mean size for consumption share is 0.624 in the data, with a standard deviation of 0.159. The values ranged from 0.066 to 0.999, with a median value of 0.626. Negative values and values above one were removed from the data due to the likelihood of such values being outliers and possible inaccuracy.

I/Y: Investment Share:

In terms of GDP calculations, investment is componentized into gross fixed capital formation, inventory investment, and the net acquisition of valuables by enterprises and households (NAV). Drawing from Nurkse, its meaning lies in society's choice to not apply the whole of its production capacity to present desires of consumption but instead devote a considerable portion to its future consumption through the expansion and maintenance of its productive capacity in the form of capital goods such as plants and equipment, transportation and communication infrastructure and other instruments that can increase the productivity of effort.¹⁵

It is an essential disaggregate of GDP due to the role played by capital accumulation in economic theory as the basis for growth and proved through empirical evidence. The composition and amount of this capital stock and changes in productive activity are often analyzed through gross fixed capital formation.¹⁶ Therefore, with the centrality of capital formation in growth and raising productivity, a parameter on which low performance plays a role in definitions of informality becomes important in our discussion.

Inventory investment corresponds to the change in stock lying with a producer, usually kept to meet unanticipated manufacturing or sales variations. The term also conforms to those currently part of the aforementioned processes. For example, a result of stock produced within a given year that remained unsold is included in the domestic production for that year, and discounts for previously produced inventory may

have been sold in the given year. Hence, a net change in the stock is used to calculate GDP.

Gross fixed capital formation is further divided. It is divided into three components. The first is fixed capital investments by firms or the net change in the value of a producer's fixed assets, i.e., those tangible or intangible assets used repeatedly in the production process for more than one accounting year.¹⁶ An essential point to note is that this differs from ordinary intermediate expenditure on the maintenance of the current capital stock but will include improvements to fixed assets expected to extend their length of usage and production capacity. This will also include commercial and industrial buildings and other constructions of the like by the firm. Public Investment in similar fixed assets, and notably in the fashioning of public infrastructure, including the establishment of roads, railways, schools, hospitals, etc. Finally, expenditure on residential dwellings is part of this. Since the 1993 UN System of National Accounts, valuables classified as precious stones and metals not to be used in the process of production, works of art and antiques, and other valuables have been included as a part of the capital account at the actual or estimated values amounts payable on the transferring of ownership, inclusive of any associated transaction costs. Three approaches are generally used for estimating the form of commodity flow, expenditure, and financing approach.¹⁷

Investment shares are centered around a median of 0.208 with a mean of 0.215 and a standard deviation of 0.105. The data ranged from 0.004 in Bulgaria in 1996 to 0.95 in Nigeria in 1997. Negative values and values above one were removed from the data due to the likelihood of such values being outliers and possible inaccuracy.

G/Y: Government Spending Share:

The government spending share of GDP includes expenditure by the government on purchasing goods and services as part of general government expenditure. Spending by the government on producing nonmarket final goods and services and social transfers provided in kind will be included in the same. It does not include transfer payments made to consumers, including social security, which would be included in consumption, or to firms with subsidies for capital investment as that is included as part of the investment. Contribution to Gross Fixed Capital Formation will be included as part of the investment, and its addition will lead to the share of government output, a different figure.

It can be componentized into various expenses, including, first, a group of costs reflecting collective consumption that provides utility for society as a whole or a significant proportion of it and are hence known as public goods and services. The second would focus on those focused around an individual household, which are the social transfers in kind mentioned earlier and market goods and services provided to households. An important note here is that since government-provided goods and services often do not possess a market price, they are valued at the sum of the costs of their production, which may include compensation of government employees, intermediate consumption, and depreciation.¹⁸ This division between individual and borderline consumption may not be well-

defined, such as expenses of Ministries of Health at a national level being collected, during the funding of a particular hospital or individual. However, this differentiation is irrelevant to our analysis and can be dismissed.

The size of the government's final consumption expenditure in GDP ranged from 0.005 in Nigeria in 2003 to 0/816 in Guinea-Bissau in 1980. The average size was 0.183, with a standard deviation of 0.0913. The value at the 50th percentile was 0.165.

X/Y and M/Y: Exports and Imports Shares:

Exports include the sale of goods and services, included in the boundary of production of GDP, from residents to non-residents. Barter transactions or goods sent abroad as part of gifts or grants will also be included.¹⁸ Imports follow the reversed criteria, with goods not included in this boundary of production bought from non-residents by residents. Since imports enter the calculation of GDP as a negative term, we use negative import share as the relevant variable of analysis in this section.

The definition of residents here hinges on the center of economic interest of the individual residing in a particular economic territory, corresponding to the political boundaries of a nation-state, its territorial waters, and enclaves in the world. The physical passage of goods within a country's borders may not be necessary for this classification, except for food consumed in ships or planes and goods produced in the international territory by residents and then sold to non-residents. Similarly, goods sent abroad for minor processing and transportation equipment are not classified as exports when they pass international boundaries. The shares are defined as the value of exports over the value of GDP, and similarly for imports.

These shares are dependent on not only the country but the world situation. Relative prices between foreign and domestic products influenced by changes in real exchange rates due to interest rates, political factors, changes in product demand, etc., will affect these proportions yearly. Recessions or booms within international markets will also affect these interactions with the "Rest of the World" for each nation and have multiple effects on the domestic economy within a considerably co-dependent world.

The average size of exports as a ratio to GDP was 0.223, with a standard deviation of 0.247. The dataset is skewed to the right, but with a significant number of observations, it should be fine for our analysis. The median value is 0.4, ranging from 0.00002 in Georgia in 1994 to 2.822 in Singapore in 1995

The negative of the import share has a mean of -0.257 with a standard deviation of 0.263. The minimum value, or the largest absolute value of import share, was |-3.392| in Singapore in 1995, with the smallest absolute value of |-0.0001| in Georgia in 1994, corresponding with the export counterparts. The median value is -0.177.

Informal Sector Share:

A discussion on definitions must also describe the various interchangeable terms that tend to be used, such as the shadow economy, underground economy, and black or murky economy, indicating in itself the importance of the definition in the

direction of the debate and research. The margin definition from Ulyssea provides a vital building point in the form of the distinction in the form of the extensive margin of informality, defined with regard to the payments of entry fees and legal registration by firms.⁸ However, it is important to note that mere registration does not indicate the following distinct practices from other "informal" firms. The intensive margin focuses on whether firms that are formal in the first sense hire workers without a contract. The precariousness and vulnerability inherent in informal employment are captured here, but this may be subject to different criteria across geographies and cultures. Illegality in labor practices, tax avoidance, unaccounted-for production, and lack of differentiation from household finances may be other characteristics.

The share of the informal sector is defined as the value of the output of the informal sector upon the value of gross domestic output. Our dataset's mean informal sector size (unadjusted for weightage by GDP) was 0.346, with a standard deviation of 0.145. The median value was 0.337. Values ranged from 0.079 in Switzerland in 2017 to 1.126 in Thailand in 1960.

Elgin notices that the share of the informal sector as a percentage of world GDP has decreased due to lower informal shares in higher-income economies, though it does so at a decreasing rate.² The relationship between per capita income and informality may be somewhat non-linear, but Elgin and Birinci find a U-shaped relationship between informality and economic growth.¹⁹

Table 1: Below provides descriptive summary statistics of all variables used in the empirical analysis.

	C/Y	I/Y	G/Y	X/M	-M/Y	IS/Y
Mean	0.624	0.216	0.183	0.223	-0.257	0.346
Standard Deviation	0.159	0.105	0.0914	0.247	0.263	0.145
Maximum	0.999	0.950	0.816	2.822	-0.0001	1.126
Minimum	0.0664	0.004	0.005	0.00002	-3.392	0.079
Median	0.626	0.208	0.165	0.140	-0.177	0.337

Analytical Methods:

Our empirical analysis methodology will be based on a correlation analysis of the scrubbed data. A linear relationship between expenditure components of Gross Domestic Product and Informal Sector Size is calculated in terms of the Pearson Product-Moment Correlation to understand its intensity and direction. Cross-country and longitudinal regression methodologies allow for the accounting of structural differences, political, economic, social, etc., to a considerable extent. It is reported in the following section. The correlation methodology is based on calculating a line of best fit between the two variables, and its measure r indicates how close data points are to this line. We then form an ordinary least squares linear regression-based model with the constituents of GDP as our dependent variable to attempt to predict levels of informality with regard to constituents of GDP.

Before this analysis, we confirm that our data is appropriate. Our variables are continuous and measured at the ratio level. We assume a linear relationship exists between them and test this by applying correlation. For the same, as described in the Data section, they have been scrubbed for outliers. Normality is assumed as n is a large value for this t series. It is important

to note that inputs about causation cannot be drawn as a result of correlation analysis due to the possible presence of confounding variables. As a rule, the fluctuations in variable x are caused by fluctuations in multiple variables.

I will calculate and report correlation coefficients between informal sector size and spending shares of GDP. As well known, a correlation coefficient always takes a value between -1 and 1. A negative correlation implies that the two series are moving in the opposite direction, whereas a positive correlation suggests that they move in the same direction. However, not all correlation values are statistically significant. Generally, as well known, the rule of thumb is that a positive correlation should be larger than 0.10, and a negative correlation should be smaller than -0.10 to be statistically significant. I will also supplement the correlation analysis with scatter plot diagrams, utilizing trendlines to understand the effects of the correlation.

■ Results and Discussion

Table 2: Correlations of Spending Shares with Informal Sector Size.

	C to IS	I to IS	G to IS	X to IS	M to IS
Correlation	0.299	-0.346	0.0312	-0.376	0.339

Table 2 presents correlations of the informal sector with all the individual spending shares. Now having shown these correlations below, we will plot each relationship on a separate scatter plot diagram and discuss the nature of the relationship between the two variables. The author explores possible explanatory variables behind the relationships shown as a result of the analysis.

Consumption Share and Informality:

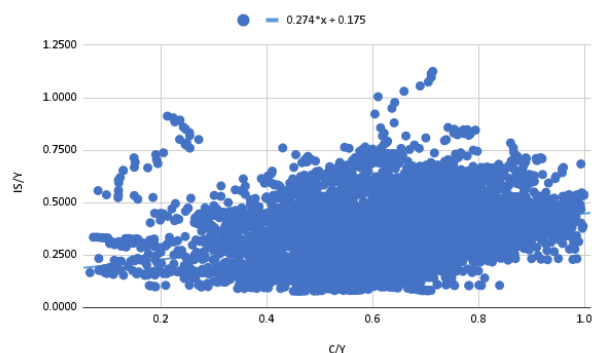


Figure 1: Consumption share and informal sector.

Consumption as a share of GDP sees a statistically significant correlation with the informal sector. Table 2 indicates a moderate positive association with an approximate value of 0.3. The value of R^2 is 0.105 for the regression model, indicating that the change in the consumption share explains 10.5% of the change in the informal economy. The model given by the line of best fit shows an approximate relationship of an increase of 0.0027 in the size of the informal share for a given increase of 0.01 in the share of consumption as a proportion of GDP. An initial theory was that high and rising corruption had been

linked to income inequality and poverty increases.²⁰ Many in the literature on informality have also expounded on the effect of this corruption as an effective additional regulatory burden, incentivizing many to switch to the informal sector.¹¹ This common variable of corruption can possibly explain the relationship between informality and consumption.

The 2012 Economic Report of the President postulated that sluggish growth in consumer spending might reflect the sharp divergence of the income distribution in the United States with increased inequality. There are two related reasons in economic theory for the same. The first, composed of the Keynesian view of consumption, predicts a reduction in consumption with increased inequality due to the lower marginal propensities to consume the more affluent households, earning greater proportions of the country's income.

The second, as in *Inequality and Aggregate Demand*,²¹ relates to a more permanent change. The volatility in incomes associated with low-income households, especially in developing countries, leads to permanent raises in aggregate savings. Many of these households are likely to be involved in the informal economy due to their low-income, low-productivity nature. They may have a proportion of this volatility derived from such involvement, especially in developing countries. This would indicate that lower spending on consumption could be correlated with higher informality, which doesn't seem to be the case. Recent literature suggests that an empirical relationship between consumption and inequality may not exist as ideated in theory, perhaps explaining why the initial hypothesis is inaccurate.²² To attempt to explain the positive relationship, we may rely on the equations of national income; we know that injections and leakages from the flow, assuming the effect of the balance of payments is held constant, give us

$$Y = C + S + T$$

Disposable income here is given by $Di = C + S - T$

Where Y is national income which is spent in the following components as C is consumption, S is saving, T is Taxes.

With the effect of constant government expenditure, taxes, and constant income, a greater consumption share implies a smaller share of savings. Saving finances the supply of loanable funds with a constant balance of payments. Greater shares for consumption will mean less money available for investment, raising interest rates and disincentivizing the investment expenditure, reducing its share in GDP. This will lead to a greater consumption share implying a smaller investment share, and hence greater informality, possibly explaining the positive relationship.

Understanding the effect of the Balance of Payments, as a result of decreased savings, some amount of investment could be met through net capital inflows, which could increase real exchange rates. This would cause a reduction in exports. While there would be an increase in imports relative to exports, absolute values may decrease due to the lesser availability of foreign exchange. As explained later, this reduction in the shares of exports and possible reduction in the import share, which are negatively related, point to greater consumption's positive relationship through these channels.

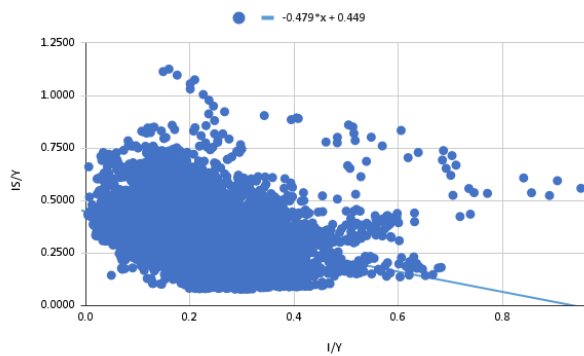


Figure 2: Investment Share and Informal Sector.

Figure 2 is the scatter plot of the size of the informal sector as a ratio to GDP with regard to the share of investment. There is a statistically significant negative correlation of value -0.346 , as indicated in Table 2. The regression model gives us an R^2 value of 0.12 , suggesting that 12% of the variation in the share of the informal sector is explained by variation in the investment share in the regression model. The line of best fit indicates that this relationship can be modeled by a decrease of 4.8×10^{-3} in the share of informality for every $1/100$ increase in the size of the investment share.

To analyze the possible reasons behind this significant correlation, we may view informality from its various definitions, which measure and relate different attributes of the same phenomenon. Three broad arguments stand interlinked and support each other.

First, we focus on the issue of property rights and the regulatory burden. The definition of informality hinging on the escape from the regulatory burden and as a means of evasion and non-compliance would indicate that informal firms face a constant risk of the confiscation of their assets by state authorities, discouraging investment in the fixed capital stock of considerable value due to uncertainty of its future availability for use. Regulatory burdens, compounded by firms' lack of compliance and preference for evasion and avoidance of costs of navigation of the system, make it likely that securing permissions that may become necessary for expansion will be difficult. Difficulties in enforcing property rights may add to the uncertainty, with possible questions over asset ownership and acquiring other resources that may be necessary to fuel expansion and drive investment. The strong negative association further aids this argument in the quality of the legal sector and, as a result, the enforcement of property rights and informality.¹⁰ Thus, greater investment could happen due to lower regulatory burdens and better property rights, which are positively associated with informality.

Second, the relationship between informality and credit constraints offers an additional viewpoint. Research on informality has emphasized the role of credit constraints mirroring firms in low productivity growth outcomes. The precariousness and isolation of activity that defined informality,²³ along with the noncompliance and evasion of state rules, put enterprises in the informal sector, with the absence of registration and documentation that may be characteristic of firms avoiding regulator burden in a difficult situation with regards to securing formal credit that can aid expansion and small firm size, relative low-

er asset wealth may make terms of credit unfavorable. This would lead firms to forgo investment or access normal sources charging high-interest rates, reducing their quantity. The subsistence functioning of parts of the sector would not allow the accumulation of enough capital for investment. Lower levels of entrepreneurial capital in the sector would add to the credit constraints discussed in making investment unlikely.

Third, we focus on the role of productivity in informal activity. Much of the work on informality has emphasized that extensive crackdowns on the sector would see a fall in employment and output. This has been characterized by the inherent low productivity nature of the sector due to the relative lack of capital and selection, some of it self-selection, of lower productivity inputs and processes.² Due to these reasons, survival in the formal sector with the costs of compliance with taxes would make firms uncompetitive and unable to survive. By increasing the capital stock available to these firms, investment would increase productivity and allow firms to create conditions that would enable them to move to the formal sector in a way that allows them to partake of enough benefits to balance costs.

Additionally, catering firms to different markets is a point to consider. Many theorists point out that the informal and formal sectors seem to cater to different sets of consumers altogether, with the informal sector producing more low-quality, lower-cost goods for lower-income consumers.⁶ Drawing on the fundamentals of Smith in the *Wealth of Nations*,²⁴ the investment would require larger production and a larger market to ensure its feasibility. Due to the nature of the market, the normal sector caters to would make it infeasible.

Considering that these low-income markets could contain unskilled laborers' characteristics of low productivity used in the definitions discussed above is important. The informal sector tends to engage in unskilled labor-intensive activity in a small-scale, household-financed way, consistent with many studies.²⁵ The availability of unskilled labor makes a case for low-cost conditions that make it preferable to capital as a factor of production due to the substitution effect, discouraging investment in capital stock. These low wages could add to the cycle of a differentiated low-income market. This is consistent with models that view unskilled labor and capital as substitutes in the informal sector, while skilled labor may act as a complement.²⁶

Government Share and Informality:

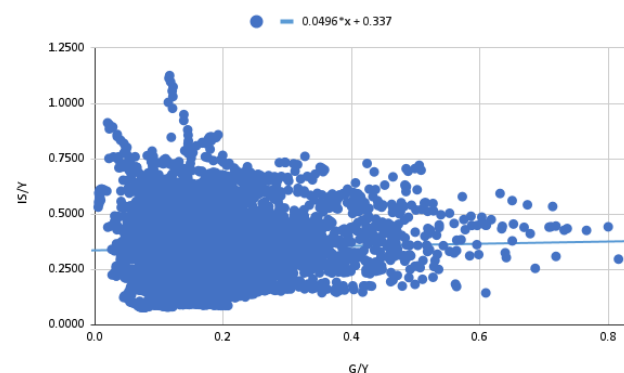


Figure 3: Government Spending Share and Informal Sector.

The share of final government consumption in GDP shows a statistically insignificant relationship with informality, with a value of r below 0.1 and near zero, as from Table 2. The scatter plot of the informal sector and government spending share is shown in Figure 3. The linear regression model is inapplicable here. This can be explained by the action of opposing factors in the relationship between government spending on informality.

Government spending through the provision of public goods, including infrastructure, which could make formality's benefits more apparent, and health and education, supporting increasing formalization, aiding the reduction of informality, would indicate a positive covariance. However, its ability to finance this expenditure could be severely impaired by the presence of a large informal economy from which resources cannot be collected. The perceived lack of delivery of public goods in particular periods, especially during political and economic unrest, can incentivize the shifting of production to the informal economy, which in turn can make the delivery of these public goods more difficult, supporting a negative covariance. Hence, while higher tax rates to finance government spending as a share of GDP could incentive informality through the imposition of a fiscal burden, the better legal or regulatory environment offered could counteract and incentive official production. This is consistent with work around the regulatory burden in the field.^{9,27}

Wagner's law points to an absolute and relative increase in spending by the government with the growth of per capita income, with an essential long-run elasticity of public spending above 1. Studies have found empirical evidence for the same.²⁸ Informality, however, has a strong negative linear covariance with per capita GDP.⁶ Thus, increases in per capita income, a decrease in informality, and an increase in relative nominal government expenditure are associated, pointing to a negative correlation between informality and government share of GDP.

However, increases in per capita income may lead to relative price level increases in government expenditure through the Balassa-Samuelson effect, reducing the impact on the share of real output. Government expenditure is estimated mainly through the production of the non-tradable provided by it to the public, which would exhibit greater price levels with regard to tradable goods, with growth coming from productivity. Stagnation in the share of real output could mean no real change in the provision of public goods, explaining why informality is not linked to the government's share in output.

Much public corruption, however, finds itself linked to government involvement. Increasing the spending share of the government could indicate more opportunities for rent-seeking by the government bureaucracy and greater imposition of a regulatory burden. This would again incentive informality, with the costs of corruption effectively adding on, as discussed in the section on consumption.

Exports Share and Informality:

The data shows an empirical relationship between exports as a share of GDP and informal share in Figure 4. A statistically significant negative association of correlation coefficient value of -0.376 is present, as shown in Table 2. In the regression model, a value of R^2 of 0.141 indicates that the variation

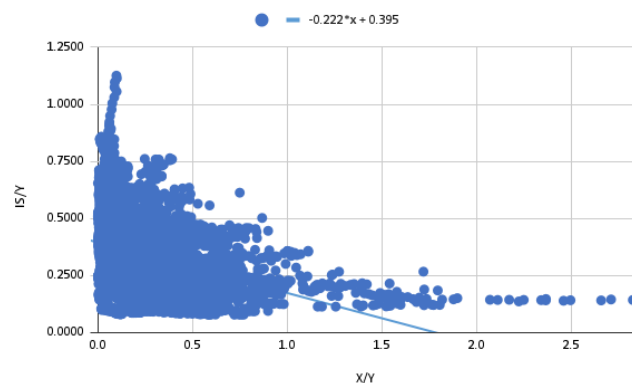


Figure 4: Exports Share and Informal Sector.

explains 14.1% of the variation in the share of the informal sector in exports as a share of GDP. The line of best fit offers a model with an increase in exports of 0.01 as a share of GDP associated with a decrease in the share of the informality of 0.0022 basis points.

It stands to reason that large amounts of exports as a percentage of GDP could mean a large proportion of the population engaged in such activities. The exporting firms will require industrial production bases, possible only through investment. If exports are to remain or become competitive, they may need to keep up with upgrades in technology requiring investment. Hence, reasons applicable for investment being negatively associated with informality could extend to exports through its indirect effect. Additionally, exports tend to need financial support in the exchange of currency, insurance contracts, and credit until payments are collected, making it difficult for informal firms to access due to the financial frictions they tend to face.

Greater trade through exports and imports can result and indicate greater integration in the world economy. This leaves countries more dependent on others and more subject to global standards involving labor laws and protections that may require crackdowns on the informal sector, leading to its reduction. This greater integration, acting as greater knowledge transfer and Foreign Direct Investment inflows, can lead to rapid technological development, as experienced in Japan and South Korea in the second half of the 20th century, where American investment fueled growth. A resultant decrease in the size of the informal sector with greater productivity labor and individuals is probable, with firms and individuals able to better take advantage of and ensure delivery of formal sector benefits such as public goods and finding it more challenging to hide production from the government eye due to its absolute increase. This is seen in Figure 5.1; whereas real GDP per capita increases over the years, informality decreases. In Figure 5.2, on plotting real GDP per capita logarithmically on the horizontal axis, we can observe an almost constant percentage rate of change in informality.

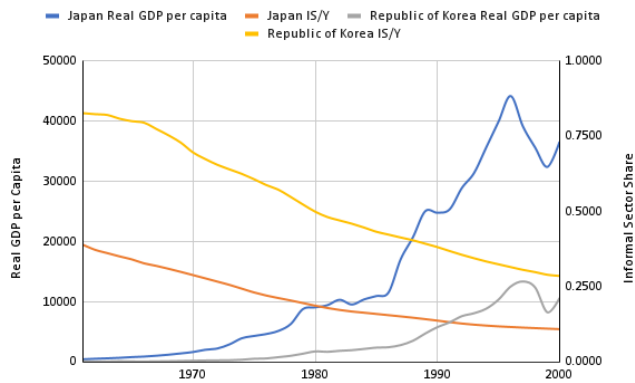


Figure 5.1: Real GDP per capita sourced from the World Bank national accounts data (NY.GDP.PCAP.CD) has been plotted with the informal sector share from Elgin (2021) for Japan and the Republic of Korea in 1960-2000.

Informality and Economic Growth in Japan

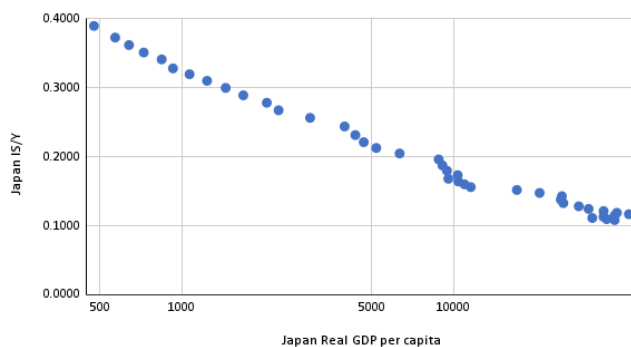


Figure 5.2: Real GDP per capita sourced from the World Bank national accounts data (NY.GDP.PCAP.CD) has been plotted against the informal sector share in Japan (on a logarithmic scale).

Development literature suggests that higher percentages of exports to GDP indicate higher growth rates. This context may hold relevance in our discussions of informality, considering established relations between growth, productivity, and informality. The Dutch disease possibility may offer some outliers in this analysis.

While the discussion around informality and economic growth points to a non-linear relationship, its componentization can help form a possible theory. Elgin and Birinci (2016) find support for a negative correlation of informality with economic growth in low-income economies. The literature has suggested that formal firms can better take advantage of higher investment credit opportunities, engage in asset collateralization efficiently, and increase access to public goods like infrastructure.^{11,29} Their resultant higher productivities may allow them to become competitive exporters, aiding the share of such in GDP.

Economic growth is positively correlated with increases in the export share of GDP.³⁰ The typical relationship with exports is positively associated with economic growth. However, economic growth is negatively associated with informality, which may explain some parts of the relationship between exports and informality. Elgin and Birinci also found that in high-income economies, which may tend to have larger shares of exports in GDP,¹⁹ informality may cause increases in

growth. This can explain the panning out of the effect at higher levels in our analysis.

Exploring productivity further, as alluded to above, while variations among economic sectors exist, studies have found support for higher productivity in exporting firms compared to those focused on the domestic market.³¹ In Taiwan, Chen, and Tang found contribution to productivity improvements through exports due to channels including economies of scale.³² As economies become more export-oriented, with exports consuming a larger share of the proportion of GDP, firms that contribute to more significant proportions of this export-oriented GDP are likely to be formalized, considering the productivity differentiations inherent in them from the informal economy and in the access to capital, investment, and quality of inputs available to them. There will also be additional productivity derived from entrepreneurial capital that is more likely to be employed in the formal sector.¹⁰

Imports Share and Informality:

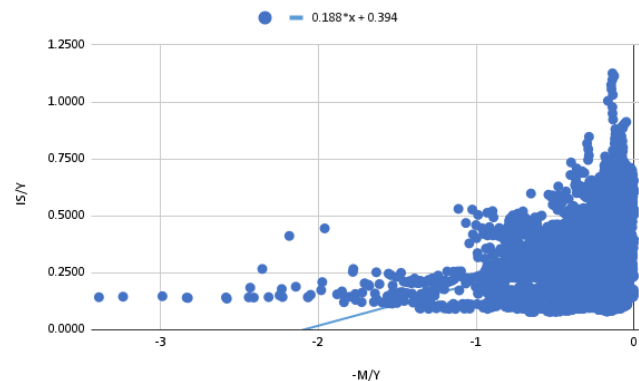


Figure 6: Imports Share and Informal Sector.

The action of the negative imports share corresponds to an associated increase in informality, underlying a statistically significant negative relationship between imports and informality, as seen in Figure 6. Table 2 gives us a correlation coefficient value of 0.339 with the negative of the import share. The value of R2 of 0.115 indicates that 11.5% of the variation in IS/Y is explained by the variation in the share of imports. The line of best fit offers a model wherein an increase of 1/100 in the imports share corresponds to an associated decrease of 0.0019 in the informal share of GDP.

Similar to exports, imports as a share of GDP have shown positive covariance with economic growth.³⁰ In a similar manner to as suggested following this discussion in the export result in analysis, imports are suggested to be negatively correlated to the share of the informal sector. For the growth of imports as a share of GDP, either the current account will have to grow, likely fueled by merchandise trade, making the reasons for exports valid, or through transfers such as remittances which are limited in terms of growth ceilings comparatively. Surpluses on the capital account could fuel imports. Still, incentivizing inflows would require good governance, favorable laws for firm performance, and economic growth, all factors associated with reductions in informality. Similarly, the international aid part of the current account could also be contingent on the implementation and upholding of specific

standards, with greater integration in the world economy as a whole, similar to the case of exports, making countries more subject to regulations such as labor laws, leading to crackdowns on informality, and requiring certain practices, such as perhaps reduction in corruption, again being associated with lesser informality. Their relevance helps explain the relationship between imports and informal shares.

Informality (logarithmic) and Spending Shares:

Table 3: Informality (logarithmic) and Spending Shares.

	C/Y to ln(IS/Y)	I to ln(IS/Y)	G/Y to ln(IS/Y)	X/Y to ln(IS/Y)	M/Y to ln(IS/Y)
Correlation to log (IS/Y)	0.325	-0.372	0.068	-0.401	0.358

Table 3 shows, for all covariances, stronger relationships when modeling using the logarithmic of the share of informality in the same direction of the association. The data indicates a panning out of the effect of the associated increase in informality at higher levels of spending shares relative to the mean values for the spending shares, with stronger effects observed at changes in lower levels of spending shares. Our analysis of probable causes remains valid and is characterized by this behavior consistent with the explanation that at higher levels, associated effects of share of spending are already near maximum and have a diminishing marginal impact.

Conclusion

The paper indicates a statistically significant positive relationship between the share of the informal sector and consumption, with a possible reason explored, including the resultant reduction of investment as a result of greater consumption. The investment share shows a statistically significant negative relationship, with property rights and regulatory burden, credit constraints, and the impact of productivity growth playing possible roles. Analysis shows government final consumption spending as a share of GDP to be unrelated, likely due to counteracting effects with a possible explanation of inverse relationship through the action of Wagner's law and the association of income levels with informality tempered by the Balassa Samuelson effect. Greater trade, both in the form of exports and imports, shows a significant negative relationship with the share of informality, expectedly supported by greater integration and economic growth and expansion of a higher productivity base for exports. Many of the spending shares likely have interlinked effects through their impacts on each other.

There is scope for a full-fledged econometric analysis in a multivariate model, with control for the effect of constituents on GDP on each other, to develop an understanding of the exact nature of the relationship between the constituents of GDP and informality. Modeling the impact of change in different shares in a dynamic equilibrium model could offer light on "ideal" structural compositions of GDP with regard to the informal economy. It will also be necessary to explore the composition of informality in terms of productivity, growth, and quality of employment and how that may be affected regarding the spending shares.

The study's relevance is key in policymaking, perhaps holding answers to critical questions regarding expanding the tax base and providing social support to all vulnerable economic actors. Developing an understanding of the effects of the shares of GDP through the channels proposed in this paper, in terms of their extent and applicability, can help open up new ranges of policy options while illuminating the impact of structural differences across countries and, as the result of adopted policies in affecting the informal sector. The middling relationship with consumption relative to other spending shares for informality suggests it may not be the most effective channel, especially as our analysis points to multiple other explanatory variables, such as corruption and inequality. This understanding, however, could provide a greater impetus to dealing with the same through the methods of formalization. For economic growth, the paper helps indicate that informality is associated with a lower investment share due to disincentives caused by or as pre-conditions for it. Thus, crowding in large-scale investment across enterprise strata to unlock productivity gains would likely see a highly-associated decrease in informality. In the context of our analysis, the self-selection approach would suggest that investment in human capital, along with a reduction in regulatory burden and credit constraints, would be key to this process. The non-existent relationship with government spending can allude to how rather than the quantity of spending, the quality of norms associated with doing business and the preconditions responsible for it are more effective in dealing with informality. Greater integration into the world economy associated with opening up markets to greater competition, incentivizing capital usage, and loosening burdensome restrictions would likely aid in reducing informality. A greater focus on export-oriented industries instead of domestic ones in the economy would incentivize businesses to innovate and compete. It would do the same through an additional channel, inviting a greater demand for public goods. The meeting of this demand could help disincentivize informality among other industries. The diminishing marginal impact observed in Table 3 indicates that a combination of such efforts will be necessary, rather than single silver bullets, which can achieve desired outcomes.

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