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# Does domestic investment spur economic complexity? Effects and transmission channels

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## Abstract

This paper presents the first large-scale study examining the impact of domestic investment on economic complexity, using a dataset of 84 countries spanning four decades (1980-2019). By employing a range of estimation techniques, including SGMM, dynamic panel threshold models, and quantile regression methods, we establish several key findings. First, domestic investment promotes economic complexity above a certain threshold. Second, the nonlinear relationship between domestic investment and economic complexity is influenced by the levels of corruption and socio-economic conditions. Third, we identify economic growth, health, and education as key channels through which domestic investment affects economic complexity. Our results are robust across alternative specifications, methodologies, business cycle fluctuations, and levels of economic development. This study highlights the importance of adopting strategies that enhance domestic investment, reduce corruption, and improve socio-economic conditions to fully leverage the benefits of domestic investment on economic complexity

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# 1 Introduction

The past few years have seen the emergence of a new strand in development economics known as economic complexity, which is defined as the diversified knowledge and structural transformation within an economy to more effectively utilize its resources (Payne et al., 2023; Hidalgo and Hausmann, 2009). This body of literature aims to revive ideas that place structural transformation and industrialization at the heart of economic growth discussions, while framing economic development as a process of learning to produce and export increasingly complex products (Kamguia et al., 2022). In this light, Hidalgo and Hausmann (2009) developed the economic complexity index (ECI) to measure economic complexity. Kannen (2020) indicates that the ECI is a more efficient proxy for economic development. Hence, it is very important to investigate the determinants of economic complexity. Recent research has substantially advanced the empirical investigation into the determinants of economic complexity, including remittances (Saadi, 2020; Ajide, 2024), foreign aid (Kamguia et al., 2022), trade (Ogbuabor et al., 2025; Ajide, 2024), FDI (Kannen, 2020; Khan et al., 2020; Osinubi and Ajide, 2022; Kouam et al., 2023; Ajide, 2024), financial level development (Njangang et al., 2021; Valentine et al., 2024) and country stability (Avom and Ndoya, 2024).

Despite the expanding corpus of literature on the impacts and more crucially, the determinants of economic complexity, empirical investigations into the role of domestic investment remain conspicuously absent. Indeed, domestic investment is pivotal in driving economic development. Anyanwu (2006) contends that regardless of global integration, development and finance fundamentally stem from within a country. In fact, domestic investment is a critical determinant of economic development due to its capacity to enhance savings, improve social welfare and bolster national prosperity (Bakari et al., 2019).

However, the role of domestic investment in economic development remains mixed and inconclusive. For example, with respect to a critical indicator of economic development, namely economic growth, some researchers highlight a positive link between domestic investment and growth (Sulub et al., 2020; Bakari, 2021), while others identify a significant adverse effect of domestic investment on this aspect of economic development (Bakari et al., 2019; Bakari, 2018). Consequently, a major question arises: does domestic investment spur economic complexity?

This paper ascertains the impact of domestic investment on economic complexity. We contribute to the literature on the effectiveness of domestic investment in several ways. First, to the best of our knowledge, this is the first study to examine the effect of domestic investment on economic complexity. Second, we explore whether there is a threshold in the relationship between domestic investment and economic complexity. This relationship may depend on the level of domestic investment, where the latter could potentially promote economic complexity either below or above a specified threshold. Third, we evaluate if there exist threshold levels of corruption and socio-economic conditions above which domestic investment promotes economic complexity. Fourth, this study extends the analysis by conducting a mediation analysis. To this end, we identify and empirically evaluate the mediating effects of three potential channels: economic growth, health and education. Lastly, this study addresses endogeneity by employing suitable econometric techniques. Specifically, it utilizes two different empirical strategies: the two-step system Generalized Method of Moments (GMM) and the dynamic panel threshold model.

The remainder of this paper is structured as follows: Section 2 presents the conceptual

framework, Section 3 describes the data and empirical strategy, Section 4 discusses the empirical results and Section 5 concludes.

# 2 Conceptual framework

We hypothesized three main channels through which domestic investment can affect economic complexity: economic growth, life expectancy and education.

## 2.1 The economic growth channel

Domestic investment is a very important determinant of the level of economic activity in an economy. Investment at the level of domestic markets boosts its productive capacity, economic diversification and promotes job creation by fostering new enterprises. In fact, higher levels of domestic investment enhance an economy's ability to produce more goods and services. Mohamed et al. (2013) highlight that domestic investment is an important component of aggregate demand and increases the stock of private assets in an economy. Many studies in the literature found a positive linkage between domestic investment and economic growth (Mohamed et al., 2013; Bakari et al., 2019; Bakari, 2021). On the other hand, economic growth has been found to be an important driver of economic complexity. The level of per capita GDP creates the environment for innovation and productivity hence upgrading economic complexity (Ajide, 2024; Avom and Ndoya, 2024). For this reason, we hypothesize that domestic investment affects economic complexity through economic growth.

## 2.2 The population health channel

Domestic investment is found to be a key determinant of population health. National governments stand a better chance of attaining improved health outcomes by concentrating domestic resources on bolstering the national health care system. In fact, some scholars advocate for domestic investment. Aigheyisi (2019) argues that the stock of capital in an economy promotes the creation of enterprises which in turn reduces unemployment, enhances welfare, and improves both the quality of life and life expectancy. Similarly, Abubakar et al. (2022) posit that domestic investment is more efficient than foreign aid in promoting population health in Nigeria. Recent studies highlight the link between population health and economic complexity. Healthier individuals are more productive and live longer, accumulating more codified and non-codified knowledge, thereby upgrading economic complexity. Kouam et al. (2023) document a relationship between infant mortality and economic complexity using 21 Sub-Saharan African countries. Şanlı et al. (2024) found that health is a key driver of economic complexity for 97 countries. Therefore, domestic investment could potentially promote economic complexity through its positive effect on population health.

## 2.3 The education channel

Domestic investment plays a significant role in promoting education and skill development. In fact, investing in school infrastructures and research promotes human capital accumulation in an economy. In this sense, Duflo (2001) and Glewwe and Ilias (1996) show that investment in human capital promotes education. In contrast, economic theory

posits that human capital improves individuals' knowledge and abilities, thereby boosting economic growth rates (Romer, 1990). Hidalgo and Hausmann (2009) argue that the sophistication of exported goods arises from the accumulation of capabilities, knowledge, and skills. Consequently, higher levels of human capital may enhance a country's economic complexity. Hence, we hypothesize that education is a potential channel through which domestic investment affects economic complexity.

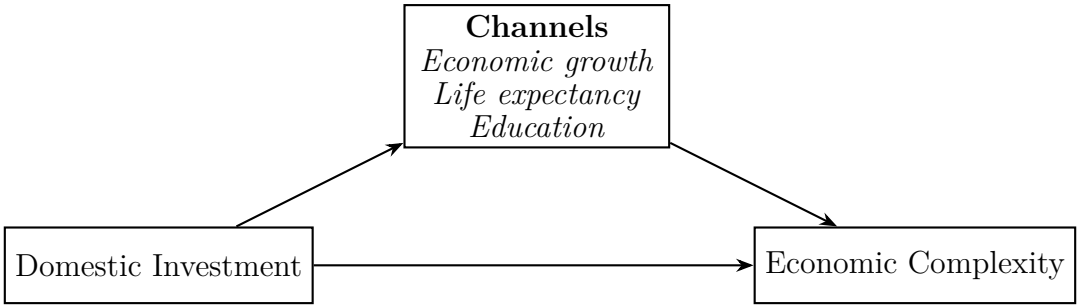


Figure 1: Conceptual framework linking domestic investment, channels, and economic complexity.

# 3 Empirical strategy and Data

## 3.1 Data

We study the effect of domestic investment on economic complexity focusing on an unbalanced panel of 84 countries with data spanning from 1980 to 2019. Data are collected from various sources: the Atlas of Economic Complexity (AEC), the World Bank: World Development Indicators (WDI), the International Country Risk Guide (ICRG) and Penn World Trade (PWT9). The availability of data determines the sample selection and the periodicity. Definition of variables, data sources, and the complete list of countries are provided in Table A2 and Table A3 in the appendix.

Figure 2 shows the prediction of ECI from a linear regression of ECI on domestic investment for 84 countries over the period 1980 to 2019. This preliminary estimation shows a positive linkage between domestic investment and economic complexity.

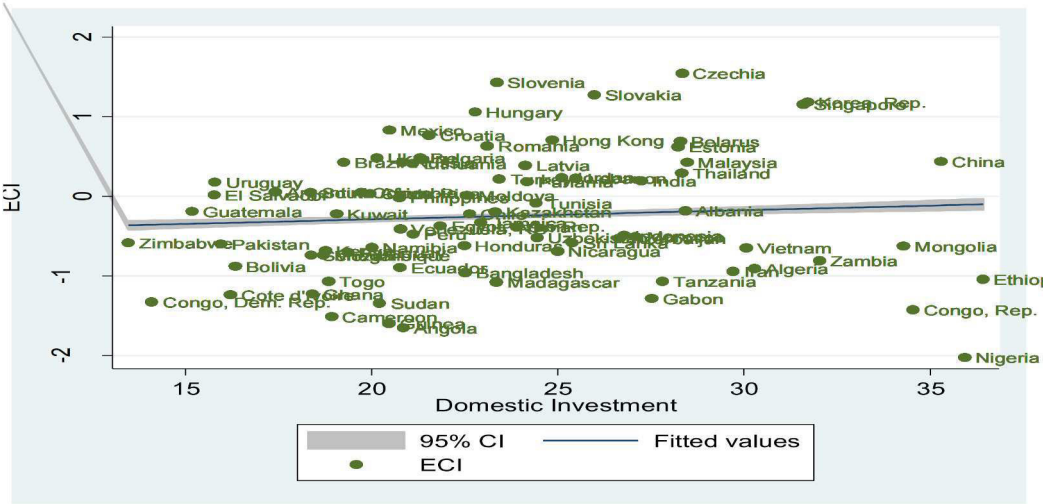


Figure 2: Economic complexity and domestic investment.

Table 1: Descriptive Statistics

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| ECI | 2,985 | -0.292 | 0.796 | -2.791 | 1.865 |
| DI | 2,812 | 23.263 | 7.988 | 0 | 89.386 |
| POP | 3,360 | 1.709 | 1.658 | -27.722 | 19.360 |
| Trade | 2,943 | 77.863 | 54.571 | 1.219 | 442.62 |
| FDI | 3,082 | 3.168 | 5.446 | -40.087 | 60.188 |
| Corrupp | 2,792 | 2.539 | 0.989 | 0 | 6 |
| GDP | 3,068 | 1.858 | 5.046 | -43.567 | 46.471 |
| Life | 3,360 | 66.584 | 8.855 | 35.923 | 85.180 |
| HCI | 3,001 | 2.210 | 0.634 | 1.030 | 4.352 |
| Sociocond | 2,792 | 5.144 | 1.902 | 0.5 | 11 |

Table 1 illustrates the summary statistics of the variables used in this study. ECI varies from a minimum value of -2.791 to a maximum of 1.865. Moreover, the low standard deviation of ECI indicates a very low variation in economic complexity. In line with Kamguia et al. (2022), we observe that many countries in our sample have not been able to transform their economies from basic primary commodities to more complex goods. Table A1 in the appendix presents the correlation matrix between all the variables used in this study. We find that the domestic investment is weakly positively correlated with economic complexity, confirming the preliminary results found in figure 2.

## 3.2 Estimation strategy

We hypothesize that there is a positive relationship between domestic investment and economic complexity. Thus, we investigate the following model in equation (1):

$$Economic\_complexity = f(\text{Domestic investment}, X) \tag{1}$$

Where X represents the set of controls. We estimate the relationship described in equation (1) by using three main estimation methods. We start by performing a system generalized method of moments as shown in equation (2):

$$\text{ECI}_{i,t} = \alpha + \beta_1 \text{ECI}_{i,t-1} + \beta_2 \text{DI}_{i,t} + \beta_3 X_{i,t} + \mu_i + \gamma_t + \varepsilon_{i,t} \tag{2}$$

Where $ECI_{i,t}$ represents the economic complexity index (ECI) for country i at time t, while $\text{ECI}_{i,t-1}$ refers to its lagged value. The lagged ECI has been considered by many studies in the literature (Saadi, 2020; Kamguia et al., 2022; Ndoya and Bakouan, 2023). This is because economic complexity is a path-dependent process influenced by its historical evolution, it is even more crucial to take its memory effect into account when incorporating economic complexity as a lagged variable in the model. $\text{DI}_{i,t}$ represents domestic investment. $X_{i,t}$is the vector of control which includes population, trade, FDI and corruption. $\mu_i$ represents unobserved country-specific effect, $\gamma_t$ stands for time specific effect and $\varepsilon_{i,t}$ is the error term.

We use the system generalized method of moments (SGMM) by Arellano and Bond (1991)and developed by Arellano and Bover (1995) and Blundell and Bond (2000) as our main methodology. This choice is based on the fact that the SGMM estimator helps us mitigate potential endogeneity in our study. In fact, endogeneity might arise in our study mainly due to three problems: measurement errors, omitted variable bias and reverse causality. First, most economic complexity-related studies are prone to endogeneity due to errors in their measurement (Ndoya and Bakouan, 2023). Second, omitted variable bias is another potential source of endogeneity. This occurs when important macroeconomic variables that may not be included in the regression models are determinants of economic complexity. Third, reverse causality could arise because domestic investment may promote economic complexity, but a complex economy could also stimulate domestic investment. This is because it offers both advanced market conditions and innovation. Hence domestic investors might perceive it as an opportunity to gain competitive advantage and access new market opportunities. As earlier mentioned, the SGMM method helps us solve these problems. This estimator consists of estimating simultaneously the first difference equation and the level equation. Moreover, it has the advantage of improving efficiency and avoiding the weak instrumentation problem observed in the first-difference GMM (Arellano and Bond, 1991). We use the finite sample correction of the covariance matrix by Windmeijer (2005) to overcome downward bias of standard deviation estimates (of the two-step GMM). Furthermore, we limit the number of lags of the endogenous variables to mitigate problems due to instrument proliferation. The Hansen's test of over-identification and Arellano-Bond test for first and second serial correlation are used to ensure the consistency of the SGMM estimates. In addition, we estimate our model using both the OLS and FE estimators. SGMM results are reliable if the coefficient of the lagged dependent term lies between that of the fixed-effects and OLS estimate.

Furthermore, to ascertain the existence of threshold level of domestic investment (and two other proxies for institutions) in the linkage between domestic investment and economic complexity, we use the dynamic panel threshold model by Seo and Shin (2016). This methodology also helps address the endogeneity problem in the domestic investment-economic complexity nexus. The model takes the following form:

$$ECI_{it} = \mu_i + \phi ECI_{i,t-1} + \beta_1 X_{it}\,\mathbf{I}(q_{it} \leq \gamma) + \beta_2 X_{it}\,\mathbf{I}(q_{it} > \gamma) + \varepsilon_{it} \tag{3}$$

Where $q_{it}$ is the threshold variable, $\gamma$ represents the threshold level, $\varepsilon_{it}$ is the error term. $\mathbf{I}$ is an indicator function taking a value of 1 if the argument in the indicator function holds, and 0 otherwise. The threshold variable, $q_{it}$, divides the sample into distinct regimes characterized by different slope parameters, $\beta_1$ and $\beta_2$. We use domestic investment, corruption, and socioeconomic conditions as threshold variables. $X_{it}$ stands for a vector of explanatory variables. In line with Osei and Kim (2020), we incorporate a threshold intercept $\gamma$ to account for variations in the regime intercept. Including the

regime intercept reduces the possibility of bias in the estimations of the marginal effect and the threshold.

Furthermore, for robustness test, we use the quantile regression technique introduced by Koenker and Bassett Jr (1978) as an alternative methodology. This method is robust to outliers and heavy distributions (Zhu et al., 2016). This allows us to analyze the distributional and heterogeneous effects of domestic investment on economic complexity, thus controlling for unobserved individual heterogeneity.

Finally, we investigate how domestic investment impacts economic complexity through three channels: economic growth, life expectancy, and education. As outlined in section 2, domestic investment is expected to influence economic complexity indirectly through these channels. To test this, we adopt a two-step approach following Moteng et al. (2023); Munyanyi and Churchill (2022).

# 4 Empirical Results

## 4.1 Baseline results

This subsection presents the baseline results of the impact of domestic investment on economic complexity. The econometric model is estimated using the two-step system GMM and the results are displayed in Table 2. Column 1 reports the OLS results, while columns 2 and 3 present the results of the FE and the SGMM estimations, respectively.

Table 2: Baseline results

| | **Dependent variable: ECI** | | |
|---|---|---|---|
| | OLS | FE | SGMM |
| | (1) | (2) | (3) |
| L.ECI | 0.983*** | 0.820*** | 0.890*** |
| | (0.005) | (0.012) | (0.056) |
| DI | 0.001*** | 9.52E-05 | 0.005*** |
| | (0.0004) | (0.001) | (0.002) |
| POP | -0.002 | 0.003 | -0.059* |
| | (0.002) | (0.003) | (0.035) |
| Trade | 0.0002*** | 0.001*** | 0.0005** |
| | (6.80E-05) | (0.0002) | (0.0002) |
| FDI | 8.34E-05 | 0.0004 | -0.0012 |
| | (0.001) | (0.001) | (0.001) |
| Corrup | 0.003 | -0.001 | 0.013 |
| | (0.003) | (0.004) | (0.018) |
| Constant | -0.041*** | -0.092*** | -0.110* |
| | (0.013) | (0.022) | (0.060) |
| Observations | 2,226 | 2,226 | 2,016 |
| R-squared | 0.97 | 0.679 | |
| AR(1) | | | 0.000 |
| AR(2) | | | 0.891 |
| Hansen Test (p-value) | | | 0.190 |

*Notes:* Standard errors in parentheses; $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Therefore, our baseline results are shown in column 3, based on our preferred estimation technique (SGMM). The regression results satisfy Hansen's test of over-identification and confirm the absence of second order serial correlation confirming the validity of the instruments. Lagged ECI is statistically significant at the 1% level, indicating the path dependence of developing countries' economic complexity. This notion

is consistent with findings of Hidalgo and Hausmann (2009); Kamguia et al. (2022); Ndoya and Bakouan (2023).

In line with fig 2, we find that domestic investment has a positive and significant effect on economic complexity at the 1% level. This could be due to the fact that an increase in domestic investment spurs economic growth which leads to higher income, increased consumption and stimulates business activity. Hence, this economic growth creates a more favorable environment for developing complex goods, technological advancement and innovation, thereby promoting product sophistication and economic complexity. Furthermore, domestic investment in human capital increases the skill levels of workers. Skillful workers can improve domestic products or contribute to the creation of more sophisticated products hence upgrading economic complexity. Finally, domestic investment could enhance the economy by improving health conditions. Healthier individuals are more productive and live longer, allowing them to accumulate more codified and non-codified knowledge, thereby upgrading economic complexity. Regarding the controls, the coefficient on trade is found to be positive and statistically significant at 5% level. This could be explained by the fact that when an economy becomes more open to trade, it becomes more susceptible to benefiting from spillover effects such as technological transfer, investment and higher financial flows, stimulating their productive capacity (Ogbuabor et al., 2025). Our result corroborates the results obtained by Ndoya and Bakouan (2023) and Ogbuabor et al. (2025), who found a positive linkage between trade and economic complexity. Population growth is found to negatively affect economic complexity. This result diverges from Saadi (2020) and Ndoya and Bakouan (2023).

## 4.2 Robustness checks

To test the robustness of our main results, we conduct a series of sensitivity analyses in this subsection: alternative specifications, robustness to business cycle fluctuations, differential impact of domestic investment on economic complexity, and alternative methodologies. As mentioned earlier, we start by using alternative specifications.

Table 3: Alternative specifications

| | **Dependent variable: ECI** | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| L.ECI | 0.985*** | 0.929*** | 0.930*** | 0.890*** |
| | (0.032) | (0.040) | (0.049) | (0.056) |
| DI | 0.007** | 0.005*** | 0.006*** | 0.005*** |
| | (0.003) | (0.002) | (0.002) | (0.002) |
| POP | -0.017 | -0.032 | -0.031 | -0.059* |
| | (0.036) | (0.025) | (0.025) | (0.035) |
| Trade | | 0.0003* | 0.0004* | 0.001** |
| | | (0.0001) | (0.0002) | (0.0002) |
| FDI | -0.001 | | -0.001 | -0.001 |
| | (0.001) | | (0.001)) | (0.001) |
| Corrup | -0.014 | 0.005 | | 0.013 |
| | (0.020) | (0.016) | | (0.018) |
| Constant | -0.096 | -0.118** | -0.114** | -0.110* |
| | (0.098) | (0.056) | (0.057) | (0.061) |
| Observations | 2,016 | 2,016 | 2,165 | 2,016 |
| AR(1) | 0.000 | 0.000 | 0.000 | 0.000 |
| AR(2) | 0.857 | 0.917 | 0.784 | 0.891 |
| Hansen Test (p-value) | 0.433 | 0.175 | 0.292 | 0.190 |

*Notes:* Standard errors in parentheses; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

To do this, we sequentially remove in different steps three explanatory variables from our baseline model (equation 2): Trade, foreign direct investment (FDI) and corruption (Corrup). The results are displayed in Table 3 with columns (1), (2) and (3) presenting results when we remove Trade, FDI, and Corrup respectively, while Column (4) shows the baseline results, including all the controls. The findings reveal that domestic investment promotes economic complexity in all specifications.

Table 4: Robustness to Business cycle fluctuation

| | **Dependent variable: ECI** | | |
|---|---|---|---|
| | OLS | FE | SGMM |
| | (1) | (2) | (3) |
| L.ECI | 0.939*** | 0.492*** | 0.794*** |
| | (0.017) | (0.041) | (0.093) |
| DI | 0.004** | -0.0003 | 0.021** |
| | (0.002) | (0.002) | (0.010) |
| POP | -0.026*** | -0.014 | 0.069 |
| | (0.009) | (0.014) | (0.089) |
| Trade | 0.001*** | 0.001 | 0.004*** |
| | (0.0003) | (0.001) | (0.001) |
| FDI | -0.005* | -0.002 | -0.037** |
| | (0.003) | (0.003) | (0.016) |
| Corrup | 0.002 | -0.018 | -0.049 |
| | (0.012) | (0.014) | (0.042) |
| Constant | -0.092* | -0.117 | -0.684** |
| | (0.047) | (0.080) | (0.275) |
| Observations | 494 | 494 | 382 |
| R-squared | 0.926 | 0.287 | |
| AR(1) | | | 0.000 |
| AR(2) | | | 0.408 |
| Hansen Test (p-value) | | | 0.970 |

*Notes:* Standard errors in parentheses; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

As a second robustness check, we examine whether our results are influenced by idiosyncratic dynamics at business cycle frequency. Thus, we divide the period of analysis (1980-2019) into 8 non-overlapping 5-year period, except for the last period, which is 4 years. The results (based on column 3) show that domestic investment still exhibits a positive linkage with economic complexity.

Furthermore, we investigate whether the relationship between these two variables depends on the level of income. We divide our sample into four sub-samples: low-income countries (LI), lower-middle income (LMI) countries and upper-middle (UMI) and high (HI) income countries according to the World Bank classification. The results are shown in Table 5 where columns 1, 2, 3 and 4 display estimates of the LI, LMI, UMI and HI respectively. The coefficient of domestic investment remains positive and statistically significant in all four sub- samples. This suggests that, regardless of the level of income, domestic investment has a positive and significant impact on economic complexity.

Lastly, we use quantile regression as an alternative methodology to verify if our results will vary. This model helps to determine the heterogenous effect of domestic investment on economic complexity. Results reveal that the coefficient of domestic investment behaves differently across the different quantiles. The sign and magnitude of the coefficient change as we move from lower to upper quantiles. More specifically, the coefficient on domestic investment is negative in the lowest quantile (q25) and positive in the higher quantiles (q75 and q90). However, it should be noted that the effect is strongest in the upper quantile (q90).

Table 5: The effect of economic development level

| | **Dependent variable: ECI** | | | |
|---|---|---|---|---|
| | LI | LMI | UMI | HI |
| L.ECI | 0.519*** | 1.097*** | 0.928*** | 1.023*** |
| | (0.183) | (0.023) | (0.148) | 0.0826 |
| DI | 0.026* | 0.005*** | 0.009*** | 0.003*** |
| | (0.016) | (0.001) | (0.003) | (0.001) |
| POP | -0.151 | 0.011 | 0.050 | 0.004 |
| | (0.196) | (0.017) | (0.106) | (0.036) |
| Trade | -0.001 | -0.0002 | -3.09E-05 | -7.33E-05 |
| | (0.012) | (0.0002) | (0.001) | (0.0004) |
| FDI | -0.014 | -0.001 | -0.003 | -9.41E-05 |
| | (0.010) | (0.001) | (0.004) | (0.001) |
| Corrup | -0.102* | -0.006 | -0.076 | 0.033 |
| | (0.061) | (0.013) | (0.047) | (0.025) |
| Constant | -0.246 | -0.025 | -0.069 | -0.175 |
| | (0.816) | (0.070) | (0.079) | (0.114) |
| Observations | 207 | 685 | 847 | 416 |
| AR(1) | 0.016 | 0.001 | 0.015 | 0.019 |
| AR(2) | 0.677 | 0.532 | 0.204 | 0.213 |
| Hansen Test (p-value) | 0.868 | 0.355 | 0.141 | 0.456 |

*Notes:* Standard errors in parentheses; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 6: Quantile regression results

| | **Dependent variable: ECI** | | | |
|---|---|---|---|---|
| | Q25 | Q50 | Q75 | Q90 |
| DI | -0.007*** | 0.0003 | 0.012*** | 0.013*** |
| | (0.002) | (0.003) | (0.003) | (0.004) |
| POP | -0.350*** | -0.311*** | 0.312*** | -0.253*** |
| | (0.025) | (0.020) | (0.023) | (0.037) |
| Trade | 0.003*** | 0.004*** | 0.005*** | 0.004*** |
| | (0.001) | (0.001) | (0.0003) | (0.001) |
| FDI | -0.009** | -0.014*** | 0.019** | -0.004 |
| | (0.005) | (0.004) | (0.008) | (0.009) |
| Corrup | 0.180*** | 0.201*** | 0.151*** | 0.155*** |
| | (0.013) | (0.015) | (0.014) | (0.033) |
| Constant | -0.696*** | 0.608*** | -0.323*** | -0.12 |
| | (0.089) | (0.078) | (0.067) | (0.149) |
| Observations | 2,308 | 2,308 | 2,308 | 2,308 |

*Notes:* Standard errors in parentheses; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

## 4.3 The dynamic panel threshold estimation of domestic investment on economic complexity

In this section we investigate whether a nonlinear relationship exists between domestic investment and economic complexity. To do this, we employ a dynamic threshold model and we test for the existence of a threshold level of domestic investment in the domestic investment - ECI nexus. The findings from the dynamic panel threshold model are presented in Table 7, where column 1, 2, 3 show results when domestic investment, corruption and socioeconomic conditions are used as threshold variables, respectively. The first column of Table 7 presents the results with domestic investment as the threshold variable. These results suggest the existence of a threshold level above which domestic investment promotes economic complexity. Moreover, the threshold relationship is validated by the linearity test. The results of the linearity test confirm that the models are nonlinear, as the indicators are significant at 1%. The point estimate of the threshold value is 20.483. Regarding the regime-dependent marginal effects, domestic investment promotes economic complexity above a threshold level of 20.483% of GDP. Below the latter, domestic investment is negatively associated with economic complexity. This corroborates the results obtained when using the quantile regression model, where we find a negative coefficient on domestic investment in the lower quantile (q25). Furthermore, the results when corruption is the threshold variable (column 2) reveal that the point estimate of threshold value is 2.424. This result implies that domestic investment stimulates economic complexity in countries with good control of corruption (threshold of corruption is lower than 2.42). This supports the need of quality institutions to upgrade economic complexity (Vu, 2022). Finally, results reveal that domestic investment deters economic complexity in countries with poor socio-economic conditions (threshold lower than 4.203).

Table 7: Dynamic panel threshold estimation of the effect of domestic investment on economic complexity

| **Variables** | Domestic Investment | Corruption | Socio-condition |
|---|---|---|---|
| **First regime** | -0.052** | 0.032*** | -0.015** |
| | (0.023) | (0.006) | (0.007) |
| **Second regime** | 0.053* | -0.047*** | 0.028*** |
| | (0.029) | (0.009) | (0.009) |
| **L.ECI** | 0.680*** | 0.277*** | 0.364*** |
| | (0.223) | (0.076) | (0.118) |
| **Control variables** | Yes | Yes | Yes |
| **Threshold** | 20.483 | 2.424 | 4.203 |
| CI | [17.688-23.279] | [2.034 -2.813] | [3.109 -5.297] |
| **No.countries** | 84 | 84 | 84 |
| **Linearity test(prob)** | 0.000*** | 0.000*** | 0.000*** |

*Notes:* Standard errors in parentheses; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. Socio-condition stands for socio-economic conditions.

## 4.4 Transmission Mechanism

The findings presented in Table 2-7 confirm the baseline hypothesis of a significant relationship between domestic investment and economic complexity. In this subsection, we empirically investigate the mechanisms highlighted in section II through which domestic investment impacts economic complexity. As earlier mentioned, we discussed three

mediators: economic growth, life expectancy and education. To this end, we follow Moteng et al. (2023) and Munyanyi and Churchill (2022) by conducting a two-step approach to empirically test the transmission channels.

The first model consists of estimating the impact of domestic investment on economic complexity by successively adding transmission channels (economic growth, life expectancy and education). If transmission channels are correct, the coefficient associated with domestic investment should lose statistical significance and magnitude after these channels are introduced. This is because part of the effect of domestic investment on economic complexity must be accounted for by the coefficient of the estimated transmission channels. We specify the first model in equation where we introduce in different steps our transmission channels (1):

$$\mathrm{ECI}_{i,t} = \beta_0 + \beta_1 \mathrm{ECI}_{i,t-1} + \beta_2 \mathrm{DI}_{i,t} + \beta_3 \mathrm{Z}_{i,t} + \beta_4 X_{i,t} + \mu_i + \gamma_t + \varepsilon_{i,t} \tag{4}$$

Where $\mathrm{Z}_{i,t}$ stands for the vector of transmission channels. The other terms of equation (4) have the same meaning as in our baseline model equation (1). In the second model, we estimate the impact of domestic investment on each of our channels (Zi,t) as shown in equation (5):

$$\mathrm{Z}_{i,t} = \beta_0 + \beta_1 \mathrm{Z}_{i,t-1} + \beta_2 \mathrm{DI}_{i,t} + \beta_3 X_{i,t} + \mu_i + \gamma_t + \varepsilon_{i,t} \tag{5}$$

The results of the first step are displayed in Table 8(a), where we successively add the different channels. For convenience, we report our baseline estimates in Column 1, while columns 2, 3 and 4 show results when we add GDP, life expectancy and HCI, respectively. Results reveal that the coefficient on domestic investment (from columns 2-4) loses significance and magnitude when compared to our baseline specification in column 1. Moreover, each of the three mediators has a distinct effect on economic complexity as observed in columns 2-4 (Table 8a). HCI has the highest positive mediating contribution to DI. Furthermore, the results in Table 8(b) show that DI has a positive and significant effect through each transmission channel. Therefore, we find empirical evidence that the three channels hypothesized in Section II are valid.

Table 8: Transmission Mechanism: 1st step

| | **Dependent variable: ECI** | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| L.ECI | 0.890*** | 1.012*** | 0.901*** | 0.896*** |
| | (0.056) | (0.020) | (0.041) | (0.048) |
| DI | 0.0052*** | 0.0009* | 0.004** | 0.0044* |
| | (0.002) | (0.0005) | (0.002) | (0.002) |
| POP | -0.059* | -0.001 | -0.025*** | 0.006 |
| | (0.035) | (0.014) | (0.009) | (0.029) |
| Trade | 0.0005** | -0.0001 | 0.0003** | 4.03E-05 |
| | (0.0002) | (0.0002) | (0.0001) | (0.0002) |
| FDI | -0.001 | 0.00346 | -0.00127 | -5.97E-05 |
| | (0.001) | (0.004) | (0.001) | (0.001) |
| Corrup | 0.013 | -0.0195** | 0.0404* | 0.005 |
| | (0.018) | (0.009) | (0.021) | (0.013) |
| GDP | | 0.004* | | |
| | | (0.003) | | |
| Life | | | 0.004** | |
| | | | (0.002) | |
| HCI | | | | 0.101* |
| | | | | (0.053) |
| Constant | -0.110* | 0.0283 | -0.440*** | -0.374*** |
| | (0.061) | (0.025) | (0.161) | (0.14) |
| Observations | 2,016 | 2,175 | 2,015 | 1,905 |
| AR(1) | 0.000 | 0.000 | 0.000 | 0.000 |
| AR(2) | 0.891 | 0.591 | 0.985 | 0.880 |
| Hansen Test (p-value) | 0.190 | 0.157 | 0.710 | 0.312 |

*Notes:* Standard errors in parentheses; $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 9: Table 8 (b): Transmission channels – step2

| | GDP | Life | HCI |
|---|---|---|---|
| L.GDP | 0.439*** | | |
| | (0.164) | | |
| L.Life | | 0.981*** | |
| | | (0.020) | |
| L.HCI | | | 1.034*** |
| | | | (0.019) |
| DI | 0.259* | 0.048* | 0.003*** |
| | (0.152) | (0.026) | (0.001) |
| POP | 0.277 | -0.014 | 0.028** |
| | (1.264) | (0.065) | (0.012) |
| Trade | -0.003 | -0.0003 | 0.001*** |
| | (0.005) | (0.002) | (0.0002) |
| FDI | 0.029 | -0.001 | -0.007*** |
| | (0.035) | (0.008) | (0.002) |
| Corrup | 0.008 | -0.037 | -0.006 |
| | (0.142) | (0.069) | (0.004) |
| Constant | -5.015* | 0.613 | -0.176*** |
| | (2.567) | (1.464) | (0.068) |
| Observations | 2,326 | 2,409 | 2,204 |
| AR(1) | 0.000 | 0.006 | 0.052 |
| AR(2) | 0.868 | 0.587 | 0.175 |
| Hansen Test (p-value) | 0.180 | 0.587 | 0.147 |

*Notes:* Standard errors in parentheses; $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

# 5 Conclusion and policy recommendations

Domestic investment is a crucial driver of economic growth, promoting various dimensions of economic development. However, a new strand of literature on economic development, called economic complexity, has emerged. Despite significant progress in understanding the determinants of economic complexity, the relationship between domestic investment and economic complexity remains largely unexplored. Therefore, we investigate the impact of domestic investment on economic complexity using data from 84 countries over the period 1980 to 2019.

We employ the system GMM (SGMM), dynamic panel threshold model and quantile regression models and find that domestic investment stimulates economic complexity above a threshold value of 20.483% of GDP, while deterring it below this threshold. Secondly, the nonlinear relationship between domestic investment and economic complexity depends on the levels of corruption and socio-economic conditions. Specifically, domestic investment promotes economic complexity in countries with good control of corruption (threshold of corruption is lower than 2.42) and favorable socio-economic conditions (above threshold value of 4.203). Furthermore, we find that economic growth, life expectancy and education are key channels through which domestic investment affects economic complexity. Trade and population growth are also found to be determinants of economic complexity. Finally, our results are robust to alternative specifications, alternative methodologies, business cycle fluctuations and varying levels of economic development.

Following this, we propose four key policy recommendations. First, we suggest that policymakers work to reduce corruption while increasing domestic investment. Lower levels of corruption will enable domestic investments to be more effectively channeled, enhancing productivity and technological advancement. This, in turn, should improve the volume, type, and quality of exports in terms of sophistication and ubiquity. Secondly, this study recommends that policymakers should focus on improving the socio-economic conditions of citizens. Better socio-economic conditions will support investments in productive ventures and reduce the tendency to consume profits from investments, prioritizing long-term well-being. Improved living conditions will boost productivity and enhance both the quality and quantity of goods, thus promoting economic complexity. Lastly, we recommend that greater emphasis be placed on increasing human capital through the allocation of domestic investment, to enhance international competitiveness. This can be achieved by improving the quality of education, which will increase technological capabilities and stimulate the production of more sophisticated products.

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# A Appendices

Table A1: Correlation table

| | ECI | DI | POP | Trade | FDI | Corrup |
|---|---|---|---|---|---|---|
| ECI | 1.000 | | | | | |
| DI | 0.061 | 1.000 | | | | |
| POP | -0.417 | -0.027 | 1.000 | | | |
| Trade | 0.382 | 0.204 | -0.104 | 1.000 | | |
| FDI | 0.154 | 0.216 | -0.109 | 0.502 | 1.000 | |
| Corrup | 0.284 | 0.050 | -0.028 | 0.247 | 0.082 | 1.000 |

Table A2: Variable Descriptions

| **Variable** | **Description** | **Source** |
|---|---|---|
| **Dependent Variables** | | |
| Economic complexity index (ECI) | Measure the diversity and the ubiquity of a country's export structure, corrected for how difficult it is to export each product | Atlas of economic complexity http://atlas.media.mit.edu |
| **Interest Variable** | | |
| Domestic investment (DI) | Gross fixed capital formation (% of GDP) | WDI |
| **Control Variables** | | |
| TRADE | Trade is the sum of exports and imports of goods and services (%GDP). | WDI |
| Foreign Direct Investment (FDI) | Net inflows of foreign direct investment as a percentage of GDP. | WDI |
| Corruption (Corrup) | This is an assessment of corruption within the political system | ICRG |
| Education (HCI) | Human capital index, based on years of schooling and returns to education; see Human capital in PWT9 | PWT9 |
| Gross Domestic Product (GDP) | is measured as the annual percentage growth rate of GDP per capita | WDI |
| Population growth (POP) | Population growth (annual %) | WDI |
| Life expectancy (Life) | Life expectancy at birth, total (years) | WDI |
| Socioeconomic Conditions (Socio-condition) | This is an assessment of the socioeconomic pressures at work in society that could constrain government action or fuel social dissatisfaction | ICRG |

*Notes:* WDI stands for World Development Indicator, ICRG stands for International Country Risk Guide, PWT9 represents the Penn World Trade

Table A3: List of Countries

| | | | | | |
|---|---|---|---|---|---|
| Albania | Congo, Dem. Rep | Guinea | Lebanon | Panama | Tanzania |
| Algeria | Congo, Rep | Honduras | Lithuania | Paraguay | Thailand |
| Angola | Costa Rica | Hong Kong | Madagascar | Peru | Togo |
| Argentina | Cote d'Ivoire | Hungary | Malaysia | Philippines | Trinidad and Tobago |
| Azerbaijan | Croatia | India | Mexico | Qatar | Tunisia |
| Bangladesh | Czechia | Indonesia | Moldova | Romania | Turkey |
| Belarus | Ecuador | Iran | Mongolia | Russia | Ukraine |
| Bolivia | Egypt | Jamaica | Morocco | Senegal | Uruguay |
| Brazil | El Salvador | Jordan | Mozambique | Singapore | Uzbekistan |
| Bulgaria | Estonia | Kazakhstan | Namibia | Slovakia | Venezuela |
| Cameroon | Ethiopia | Kenya | Nicaragua | Slovenia | Vietnam |
| Chile | Gabon | Korea, Rep | Nigeria | South Africa | Yemen |
| China | Ghana | Kuwait | Oman | Sri Lanka | Zambia |
| Colombia | Guatemala | Latvia | Pakistan | Sudan | Zimbabwe |