Determinants of Economic Dynamism among the 22 Municipalities in the Philippines

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Abstract: This study was conducted to identify the determinants of economic dynamism as proxy to investment climate of the 22 Municipalities in the Philippines. The variables namely infrastructure pillar, government efficiency pillar, and resiliency pillar from the Cities and Municipalities Competitiveness (CMCI) Survey are the independent variables considered in the study. Using panel regression in the analysis, the results show that economic dynamism is significantly driven by government efficiency and infrastructure pillars. Furthermore, the study revealed that economic dynamism scores of the Municipalities are increasing overtime as shown by the time effect component in the model. This suggests that the municipalities had improved their business climate over time, even during the pandemic. Based on the results, it is recommended that local government units (LGUs) focus on improving their performance under the indicators of government efficiency and infrastructure pillar to create a more business-friendly environment and attract more investors. Additionally, while the resiliency pillar did not show a statistically significant effect on economic dynamism, further review and enhancement of the indicators measuring resilience were suggested to better capture its impact.
Keywords: Economic Dynamism; Investment Climate; Municipality; Philippines; PCSE
JEL Classification: H11; D61; H54

Introduction

Municipalities and cities play crucial roles in the economic performance of regions and nations. The presence of vibrant cities and municipalities creates a favorable environment for businesses to flourish, attracting investments and fostering entrepreneurship (González-García et al., 2019). It is crucial to analyze them in assessing the economic performance of countries, given their substantial impact on fostering economic growth and progress. According to Coulombe et al. (2022), municipalities and cities are key actors in the overall economic landscape, serving as centers of commerce, innovation, and economic activity. However, there exists a significant gap between municipalities and cities in terms of economic indicators. Based on a study conducted by Khalid et al. (2019), economic indicators serve as an important function in understanding the disparities between municipalities and cities. These indicators include factors such as GDP, income per capita, employment rate, poverty level, and access to basic amenities. Likewise, cities demonstrate superior economic performance in areas where it is a prominent city that has a strong urban

governance capability, as opposed to regions where urban government capacity is more evenly distributed in which would result to a greater financial capacity for development initiatives from larger revenue bases and economies of scale (Ott et al., 2020). For instance, GDP per capita of New York City is significantly higher than that of smaller municipalities within the state (Yang, 2023). This demonstrates the ability of superior cities to attract and generate wealth, ultimately leading to a higher standard of living for their residents. Hence, cities possessing substantial government capacity wield significant influence in both policymaking and its subsequent implementation.

Municipalities, on the other hand, may provide necessary services but may lack the amenities or infrastructure seen in bigger urban regions because cities are frequently larger in terms of both geographical area and population, providing them with more resources and revenue-generating options. It faces challenges such as constrained resources, insufficient infrastructure, and a dearth of opportunities, leading to inferior economic indicators (Kutlar et al., 2012). The contrast in economic performance between municipalities and cities holds significant implications for policymakers and stakeholders, influencing decisions regarding resource distribution, urban planning, and strategies for poverty reduction. Consequently, addressing these economic disparities is imperative, advocating for inclusive development across all regions to attain sustainable economic growth and diminish inequality in developing nations. In addition, these Municipalities frequently encounter distinct challenges and opportunities in contrast to larger urban centers (Slack & Bird, 2013). Disparities in performance can be ascribed to various factors, including the extent of investment in infrastructure, the existence of industry clusters, and the quality of governance.

Municipalities, being at the center of economic activity, ought to create an atmosphere that encourages investment in the development of infrastructure (Mubangizi, 2021). It was found by Berntzen and Johannessen (2016) that evaluating the preparedness of small and rural municipalities is crucial for any transition to a smart city, as it provides implementers and planners with information on the state of the infrastructure and important components of a municipality. By understanding their starting point, municipalities may better implement and improve the critical infrastructure and key components needed to transform into smart cities. It must be noted that Municipalities often lack basic amenities such as reliable transportation, healthcare facilities, and educational institutions, which compel people to migrate to urban areas in search of better opportunities and improved living conditions. Urbanization and economic growth are closely linked phenomena that have a significant impact on the development and performance of municipalities and cities. Ajaero and Onokala (2013) noted that initiatives aim to improve the socioeconomic conditions of rural areas, thereby reducing the push factors that drive individuals to migrate to urban centers. By providing essential infrastructure, such as roads, schools, and healthcare facilities, rural development initiatives can enhance the overall quality of life in rural communities, making them more attractive and viable for residents. Consequently, individuals may choose to stay in their hometowns rather than migrating to urban areas in search of better opportunities. Furthermore, these initiatives also promote the diversification of rural economies, creating employment opportunities and income sources that can help sustain the local

population (Kronsell & Mukhtar-Landgren, 2018). By addressing the root causes of migration, municipalities development initiatives can alleviate the strain on urban areas and contribute to more balanced regional development.

Initiatives to attract investments are undertaken not only at the national level but also at the local level. Municipalities involvement in this area is a critical first step in guaranteeing the region's sustainable growth. Since municipalities are at the center of economic activity, municipalities ought to create an atmosphere that encourages investment in the development of infrastructure. Over the next several decades, attracting investments at the municipal or municipal group level that match resources, capacity, and demand will be of utmost importance (Tonkova, et al., 2017).

Infrastructure encompasses physical resources that connect and support a community, facilitating the provision of products and services (DTI-CB, 2023). This includes fundamental production inputs such as electricity and water, production interconnections like roads and communications, and infrastructure for the creation of human capital (Palei, 2015). Evaluating the impact of infrastructure projects on economic growth requires an understanding of key variables for measuring economic dynamism, including road networks, availability of utilities, health and education sectors, and investment in infrastructure (Du & Douch, 2018; Arvanitidis & Petrakos, 2010). Elsnari (2018) highlights the close relationship of infrastructure with economic growth and productivity. Adequate infrastructure, such as well-maintained transportation networks, facilitates efficient flow of goods and people, lowering transaction costs and attracting businesses and investors, leading to job creation and increased economic activity. Ultimately, assessing the influence of infrastructure projects demonstrates their critical role in supporting economic development and enhancing a nation's overall well-being (Palei, 2015).

The importance of government efficiency in promoting economic growth at the municipal level must be taken into account. Ning et al. (2021) emphasized the economic costs imposed by factors like lack of trustworthiness and inability to provide suitable business services. Farinha et al. (2020) identified ten indicators influencing government efficiency, including compliance with the Comprehensive Development Plan and capacity for local resources. This is crucial for enhancing the business environment and attracting investment, leading to positive economic performance (Rodríguez-Pose & Zhang, 2019). Efficient governance fosters trust and reduces transaction costs, encouraging economic activity (Rodriguez-Pose & Zhang, 2019). Governments can stimulate economic activity and attract investment by promoting efficiency and creating a conducive business environment (Yang et al., 2021). The proper distribution of resources through competent governance facilitates sustainable economic growth (Wen et al., 2021). Policymakers should prioritize government efficiency to promote long-term growth and prosperity (Wen et al., 2021).

Moreover, resiliency which refers to the ability to absorb and adapt to changes, encompassing mechanisms for disaster preparedness and risk reduction, infrastructure, and coordination (Bruneckiene et al., 2018) is an important factor to attract investors. Factors for assessing resilience include disaster risk reduction plans, land use plans,

emergency drills, early warning systems, and budget allocation for resilience financing (Pant et al., 2014). For instance, the ratio of the disaster risk reduction budget to the local government unit budget serves as an indicator of resilience finance (Department of Budget and Management, 2019). Geohazard maps from the Mines and Geosciences Bureau aid in local risk assessments, while indicators for infrastructure resilience include emergency vehicles, utilities, trained responders, and sanitation facilities (Philippine News Agency, 2019). Studies show that strong economic dynamism contributes to resilience, supporting industries and attracting investments (Williams et al., 2013; Fratesi & Rodríguez-Pose, 2016). A dynamic and resilient economy is more attractive to investors due to its ability to recover from setbacks (Fratesi & Rodríguez-Pose, 2016).

To assure higher returns for investors, it is crucial to create an optimal investment climate. The study of D'Ionsod, et. al (2019) focuses on the factors affecting the investment climate of cities. However, there has been limited exploration of the factors that specifically influence the investment climate at the municipal level. With this, the study aims to identify the key factors that can influence the business climates of municipalities in the Philippines. To measure the business climate in this study, the economic dynamism pillar was used, which reflects the attractiveness of cities or municipalities to investors and the expansion made for business opportunities in the area (DTI-CB, 2023). Hence, economic dynamism can be used as a basis in deciding as to where investors will locate or put up the business. Specifically, this paper seeks to examine the effects of the following pillars from the Cities and Municipalities Competitiveness Index (CMCI) Survey namely government efficiency, infrastructure, and resiliency on the economic dynamism among the municipalities in the Philippines. This paper provides valuable insights that can contribute to the development of strategies and policies aimed at fostering a favorable investment climate for Local Government Units (LGUs) at the municipal level in the Philippines.

Background of CMCI Survey

CMCI is a program that encourages local governments to collect and submit data on their performance based on the five core and convergent pillars of Economic Dynamism, Government Efficiency, Infrastructure, Resiliency, and Innovation. This is conducted annually to evaluates the competitiveness of cities and municipalities in the Philippines, aiming to enhance its local competitiveness and attract more investors. Before its launch in 2011, there was no regular mechanism for compiling indicators of local government performance in the Philippines, leading to the creation of CMCI. The survey, which is conducted with the assistance of Regional Competitiveness Committees (RCCs), encourages LGUs of Philippine' Cities and Municipalities to submit data based on five convergent pillars: Economic dynamism, Government efficiency, Infrastructure, Resiliency, and Innovation. Each pillar, consisting of ten indicators, provides a comprehensive view of LGU performance. The addition of Resiliency pillar in 2017 and Innovation pillar in 2021 reflects an ongoing effort to enhance the measurement of competitiveness. The pillar of Economic dynamism focuses on capturing the growth of businesses and industries, as well as the promotion of employment opportunities. Its goal is to foster a thriving economy within cities and municipalities. On the other hand, the

Government efficiency pillar emphasizes the quality and reliability of government services in supporting sustainable and effective expansion. It aims to ensure that local governments provide efficient and responsive services to citizens and businesses. While the Infrastructure pillar serves as the foundation for communities by connecting, expanding, and sustaining their physical structures. This pillar plays a vital role in facilitating the delivery of goods and services to residents and industries. It encompasses various elements such as transportation systems, utilities, and public facilities. Resiliency, another important pillar, highlights how local governments prepare their areas, businesses, and people to respond effectively to different types of shocks or disruptions. It involves strategies and measures that enhance the ability of communities to recover and thrive in the face of challenges. Lastly, the Innovation pillar delves into the creation and implementation of new products, processes, or services. It aims to improve efficiency, effectiveness, and overall competitive advantage within the local economy. By encouraging innovation, cities and municipalities can stay at the forefront of technological advancements and promote continuous improvement in various sectors. (DTI-CB, 2023).

Research Method

Sources of data

The study utilized secondary data obtained from the official website of the Department of Trade – Competitive Bureau in the Philippines. The dataset covered the 22 Municipalities of the Philippines during the period from 2017 to 2023. In order to analyze this data, panel data methodology was employed, taking into account both the cross-sectional and time-series dimensions present. The cross-sectional component of the data is represented by the number of municipalities included in the study, while the time-series component refers to the time periods covered for each municipality. The analysis starts from 2017 because the pillar on resiliency, an independent variable in the study, was introduced in the CMCI survey only in 2017. The study concludes in 2023, as it is the most recent data available on the CMCI website. It is important to note that the data for the year 2018 was not captured due to unavailability across all municipalities in the CMCI website. Despite this missing data, the researchers decided to proceed with the analysis as an exploratory step to gain preliminary insights into potential relationships among the variables considered in the study. This approach also allows for future work when the missing data becomes available. Notably, the researchers recognize the possible impact this may cause on the generalizability of the results despite meeting all the MLR assumptions.

This research focuses only on the 22 municipalities of Philippines belonging in the same region and province. Score is used over rank because the latter is highly influenced by the performance of other municipalities, hence not reflective of what the municipality does possess and does not possess. The maximum score that each municipality can get for each pillar is 20 points and zero is the minimum value. The closer the score to 20 points, the better is the performance of the municipality in terms of the concerned pillar. In this

study, innovation pillar was not included because it was considered in the CMCI starting in the year 2022.

Method of Estimation

The study applied multiple linear regression for panel data to determine the effect of government efficiency, infrastructure, and resiliency pillars on economic dynamism of 22 Municipalities in the Philippines. The empirical model was estimated using the random and fixed effect model, hence, to test what model is appropriate, a Hausman test was conducted. Other necessary diagnostic tests were also conducted to check if the model suffers from other econometric issues. The Variance Inflation Factor was performed to identify if the model has multicollinearity. The Pesaran CD test was used to assess the presence of cross-sectional dependence in panel dataset. Since the data involves six (6) periods, the researchers also check the serial correlation to analyze if the model has an autocorrelation problem. To check for heteroskedasticity, the Modified Wald test was also performed. The model was assumed to have a sampling distribution that is normally distributed using the central limit theorem which says that as sample size is becoming larger, distribution of sample means becomes normal. Lastly, for the final regression of the model, the Panel-Corrected standard error (PCSE) was used to address issues of the empirical model on heteroscedasticity and autocorrelation.

Empirical Model

The model below depicts the relationship of the economic dynamism of the 22 Municipalities in the Philippines to its three (3) independent variables using panel regression analysis. The effect of all independent variables on the dependent variable were tested using the significance level of 5%:

$$ED_{it} = \propto + \text{ß}_1GE_{it} + \text{ß}_2INFR_{it} + \text{ß}_3RESL_{it} + u_{it}$$

Where:
ED_{it} is the economic dynamism score of municipality i for the years 2017 to 2023;
$\propto$ is the intercept;
$\text{ß}_1, \text{ß}_2, \text{ß}_3$ are the slope coefficients of GE, INFR, and RESL, respectively;
GE_{it} is government efficiency score of municipality i for the years 2017 to 2023;
$INFR_{it}$ is infrastructure score of municipality i for the years 2017 to 2023;
$RESL_{it}$ is the resiliency score of municipality i for the years 2017 to 2023; and
u_{it} is the individual error term.

Result and Discussion

Table 1 presents a descriptive summary information of the variables used in the panel regression analysis. For Economic dynamism scores of the 22 Municipalities from 2017 to 2023, it reveals that the highest recorded score among the 22 municipalities is 8.3677 which significantly surpass the mean score of 3.7875. In terms of government efficiency

scores, the maximum recorded score is 11.9703, which is relatively close to the mean score of all municipalities at 8.3577. The infrastructure pillar achieved its highest score at 7.9614, while the resiliency pillar stands out with the highest maximum value of 18.1867 among all variables studied. It is evident from the discrepancies between the maximum and minimum values of these variables that certain municipalities may be underperforming or lagging behind.

Table 1 Descriptive Statistics of the variables

Variables	N	Mean	Std. Dev.	Min	Max
Economic Dynamism	132	3.7875	1.4381	1.3438	8.3677
Government Efficiency	132	8.3577	2.4894	1.0535	11.9703
Infrastructure	132	4.2725	1.5950	0.1773	7.9614
Resiliency	132	12.5839	3.6176	0	18.1867

Panel Data Model Specification

To identify whether to use a Fixed Effect (FE) or Random Effect (RE) model, a Hausman test was conducted. If the Hausman Test is statistically significant, FE model should be used and if it is not statistically significant RE model was appropriate. As shown in Table 2, the Hausman Test was depicted to be statistically significant, therefore, the FE model was more appropriate than the RE model.

Table 2 Hausman Test

Test Summary	Chi-sq. Statistic	Df	Prob>chi-sq	Remark
Cross-section random	12.86	3	0.0049	FE is appropriate

Given that the model is more appropriate for FE compared to RE, then Chow test must be conducted to determine if the model is better to be analyze using pooled regression or FE. For this test, if the prob>F is significant then it indicates that FE is more appropriate. As shown in Table 3, the test indicates a prob>F of 0.0000 indicating significance at 1% level which means that FE is the suitable for the model.

Table 3 Chow test

Prob>F	Remark
0.0000	FE is appropriate

To determine if there is a time fixed effects needed in running the FE model, then a testparm is conducted. Testparm is a join test to check if the time dummies which is the year captured in the study are equal to zero. Time fixed effect is needed when the prob>F of testparm is statistically significant at 5% level. Based on the result in Table 4, the prob>F is statistically significant at 1% implying that time fixed effects should be included in running the FE model.

Table 4 Testparm to detect if time-effects is needed in the fixed effect model

F-statistic	Prob>F	Remark
14.08	0.0000	There should be time-effects included in the model

Assumptions of Ordinary Least Square for Panel Analysis

The variance inflation factor (VIF) test is conducted to evaluate the multicollinearity of the variables in the model. The rule of thumb for VIF is that values beyond 10 indicate that the model is suffering from serious multicollinearity. Based on result from Table 5, it can be inferred that the model is not suffering from a problem of serious multicollinearity given that the mean VIF of the model is only 2.56.

Table 5 Multicollinearity Test

Independent Variables	VIF	1/VIF	Remark
Economic Dynamism	3.35	0.2988	The model is not suffering from serious multicollinearity
Government Efficiency	2.51	0.3978	
Infrastructure	1.83	0.5475	
Mean VIF	2.56		

The modified Wald test was conducted to check for the presence of groupwise heteroskedasticity in the data. The test has a P-value of 1% level which is statistically significant. This indicates rejection of the null that the model is not suffering from heteroscedasticity as presented in Table 6.

Table 6 Modified Wald Test for Groupwise Heteroscedasticity in Fixed Effect Regression Model

Chi-sq. Statistic	Prob>F	Remark
543.48	0.0000	Model is suffering from Heteroscedasticity

Moreover, to test whether the variables are correlated between groups in a panel setting, the Pesaran CD Test was conducted. Based on Table 7, the result indicates to be not statistically significant at 5% level, which means the model has no issue on cross-sectional dependence.

Table 7 Pesaran's test of cross-sectional independence

Pesaran's test of cross-sectional independence	Prob>F	Remark
-1.428	1.8467	Cross sectional Independence

The study also checks if the model is suffering from serial correlation. By looking at the prob >F in Table 8, it revealed to be significant at 1% level which implies that the model has a problem of first-order autocorrelation.

Table 8 Wooldridge test for autocorrelation in panel data

F- Statistic	Prob>F	Remark
14.286	0.0011	There is first -order autocorrelation

Final Model

Table 9 shows the final result of the panel regression after conducting a series of diagnostic tests. PCSE was employed to address problems on heteroscedasticity and first-order autocorrelation that were identified. The model has a total of 132 observations for

all 22 Municipalities in the Philippines for a duration of 6 years. The overall model had an R-squared value of 0.5386, indicating that 53.86% of the variation in economic dynamism could be explained by the three independent variables. The prob>chi-square value of 0.0000 indicated that the model with the identified independent variables fit the data significantly better at a 1% level.

Table 9 PCSE Regression Result on the effect of Government Efficiency, Infrastructure, and Resiliency on Economic Dynamism of 22 Municipalities in the Philippines

Variable		Coefficient
Government Efficiency		0.2222***
Infrastructure		0.3964***
Resiliency		-0.0413
Year		
	2019	0.1949
	2020	1.2823***
	2021	1.2301***
	2022	1.8553***
	2023	1.1657***
Constant		-0.1980
N		132
Number of groups		22
Number of periods		6
R-squared		0.5386
Prob >chi2		0.0000***

*Level of significance: 1% ***, 5%**, 10% ***

Moreover, the result of the regression presented in Table 9 shows that both scores in government efficiency and infrastructure pillar are significant at 1% level. Both coefficients indicate a positive effect on Economic dynamism score. This implies that an increase in the scores of municipalities in both government efficiency and infrastructure pillars will improve their economic dynamism score. Specifically, a 1 unit increase in the score of government efficiency and infrastructure will increase the economic dynamism score of the municipalities by 0.2222 and 0.3964 points, respectively. The relationship between government efficiency and economic dynamism aligns with the conclusions drawn by D'lonsod et. al (2019) and Rodriguez-Pose and Zhang (2019), indicating that an effective government delivers reliable and high-quality services, thereby stimulating economic activity, increasing productivity, and yielding higher level of output. Similarly, the impact of infrastructure on economic dynamism is in line with the findings of Elahi and Khan (2018), as well as D'lonsod et. al (2019) and Rodriguez-Pose and Zhang (2019), asserting that robust infrastructure exerts a constructive influence on both the economy and the well-being of individuals by reducing business costs and complexities, ultimately enhancing productivity.

However, the impact of resiliency on economic dynamism was was found to be insignificant which is similar to the conclusions of D'lonsod et. al (2019) in their on the drivers of economic dynamism across cities in the Philippines. But it is important to note that the lack of statistically significant findings does not definitively negate the potential influence of the resiliency variable on economic dynamism.

In terms of the year dummy variables, which account for temporal effects with 2017 as the reference year, the result indicates that an increase in the economic dynamism score for the years 2020, 2021, 2022, and 2023 are significantly higher than 2017. The display of these positive significant effect on economic dynamism for the mentioned years indicates the municipalities have improved its business climate over the years even amidst the challenges posed by the pandemic.

Conclusion

The economic dynamism of municipalities in Philippines is a complex and multifaceted phenomenon, influenced by various factors. The findings of this study revealed that both government efficiency and infrastructure pillars significantly impact economic dynamism, highlighting the pivotal role played by these aspects in fostering economic growth and development within municipalities.

The recognition of government efficiency and infrastructure as key drivers of economic dynamism underscores the importance of effective governance and well-developed physical structures in facilitating economic growth. Government efficiency encompasses various aspects such as regulatory quality, control of corruption, and government effectiveness, all of which play critical roles in creating an environment conducive to business activity. Similarly, infrastructure, including transportation networks, communication systems, and utilities, forms the backbone of the economy of municipality, directly influencing its capacity for trade, investment, and production.

Consequently, the implications of these findings suggest that LGUs should prioritize efforts to enhance their performance across the indicators associated with government efficiency and infrastructure. By focusing on improving these pillars, LGUs can potentially stimulate a discernible increase in economic dynamism scores. This, in turn, may lead to the creation of a more favorable and enticing environment for business ventures. Such an environment is likely to attract increased investor interest, stimulate entrepreneurial activities, and contribute to overall economic expansion within the municipalities.

Moreover, the time-effect component of the analysis indicated that some municipalities have been able to demonstrate substantial improvement in their economic dynamism over the years. This underscores the potential progress within these local economies, signaling the importance of ongoing monitoring and support to sustain and strengthen these advancements.

In contrast, the resiliency pillar did not emerge as statistically significant in influencing economic dynamism in this study. Nevertheless, this finding does not definitively negate the potential impact of resilience on economic dynamics. Rather, it underscores the need for further examination and reevaluation of the indicators measuring resilience within the CMCI. It is imperative for the CMCI Competitiveness Bureau to review and enhance these indicators to effectively capture the underlying nuances of resiliency and its potential implications for economic dynamism.

Based on the overall findings of this study, future researchers could delve deeper into understanding the nuanced relationships between resilience and economic dynamism, seeking to uncover potential linkages that may not have been fully captured in the present study. Additionally, it is essential to acknowledge the limitations stemming from incomplete or missing data, as observed in the absence of 2018 data across all municipalities in the CMCI website, hence future researchers may navigate and mitigate the impact of missing data in the analysis, ensuring a more robust and reliable analysis.

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