



ISSN: 2189-9126

国際開発研究フォーラム

FORUM OF INTERNATIONAL DEVELOPMENT STUDIES

研究論文
ARTICLE

Making Decentralization Work for Industrial Development: Evidence from A Cross-Country Analysis

Bangkit A. WIRYAWAN

52-2

名古屋大学大学院国際開発研究科
GRADUATE SCHOOL OF INTERNATIONAL DEVELOPMENT
NAGOYA UNIVERSITY

Making Decentralization Work for Industrial Development: Evidence from A Cross-Country Analysis

Bangkit A. WIRYAWAN *

Abstract

Decentralization of public service provision promised to bring more efficiency that would sustain growth, hence the worldwide trend in this direction for the past four decades. In this paper, I explore the impact of expenditure decentralization on industrial development by comparing developed and developing countries. Attention in this area is important as industrialization is still considered the key towards productive structural transformation. To this end, I gathered unbalanced panel data of 74 countries for the period between 1995 and 2017 and carried out analyses using the Two-Step System GMM estimation. The result showed that in general decentralization is negatively correlated with industrial development. However, the impact is different between developed and developing countries, with the former showing a positive correlation and negative with the latter. Institutional quality is considered as a contributing factor that affects this contrasting result. My results, especially for developing countries, are robust when I use revenue decentralization as the main predictor.

Keywords: Decentralization, Government, Institution, Industrial Development

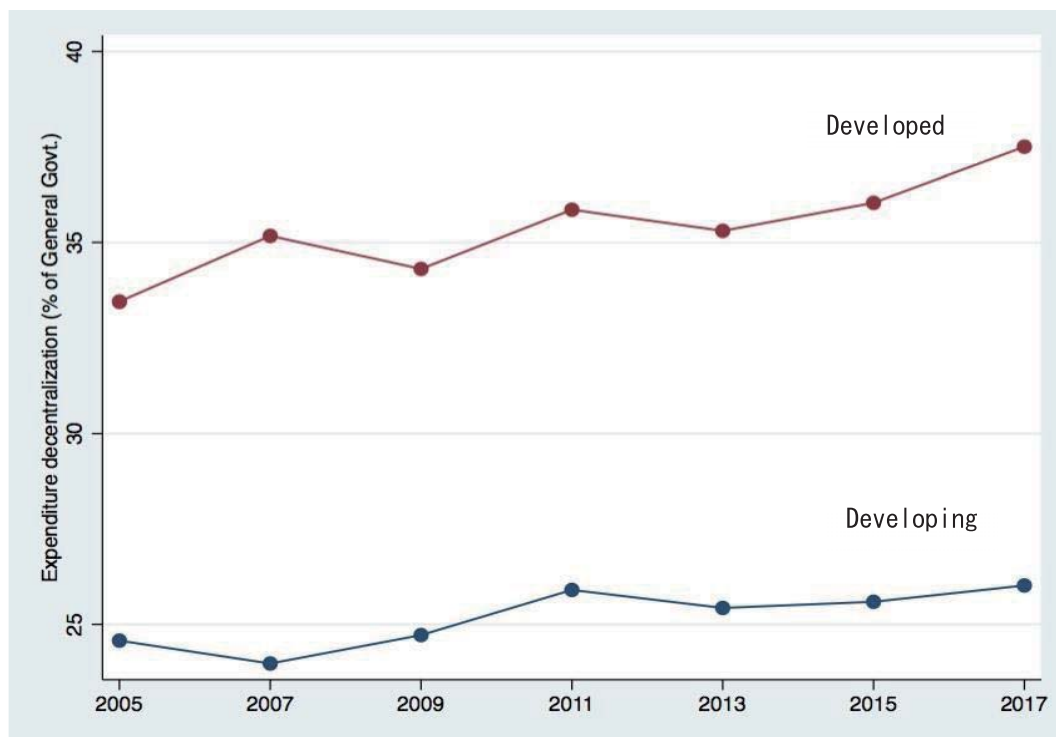
1. Introduction

Waves of decentralization have silently swept the world for the last four decades. Starting with developed countries in the early 1980s, it was then followed by a number of developing countries such as Brazil in 1988, the Philippines in 1991, Uganda in 1993, and Indonesia in 2001. As much as 89 developing countries had experimented with decentralization reform up to the late 2000s (World Bank 2008). The move had even become synonymous with the democratization movement (Schneider 2003) that came around the same time as the collapse of the centralized communist regimes in Eastern Europe. Both concepts offer a bottom-up decision-making mechanism that was the *global zeitgeist* of the post-cold war period.

In Figure 1, we can see that while decentralization has grown in importance, we continue to see different dynamics of fiscal decentralization in the past decade for developed and developing countries. The major difference has been in the level of decentralization where local government spending in developed countries constitutes north of a third (33%) of general government spending, while in

* PhD Candidate at the Graduate School of International Development, Nagoya University. I would like to extend my gratitude to Prof. Christian Otchia for the constructive comments and two referees for the reviews.

Figure 1 Decentralization in Developed and Developing Countries 2005–2017



Note: a. Decentralization is measured as a percentage of local government expenditures in state/province and city-level against the total government, b. Figures are comprised of 85 countries

Source: IMF 2019

developing countries the number is significantly lower averaging at around 27%. The figure for developed countries goes along with the argument that higher-income countries are more likely to sustain this trend (Bahl & Linn 1992; Bahl & Nath 1986). Meanwhile, in the developing world, the slope is much different. Following the decentralization program in developing countries in the past, there have been only small changes in the proportion of local government spending as shown in the blue line in the graph.

In measuring decentralization, one of the most common methods is to use the ratio of local government spending against central government spending. This serves as a qualitative measure of local government’s public service capabilities (Bahl & Nath 1986). The larger the spending of local government, the higher the level of decentralization. Countries with political decentralization, such as federalist countries, tend to be more decentralized as compared to those with only administrative or fiscal decentralization. Furthermore, scholars are also looking at the structure of revenue between central and local governments, where higher local revenue also signifies a higher degree of decentralization (Schneider 2003; Smoke 2001). Lately, growing bodies of literature have tried to develop other measurements such as the federalism index (Arzaghi & Henderson 2005) and the

decentralization score (Ivanyna & Shah 2012; Schneider 2003: 32–56; Slavinskaite 2017).

The previous body of empirical works on decentralization focused more on the impact on economic growth in general (Baskaran & Feld 2013; Davoodi & Zhou 1998; Gemmel et al. 2013; Rodriguez-Pose & Kroijer 2009). Few attempts have been made to explore the relationship with industrial development on a cross-country basis. This research offers to shed light on this area. As shown in Figure 1, developed and developing countries have been contrasting in their government spending pattern. This shall bring implications to the industrialization route taken by both groups. The objective of this research therefore is to explore the possible impact of economic decentralization on industrial development.

This paper is important in several ways. In a decentralized government institution, local governments are equipped with higher expenses for public service delivery such as infrastructure development and private sector affairs, which ideally should translate to industrial growth. This will support the efficiency promise of decentralization as posed by Tiebout (1956) and Oates (1972). Furthermore, without a robust industrial sector, a productive structural transformation would not have happened and thus income growth would tend to be slow. Failure in this area would also hinder countries' ability to increase technological capability in the future.

The remainder of this paper is organized as follows. Section 2 describes past literature discussing decentralization, institutions, and economic development. Section 3 deals with data and descriptive statistics, while Section 4 discusses the methodology. Section 5 presents estimation results and lastly, Section 6 concludes the study.

2. Literature Review

2.1. Efficiency Theory of Fiscal Decentralization

Decentralization Theorem (Oates 1972) proposed that localized provision of public goods would result in a higher level of social welfare, as needs are tailored according to each region's demand and uniqueness. Under vis-à-vis responsibility local government's public service delivery could reach Pareto efficiency, benefiting many people without making anyone worse-off. This optimum efficiency could also affect inter-jurisdictional spillover, where efficient public goods management in one region would benefit its neighboring areas (i.e., river management and border pollution control). Furthermore, Tiebout's model (1956) of the mobile consumer also pointed out how decentralization can be enjoyed by individuals as they can optimize their preference by moving from one locality to the other. The later "regional model" (Flatters, Henderson, & Meiszkowski 1974; in Oates 2005) disagrees with the former "mobile consumer model" suggesting that individual entry across jurisdiction would retard public service provided by the neighboring government.

These first-generation theories of fiscal decentralization focused more on the efficiency front based

on the asymmetry of information that exists at the local level (Oates 2005: 355). This happened due to the difference in natural characteristics such as geographical and population size.

Bahl and Nath (1986) view population and level of economic development as determining factors in affecting decentralization rate and that defense spending contributes to retarding it. This means that decentralization tends to be significantly higher for developed countries than in developing ones relative to their defense spending. They also pointed out that due to institutional differences between fiscal and political decentralization in developing countries, the efficiency gain may differ. This is a concern that was later raised by second-generation theorists.

The late 1990s witnessed the birth of second-generation theories of fiscal decentralization as well as expanding works of empirical research on the issue. The political economy of public choice, which was somehow neglected by the first-generation theory, emerged and gained focal attention (Oates 2005). This happened as many developing countries started to decentralize their institutions, where lack of political accountability had exploited its weakness. Furthermore, the call to attention for institutional development raised by North (1990) and others became a wide-ranging discourse that now influences the public-sphere discussion. Azfar et al. (1999) stated that there has been little empirical evidence of increasing efficiency under a decentralized regime and that its effectiveness depends on the underlying institutional framework. Their study is based on the previous work of Bird, Ebel, and Wallich (1995) that pointed out negative effects while also considering the positive results by others (Klitgaard 1998; Litvack et al. 1998; Matheson & Azfar 1999). Specifically, Bird and Smart (2003) found that transfer conditionalities should be imposed on the local government and that there should be increased public accountability. Treisman (2002), using various decentralization measurements, proposed that decentralization would lead to a decreasing quality of governance. Lastly, Besley, and Coate (2003), proposed another institutional perspective of decentralization in which they factored in local political decision-making in the framework, concluding that in theory decentralization is preferred when there are no public goods spillovers to the neighboring regions.

Intuitively and in theory, better governance and institution should correlate with stronger economic development, but the concern of the later theorists is that decentralization reform would only suffer from inefficiency that may arise due to the weak capacity of the local governments.

2.2. Empirical Findings

Empirical works that explored the relationship between decentralization and economic growth started burgeoning in the late 1990s. Davoodi and Zou (1998) using the Ordinary Least Square method found the impact of decentralization to be significantly negative in developing countries between 1975–1990, but not for developed countries. Similarly, Rodriguez-Pose and Kroijer (2009) revealed a negative correlation for Central and Eastern European countries from 1990 to 2004 except for tax decentralization measures. They pointed to the lack of institutional quality in many transitioning

countries in the region to have contributed to the result. This has been explored previously by de Mello and Barenstein (2001), who found that decentralization is positively correlated with institutional quality. Their finding is later confirmed by Ivanyna and Shah (2011) who revealed that decentralization improved institutions by lowering the incidence of corruption.

Martinez-Vazquez and McNab (2005) using Fixed-Effects OLS and GMM models, found that fiscal decentralization helped maintain macroeconomic stability, and the effect is significant in developed countries. This comes, however, at the cost of a negative effect on growth. For developing countries, the relationship showed the same trend albeit not statistically significant. Kalamova (2009) also found a negative relationship between decentralization and FDI when measured by the number of countries' administrative tiers. The finding is robust when measured with expenditure and revenue decentralization.

2.3. Connecting Decentralization, Institutions, and Industrial Development

Taking into account the aforementioned works on decentralization, especially on the efficiency approach, it can be concluded here that there is a logical linkage between decentralization and growth that was raised by the early theory of decentralization. In a decentralized regime, local governments can simultaneously carry out public service provision whilst also tailoring them based on local input and needs. However, later generation scholars also pointed out how institutional quality could foster the relationship. This is the underlying reason why the two processes often go hand-in-hand, decentralization and institutional reform, because without properly functioning institution decentralization will not work for development.

Local government's important role in industrial development has been highlighted by Bianchi and Labory (2006: 3). Increased globalization that came through trade deals put constraints on the central government in its ability to enact industrial policy. Hence there was a massive decline in industrial policy around the early 2000s. A bottom-up and localized industrial planning then is seen as a way to induce agglomeration. Other than concern for macroeconomic stability, fitting institutional settings at the local level is the key to unlock the full potential of this decentralized model (Sepulveda & Amin 2006: 321–341). A similar practice has been carried out in China's automotive industry, where Thun (2006) pointed out the importance of appropriate institutional infrastructure set up by the central government that provides incentives to local governments to promote the industry.

Through the literature, we can infer that decentralizing public spending can work for development, particularly to support industrialization. However, for that to work effectively some findings highlighted the importance of institutional quality.

3. Data and Descriptive Statistics

3.1. Data

The ideal dataset for studying decentralization is disaggregated data that differentiates public investment from other government expenditures. Unfortunately, none of the cross-country datasets on this topic contains such information. Most of the research to date has used the Government Finance Statistics or Fiscal Decentralization dataset provided by the International Monetary Fund (IMF). In this study, I complimented the IMF's data with some additional information gathered through the Ministry of Finance (Indonesia), National Audit Agency (The Philippines), Bureau of Statistics (China) as well as a World Bank research publication for decentralization in Vietnam. Unbalanced panel data for 74 countries are collected, consisting of 29 developed and 45 developing countries. The decentralization variable is measured in a 0-1 range of scale. It simply takes the ratio of sub-national government spending against total government spending.

In measuring decentralization, this paper follows the argument raised by Bahl and Nath (1986) where they insist on the expenditure rather than the revenue side. They suggested that measuring decentralization through the revenue side would neglect the local government's service delivery responsibility. The center point of local government activities is its public service provision ranging from local infrastructure development and providing business licenses or permits to distributing access to health and education. The measurement from the expenditure side, then, is considered more accurate despite there still existing some technical problems such as different account terms used in classifying central or local government budget. In addition, past research has an exceptionally low record of revenue decentralization data due to many countries not reporting their fiscal data to the IMF. The present research uses revenue decentralization as a mechanism to test the robustness of my findings, which also serves as one of the main contributions of this paper, relative to the existing literature.

This study also uses several additional datasets. Manufacturing share to GDP is used as a proxy of industry sector output. It was obtained from UNIDO's Industrial Statistics Database. Meanwhile, institutional data (Control of Corruption) is derived from the World Bank's World Governance Indicator (WGI). It serves as the proxy for institutional quality, where a higher score indicates a better institution. The data is measured as a score between 1 and 7. This is a slight alteration of the original measurement developed by Kaufmann et al. (2010) but with the same range.

Education index data (1-100 score), which is a proxy of human capital, is a variable I modified from the original 0-1 based index from UNDP. FDI data is obtained from UNCTAD statistics. I use the World Bank's World Development Indicator (WDI) as the source for my macroeconomic and demographic data.

3.2. Descriptive Statistics

Summary statistics in Table 1 show that the average contribution of manufacturing to GDP in all countries in the present observation stands at 14.75%, with the lowest being merely 3% and the highest at 32.58% from 1995 to 2017. The average percentage confirms the important role of the industry sector in economic development and thus serves as my dependent variable in this research. This data records the lowest number of observations due to missing data from some countries.

Decentralization index (DEC) stands at a mean value of 0.31, with 0.17 standard deviation. My data includes the highly centralized countries (e.g., where the central government spends 99% of total budget) as well as the deeply decentralized countries (e.g., where local government spending stands at 85%). However, the relatively high mean value indicates that many countries have decentralized their expenditure to the local level despite the very high variance between countries.

The average score for CONCOR is 4.04, with the highest score being 5.97 and the lowest being 1.86. The standard deviation for CONCOR is relatively small at 1.10, indicating that the distributional difference between countries is not large. Meanwhile, the necessary control variable for industrial development, GDPPC, has a mean score of 9.36 while GDP is at 12.07. Both are measured as the log of absolute value reported in Constant 2010 USD. Other sets of independent variables I used in the estimation are Foreign Direct Investment (FDI), averaging at 5.69% of GDP for all 74 countries, urbanization rate, (URB) which mean value is at 66.80%, and lastly, an education variable (EDU) which stands at a mean of 72.79 for the years between 1995 and 2017.

4. Methodology

This paper estimates the impact of decentralization on industrial development using panel data of 74 countries between 1995 and 2017. Considering the larger number of cross-sectional samples than the number of periods, the large N and small T condition, as well as the presence of heteroskedasticity within the observations, a GMM model is preferred. The estimation follows Arellano and Bover's (1995) and Blundell and Bond's (1998) model known as System GMM. This estimation was preceded by Arellano and Bond (1991) that was based on Holtz-Eakin, Newey, and Rosen (1998). The econometric models are set as the following:

$$MAN_{it} = \alpha + \beta_1 MAN_{it-1} + \beta_2 DEC_{it-1} + \beta_3 X_{it-1} + v_i + \gamma_t + u_{it} \quad \dots(1)$$

where the dependent variable that indicates industrial development is on the left-hand side of the equation (MAN_{it}). To resolve for endogeneity issue caused by unobserved heterogeneity, a lagged value of dependent variables (MAN_{it-1}) is placed as a regressor. This follows Arellano and Bond's (1991) model. I also apply the Windmeijer's (2005) two-step standard error correction to prevent it from becoming downwardly biased due to this endogenous regressor.

Meanwhile, the key independent variable used is the Decentralization Indicator (DEC_{it-1}). Control

Table 1 Summary Statistics

No.	Variable	Definition	Unit	Obs.	Mean	Std. Dev.	Min.	Max.	Source
1.	MAN	ISIC div. 15-37 industries	% GDP	1,300	14.76	5.10	3.11	32.58	UNIDO
2.	DEC	Ratio of local to total gov. exp.	0-1 Index	1,300	0.30	0.17	0.01	0.86	IMF
3.	REV	Ratio of local to total gov. rev.	0-1 Index	1,143	0.31	0.17	0.004	0.80	IMF
4.	CONCOR	Control of corruption score	1-7 Score	1,300	4.05	1.10	1.86	5.97	WGI
5.	GDPPC	GDP divided by population	Log Const. USD	1,300	9.38	1.32	5.95	11.64	WDI
6.	GOV	General government spending	% GDP	1,300	17.38	4.41	5.14	27.94	WDI
7.	FDI	FDI net inflows	% GDP	1,300	5.75	22.76	-58.33	499.6	UNCTAD
8.	URB	People living in urban areas	% Total population	1,300	67.20	17.96	14.38	97.96	WDI
9.	EDU	Weighted average of mean years and expected years of schooling	1-100 Score	1,300	72.89	13.05	32.4	94.1	UNDP

Source: Author, based on the data from IMF, UNIDO, UNCTAD, WDI, WGI, and UNDP

variables (X_{it-1}) are set at a lagged value to control for possible endogeneity bias. Following previous literature in cross-country analysis (Baskaran & Feld 2013; Levine & Renelt 1992) control variables included are investment share to GDP, human capital, population growth rate, and per capita income (GDPPC). Control of corruption (CONCOR) is used as a control variable that represents institutional quality; recall that as the literature findings above suggest, institutional quality is an important variable for measuring decentralization.

Foreign Direct Investment (FDI) and Education index (EDU) are used as a proxy of investment and human capital, respectively. General government expenditure (GOV), measured as the percentage of GDP, is used as a control for government size. Following Lim (2019) urban population share (URB) is used as a proxy to population. The ν_i and γ_t denote the year and country fixed-effects, respectively, to control for time-invariant unobserved heterogeneity and uit denotes the error term. The standard error in the estimation is clustered at the country level, following Wooldridge (2010). To evaluate the validity of the model, autocorrelation tests (the AR test) are performed as well as Hansen tests.

5. Results

This section is divided into three parts. In the first part, the baseline estimation result is presented. Secondly, a follow-up result divided between developed and developing countries is discussed, and finally a robustness check analysis is performed. Each specification includes both year and country fixed-effects.

5.1. Baseline Estimation Result

Table 2 summarizes the research findings. Column (1) shows the result of the baseline specification where I regress the lagged value of decentralization and manufacturing value-added. I find a negative and significant effect of decentralization. In column (2), I control for GDPPC and its square terms and still find a negative relationship. Based on this, roughly a 1% increase in local government budget correlates to a 0.004% industrial decline in the long run. The result confirms numerous pessimistic findings on the impact of decentralization (Davoodi & Zou 1998; Kalamova 2009; Rodriguez-Pose & Kroijer 2009).

Institutional quality (CONCOR) does not show any significance and I suspect that it suffers from heterogeneity as the sign changes when more control variables are added. GOV, which represents total government spending as a share of GDP, shows a positive correlation with the industry sector and it is significant, suggesting that in general GOV is properly allocated toward productive means to support industrial development. This positive effect is in contrast with the negative result of DEC in the same column (4), which is my main variable of interest. Both variables represent the government; the latter specifically refers to local government at the province and district level.

Table 2 Baseline Result: Two-Step System GMM

VARIABLES	DEPENDENT VARIABLE: MANUFACTURING (% GDP)			
	(1)	(2)	(3)	(4)
MAN _(t-1)	1.051 *** (0.018)	1.046 *** (0.017)	1.046 *** (0.017)	1.038 *** (0.0167)
DEC _(t-1)	- 0.363 ** (0.178)	- 0.443 ** (0.204)	- 0.446 ** (0.205)	- 0.354 * (0.212)
GDPPC _(t-1)		0.335 (0.239)	0.281 (0.265)	0.223 (0.302)
GDPPC ² _(t-1)		- 0.016 (0.014)	- 0.014 (0.016)	- 0.012 (0.017)
CONCOR _(t-1)			0.024 (0.037)	- 0.028 (0.033)
GOV _(t-1)				0.024 *** (0.008)
FDI _(t-1)				0.001 ** (0.0005)
URB _(t-1)				- 0.003 (0.002)
EDU _(t-1)				0.004 ** (0.002)
CONSTANT	- 0.106 (0.192)	- 1.277 (0.932)	- 1.467 (1.027)	- 1.382 (1.126)
Observations	1246	1245	1245	1238
Countries	74	74	74	74
Instruments	45	47	48	52
AR-1	0.007	0.007	0.007	0.007
AR-2	0.188	0.177	0.177	0.838
Hansen (P-val)	0.912	0.931	0.934	0.939

Note: *p < 0.1, **p < 0.05, ***p < 0.01, Robust standard error clustered at the country level in parentheses

Source: Author's calculation based on the data from IMF, UNIDO, UNCTAD, WDI, WGI, and UNDP

FDI shows a positive relationship with industry albeit it is a small coefficient in the final model. It is also showing significance at the 0.05 level, which is to be expected as industrial development often utilizes FDI as a production factor. Lastly, urbanization (URB) is negatively correlated with industry while education (EDU) is positive. However, only the latter is statistically significant albeit with a small coefficient value.

Post-estimation diagnostics reveals the presence of the first-order (AR – 1) serial autocorrelation, which is expected, but none for the second-order (AR–2). The absence of autocorrelation on the second-order justifies the use of the lagged value of my dependent variable. Secondly, the Hansen test reports no abnormality in the use of instruments. Overall, I find that my specifications are well-justified in supporting the finding.

Next, I extend my analysis by accessing the heterogeneity by country group. I divide countries based on their income level, whether they are in the high-income territory (i.e., per capita GDP > \$12,476 in 2017) or not. Non high-income countries are grouped as developing countries. All the G-7, most of EU-19, and most OECD countries are in the developed countries group with the exception being Estonia, Latvia, and Slovakia. Two countries are included in both groups which are the Czech Republic (classified as a developed country in 2006) and Slovenia (classified as a developed country in 1997). Most of the rest; ASEAN, BRICS, MENA, SSA, and LAC countries (except Chile), and others are categorized as developing countries. Table 3 shows the result of this estimation that contains both the baseline and the main estimation.

Column (1) shows a positive but not statistically significant effect of decentralization on industrial development among developed countries. In the next, controlling for GDPPC and GDPPC², I find that the coefficient of DEC is significant at the 0.1 significance level. The result indicates that every percentage increase of DEC in the previous year is related to a 0.008% increase of MAN in the current year. This finding for the developed countries group has been in line with the earlier theories that focused on the efficiency gain (Oates 1972; Tiebout 1956) and also with the latter model of local-based development (Bianchi & Labory 2006).

CONCOR in column (2) is shown to have a positive and significant effect on industrial development. This highlighted the empirical findings of previous institution-centered research of decentralization (Ivanya & Shah 2011; de Mello & Barenstein 2001). Both decentralization (DEC) and institutional quality (CONCOR) have the largest β coefficient, indicating the importance of both variables in promoting industrial development. GDPPC shows a positive relationship, the same sign as my baseline model but it is now significant for the developed countries. Meanwhile, GOV, which is a measure of general government expenditure as a percentage of GDP, shows a negative and significant result. FDI also shows a negative correlation but despite being significant, the coefficient is among the smallest. This negative trend also applies to URB and EDU with the first being statistically significant at the 0.05 level. This indicates that urbanization does not push for more industrial output, but rather

Table 3 GMM2S Estimation Result: Developed and Developing Countries

VARIABLES	DEPENDENT VARIABLE: MANUFACTURING (% GDP)			
	DEVELOPED		DEVELOPING	
	(1)	(2)	(3)	(4)
MAN _(t-1)	0.987*** (0.023)	0.792*** (0.090)	1.062*** (0.030)	1.059*** (0.021)
DEC _(t-1)	0.335 (0.421)	0.837* (0.443)	- 0.842* (0.475)	- 0.855*** (0.323)
GDPPC _(t-1)		0.976** (0.424)		0.647 (1.781)
GDPPC ² _(t-1)		- 0.174** (0.074)		- 0.039 (0.106)
CONCOR _(t-1)		1.544** (0.783)		- 0.024 (0.100)
GOV _(t-1)		- 0.097* (0.053)		0.029*** (0.009)
FDI _(t-1)		- 0.013** (0.007)		0.005 (0.008)
URB _(t-1)		- 0.043** (0.020)		- 0.002 (0.005)
EDU _(t-1)		- 0.029 (0.022)		0.004 (0.004)
CONSTANT	- 0.013 (0.276)	0 (.)	- 1.340*** (0.356)	- 4.535 (7.108)
Observations	583	576	663	662
Countries	29	29	47	47
Instruments	28	35	45	52
AR-1	0.084	0.041	0.015	0.014
AR-2	0.558	0.084	0.056	0.051
Hansen (P-val)	0.079	1.000	0.731	0.986

Note: *** p < 0.01, ** p < 0.05, * p < 0.1 Robust standard error clustered at the country level in parentheses, † The Czech Republic and Slovenia are accounted in both group

Source: Author's calculation based on the data from IMF, UNIDO, UNCTAD, WDI, WGI, and UNDP

it supports the growth of another sector (e.g., service).

The diagnostic test for this first group, however, failed to reject that there are no overidentifying restrictions in the model. While the AR-1 and AR-2 showed no serial autocorrelation under the 0.5 level, the Hansen test result is not within the commonly approved p-value range below 1 (Roodman 2009) for my main result in column (2). One reason for this might be due to the significantly reduced

number of cross-sectional dimensions, because only the developed countries are included in the estimation. Therefore, we should treat the result with this caution in mind.

On the second group of developing countries, the estimation result shows rather contrasting evidence. Table 3 shows that decentralization is negatively correlated with industrial development and that the relationship is significant in both columns (3) and (4). This means that an incremental 1% move towards larger decentralization corresponds with around a 0.008% decrease in industrial output share. The coefficient is relatively small, but the sign is consistent and significant. This finding is in accordance with the pessimistic findings posed by the second-generation theorists (Azfar 1999; Besley & Coate 2003; Treisman 2002).

The result shows that there is no significant result for CONCOR, thus I cannot conclude that institutional qualities in developing countries are beneficial for industrial growth. The coefficient of GOV is positive and significant, signaling the government's supportive efficiency towards the sector. However, contrary to this, the government's decision to allocate more fiscal spending to the local government, which is my DEC variable, is negatively correlated with industrial output. This could imply that spending by the central government relates more to the industry sector. Indeed in many countries, the central government holds a significant function over strategic issues that supported industrialization. An example is in Indonesia where despite its big-bang decentralization program in 2001 (Mulyo 2015; Nasution 2016), the central government still retains a large number of large-scale development projects at the local level particularly following the concern of local government's lack of capacity in the early days of the decentralization program (Nasution 2016). Another example includes the federally constructed interstate-highway that affected industrialization in the US through increasing logistics efficiency (Jaworski, Kitchens, & Nigai 2018).

Columns (3) and (4) show that there are serial autocorrelations in the first order (AR-1) with the residuals and this is expected in a GMM model. For the AR-2, under 5% rejection level the diagnostic result showed no autocorrelation. The Hansen test result lies between the approved range in both columns. Therefore, it is right to conclude that there is a negative effect of decentralization on industrial growth for developing countries and that the result is robust.

Based on the findings above, in order to make decentralization work for developing countries, it may need to be followed by improving institutional quality, as suggested by previous literature. Better institutions could enable local government to provide public service properly, even in the absence of democracy at the local level (Kosec & Moguees 2020: 165-213). Good institutions would also provide a mechanism to reduce abuse of power and inefficiencies, hence increasing control of corruption (CONCOR). The positive result from the developed countries suggested the importance of these two variables in supporting industrial development. This is something that has been pointed out earlier by institutional economists (Acemoglu et al. 2008, 2011; North 1990) and has been found to be positively correlated with decentralization as studied by de Mello and Barenstein (2001) as well as Ivanyina and

Shah (2011).

5.2. Robustness Check

To test the robustness of my findings, it is necessary to make an extension analysis. In that case, this study observes the impact of decentralization on the revenue side of decentralization (REV). However, it needs to be noted again here that revenue data covers a smaller number of countries compared to the expenditure side, as some countries do not report this data to the IMF. Table 4 presents the result. Specification (1), which includes all samples is consistent compared to my baseline result in Table 2 that decentralization is negatively correlated with industrial development. However, the relationship differs between developed and developing countries. For the latter, the finding is again

Table 4 Alternative Estimation: Revenue Decentralization

VARIABLES	ALL	DEVELOPED	DEVELOPING
	(1)	(2)	(3)
MAN _(t-1)	1.034*** (0.015)	1.039*** (0.027)	1.050*** (0.028)
REV _(t-1)	-0.258* (0.145)	0.786 (0.563)	-0.526*** (0.199)
GDPPC _(t-1)	0.475 (0.320)	-25.670* (13.400)	0.333 (1.708)
GDPPC ² _(t-1)	-0.024 (0.018)	1.225* (0.641)	-0.012 (0.102)
CONSTANT	-2.699** (1.342)	133.3* (69.70)	-2.515** (7.055)
Country fixed-effects	Yes	Yes	Yes
Year fixed-effects	Yes	Yes	Yes
Observations	1110	605	492
Num. of Countries	69	30	37
Num. of Instruments	47	47	47
AR-1	0.023	0.073	0.001
AR-2	0.931	0.586	0.492
Hansen (P-val.)	0.574	0.998	0.943

Note: *** p < 0.01, ** p < 0.05, * p < 0.1 Robust standard error clustered at the country level in parentheses † The Czech Republic and Slovenia are accounted in both group

Source: Author's calculation based on the data from IMF, UNIDO, UNCTAD, WDI, WGI, and UNDP

consistent, showing a significantly negative correlation. Specifically, a 1% increase in local revenue is correlated with a 0.005% decrease in industrial output share. My post-estimation result showed an absence of serial autocorrelation on the second-order (AR-2) as well as no abnormality on the Hansen test.

6. Conclusion

After decades of decentralization in developed and developing countries, the impact on the industrial sector needs to be assessed. Industrialization has been the key to productivity growth for many developed countries, and developing countries wish to follow along including through applying a decentralized model. This paper tried to shed light on the relationship between these two variables. Using dynamic panel data System GMM analysis for 74 countries from 1995 to 2017, I found that expenditure decentralization in the previous year is negatively correlated with industrial development. However, the result is different between developed and developing countries, with the former showing a positive and significant relationship in the main result. In the group of developing countries, the estimation showed a consistent negative correlation. This would suggest that the decentralization program in developing countries has not been able to provide fiscal efficiency that is needed to push for industrialization. The absence of a significant relationship with the institutional variable (CONCOR), signifying a weak institutional setting, could be an important factor that affects the relationship. This result for developing countries confirmed the pessimistic view of decentralization raised by second-generation theorists (Azfar et al. 1999; Bird & Smart 2003; Treisman 2002) that weak local institution retards development. My findings are robust to different measurements of decentralization, particularly for developing countries, as I also tested the revenue side. Finally, in order to make decentralization work to promote industrial development, a strong institutional reform that could mitigate the inefficiencies of public service provision is necessary to accompany the decentralization program.

References

- Acemoglu, D., Johnson, S., Robinson, J., & Yared, P. 2008. Income and Democracy. *American Economic Review*. 98: 808-842.
- Acemoglu, D., Ticchi, D. & Vindigni, A. 2011. Emergence and Persistence of Inefficient States. *Journal of the European Economic Association*. 9(2): 177-208.
- Arellano, M., & Bond, S. 1991. Some Test of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *The Review of Economic Studies*. 58(2): 277-297.
- Arellano, M., & Bover, O. 1995. Another Look at the Instrumental Variable Estimation of Error-Components Models. *Journal of econometrics*. 68(1): 29-51.
- Arzaghi, M. & Hendersen. 2005. Why Countries Are Fiscally Decentralizing. *Journal of Public Economics*. 89(7):

- 1157–1189.
- Azfar, O., Kahkonen, S., Lanyi, A., Meagher, P., & Rutherford, D. 1999. *Decentralization, Governance, and Public Services, The impact of Institutional Arrangements: A Review of the Literature*. Center for Institutional Reform and the Informal Sector Working Paper No. 255. College Park: University of Maryland.
- Bahl, R., & Nath, S. 1986. Public Expenditure Decentralization In Developing Countries. *Environment and Planning C: Government and Policy*. 4(4): 405–418.
- Bahl, R., & Linn, J. F. 1992. *Urban Public Finance in Developing Countries*. New York: Oxford University Press.
- Baskaran, T., & Feld, L. P. 2013. Fiscal Decentralization and Economic Growth in OECD Countries: Is There A Relationship? *Public Finance Review*. 41(4): 421–445. <https://doi.org/10.1177/1091142112463726>.
- Besley, T., & Coate, S. 2003. Centralized Versus Decentralized Provision of Local Public Goods: A Political Economy Approach. *Journal of Public Economics*. 87: 2611–2637
- Bianchi, P., & Labory, S. 2006. From ‘old’ Industrial Policy to ‘new’ Industrial Development Policy. In P. Bianchi and S. Labory (eds), *International Handbook on Industrial Policy*. 3–27. Massachusetts: Edward Elgar.
- Bird, R., Ebel, R., & Wallich, C. 1995. Fiscal Decentralization: From Command to Market. In R. Bird, R. Ebel, & C. Wallich (eds), *Decentralization of the Socialist State: Intergovernmental Finance in Transition Economies*. 1–68. Washington, D.C.: The World Bank
- Bird, R., & Michael Smart. 2003. Intergovernmental Fiscal Transfers: International Lessons for Developing Countries. *World Development*. 30(6): 899–912.
- Blundell, R., & Bond, S. 1998. Initial Conditions and Moment Restrictions in Dynamic Panel Data Models. *Journal of Econometrics*. 87(1): 115–143.
- Davoodi, H., & Zou, H. 1998. Fiscal Decentralization and Economic Growth: A Cross-Country Study. *Journal of Urban Economics*. 43: 244–257.
- De Mello, L., & Barenstein, M. 2001. *Fiscal Decentralization and Governance: A Cross-Country Analysis*. IMF Working Paper WP/01/71, Washington D.C.: IMF
- Gemmell, N., Kneller, R., & Sanz, I. 2013. Fiscal Decentralization and Economic Growth: Spending Versus Revenue Decentralization. *Economic Inquiry*. 51(4): 1915–1931.
- Holtz-Eakin, D., Newey, W., & Rosen, H. S. 1988. Estimating Vector Autoregressions with Panel Data. *Econometrica*. 56: 1371–1395.
- Ivanyna, M. & Shah, A. 2011. Decentralization and Corruption: New Cross-Country Evidence. *Environment and Planning C: Government and Policy*. 29(2): 344–362.
- Ivanyna, M. & Shah, A. 2012. *How Close is Your Government to Its People? Worldwide Indicators on Localization and Decentralization*. Policy Research Working Paper. No. 6138, Washington, DC: The World Bank.
- Jaworski, Taylor, Carol T. Kitchens, & Sergey Nigai. 2018. *The Interstate Highway System and the Development of the American Economy*. Unpublished Manuscript. Boulder: University of Colorado.
- Kalamova, M. 2009. *Essays in International Trade and Public Economics*. Berlin: Peter Lang.
- Kaufmann, D., Kraay, A., & Mastruzzi, M. 2010. *The Worldwide Governance Indicators: A Summary of Methodology, Data and Analytical Issues*. World Bank Policy Research Working Paper. No. 5430, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1682130
- Klitgaard, R. 1998. *Controlling Corruption*. Oakland: University of California Press.
- Kosec, K., & Mogue, T. 2020. Decentralization Without Democracy. *World Politics*. 72(2): 165–213.
- Levine, R., & Renelt, D. 1992. A Sensitivity Analysis of Cross-Country Growth Regressions. *American Economic Review*. 82: 942–963.
- Litvack, J., Ahmad, J., & Bird, R. 1998. *Rethinking Decentralization in Developing Countries*. Washington, DC: The World Bank
- Lim, Sunghun. 2019. *Global Agricultural Value Chains and Structural Transformation*. Staff Paper Series P 19–4. St. Paul: University of Minnesota.
- Martinez-Vazquez, J. 2005. *Fiscal Decentralization, Macrostability, and Growth*. International Center for Public Policy Working Paper Series 0506.

- Matheson, T., & Azfar, O. 1999. *Decentralization and Social Welfare in the Minority Provinces of the Philippines*. Mimeo. College Park: University of Maryland.
- Mulyo, S. A. 2015. Decentralization in Indonesia: An Empirical Analysis of District and City Performance. In Otsubo, S. (ed.), *Globalization and Development Vol III*. London: Routledge.
- Nasution, Anwar. 2016. *Government Decentralization Program in Indonesia*. ADBI Working Paper no. 601 DOI: <http://dx.doi.org/10.2139/ssrn.2877579>
- North, D. 1990. *Institutions, Institutional Change and Economic Performance*. Cambridge: Cambridge University Press.
- Oates, W. 1972. *Fiscal Federalism*. New York: Harcourt Brace Jovanovich.
- Oates, W. 2005. Toward A Second-Generation Theory of Fiscal Federalism. *International Tax and Public Finance*. 12: 349–373.
- Rodríguez-Pose, A., & Kroijer, A. 2009. Fiscal decentralization and economic growth in Central and Eastern Europe. *Growth and Change*. 40(3): 387–417. <https://doi.org/10.1111/j.1468-2257.2009.00488.x>
- Schneider, A. 2003. Decentralization: Conceptualization and Measurement. *Studies in Comparative International Development Fall 2003*. 38(3): 32–56.
- Sepulveda, L., & Amin, A. 2006. *Decentralizing industrial policies: threat or opportunity in developing countries?* In P. Bianchi and S. Laborine (eds), *International handbook on industrial policy*. 321–341. Massachusetts: Edward Elgar.
- Slavinskaite, N. 2016. Fiscal Decentralization and Economic Growth in Selected European Countries. *Journal of Business Economics and Management*. 18(4): 745–757.
- Smoke, P. 2001. *Fiscal Decentralization in Developing Countries: A Review of Current Concepts and Practice*. Democracy, Governance, and Human Rights Programme Paper No. 2. Geneva: UNRISD.
- Thun, E. 2006. *Changing Lanes in China: Foreign Direct Investment, Local Governments, and Auto Sector Development*. New York: Cambridge University Press.
- Tiebout, C. M. 1956. A Pure Theory of Local Expenditures. *Journal of Political Economy*. 64 (October): 416–424.
- Treisman, D. 2002. *Decentralization and the Quality of Government*. Mimeo. Los Angeles: UCLA.
- Windmeijer, F. 2005. A Finite Sample Correction for the Variance of Linear Efficient Two-Step GMM Estimators. *Journal of Econometrics*. 126: 25–51.
- Wooldridge, J. M. 2010. *Econometric analysis of cross section and panel data*. Cambridge: MIT Press.
- World Bank. 2008. *Decentralization in Client Countries: An Evaluation of World Bank Support 1990–2007*. Washington: The World Bank.

Appendix A: List of Countries used in Estimation

1	Afghanistan	26	Estonia	51	Netherlands
2	Argentina	27	Finland	52	New Zealand
3	Armenia	28	France	53	Norway
4	Australia	29	Georgia	54	Paraguay
5	Austria	30	Germany	55	Peru
6	Azerbaijan	31	Greece	56	Philippines
7	Belarus	32	Honduras	57	Portugal
8	Belgium	33	Hungary	58	Romania
9	Bolivia	34	Iceland	59	Russia
10	Bosnia	35	India	60	Serbia
11	Brazil	36	Indonesia	61	Slovakia
12	Bulgaria	37	Ireland	62	Slovenia
13	Cambodia	38	Israel	63	South Africa
14	Canada	39	Italy	64	Spain
15	Cape Verde	40	Japan	65	Sweden
16	Chile	41	Kenya	66	Switzerland
17	China	42	Korea	67	Thailand
18	Colombia	43	Kyrgyzstan	68	Tunisia
19	Costa Rica	44	Latvia	69	Turkey
20	Republic of Congo	45	Lithuania	70	UK
21	Croatia	46	Luxembourg	71	US
22	Czechia	47	Malta	72	Uganda
23	Denmark	48	Mexico	73	Ukraine
24	Egypt	49	Moldova	74	Vietnam
25	El Salvador	50	Myanmar		