

**Fiscal Decentralization and Rural Infrastructure Development:
Evidence from Myanmar (2011-2018)**

By

ZIN, Khin Mg

THESIS

Submitted to

KDI School of Public Policy and Management

In Partial Fulfillment of the Requirements

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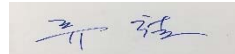
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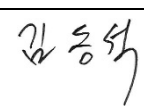
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Professor Kim, Dongseok



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ABSTRACT

The fiscal decentralization in Myanmar continues to deteriorate and pose a challenge the long lasting for the growth in the longer time horizon. The main objective of this paper is to observe the fiscal decentralization and rural infrastructure development: evidence from Myanmar and examine whether fiscal decentralization effect directly or indirectly on infrastructure by using an econometric model for the period 2011-2018. This study examines the budget decentralization's impact on infrastructure not only in the long run but also in the short run. The long and short run estimates are investigated using multiple regression method and fixed effects estimation method. Two variables including Revenue autonomy and the total number of miles of earth road construction were used in this analysis. The data was collected from the Ministry of Planning, Finance and Industry, Budget Department and the Department of Highways. Through the analysis findings show that Revenue autonomy positively causes the earth road construction. That's why this observation concluded that earth road construction causes Revenue autonomy and Revenue autonomy causes the earth road construction. There is a bidirectional causal relationship in both the earth road construction variable and Revenue autonomy variable and exists a long run relationship between Revenue autonomy and the earth road construction from multiple regression method and fixed effects estimation method. Therefore, Revenue autonomy policy needs to be coordinated with each other for curbing the earth road construction.

Key words: Fiscal Decentralization, Infrastructure development, Revenue autonomy, States and Regions, Myanmar.

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CHAPTER ONE

INTRODUCTION

Myanmar's decentralized political system changed from a central governance system to a democratic system through the 2010 general elections in accordance with the 2008 constitution. The 2008 constitution established a new local government apparatus, including 14 state and regional governments, with local legislatures (known as Hluttaws). As a direct result, the elected government started to implement the Framework for Economic and Social Reforms (FESR) to get higher improvements in the development of the socio economic life of the citizens. It was the beginning point of fiscal decentralization to achieve sustainable economic management (FESR,2012). The fiscal decentralization that has taken place in Myanmar has had a major impact on Public Financial Management (PFM) system.

Recently, the fiscal decentralization of Myanmar has taken some important steps on the path to decentralization. The study of Myanmar fiscal decentralization and rural infrastructure development has become an important issue in the developing country. This fiscal decentralization is a matter of significant current interest for local autonomy and rural development, addressing revenue autonomy and resources of longstanding tensions although autonomy remains largely constrained in Myanmar. It has been asserted that pointed out the strengths and weaknesses of the existing budget allocation and revenue mobilization system and were an important step in designing the public finance management reform strategy (World Bank,2015).

Fiscal decentralization is a significant matter for the current process of transferring fiscal autonomy and resources from the central government to its lower level like states and regions, rural and urban. Only if the central government transferred revenue autonomy to the local government, will have a higher level of spending social infrastructure development on revenue autonomy. Rural infrastructure development such as rural road construction is thought

to be Myanmar's economic and social development, particularly in rural and remote areas. It is commonly asserted that facilitating access to and participation in markets as well as expanding access to essential services, such as education and health care (Limi et al., 2015). This highlights the importance of community-based engagement in determining the nature of road infrastructure investment. According to the report of "A review of decentralization in Myanmar and the road sector,2018", responsibility for funding works on rural roads is now being shifted to state and region governments, without, it appears, an accompanied increase in intergovernmental transfers or own-revenue sources. It has been argued that an important study on rural infrastructure development; however, I intend to show that considerations should be given to local revenue generation capacity potentially expanding revenue responsibilities in tandem with the increase of expenditure responsibilities. The former research has focused on the impact of expenditure and economic growth on rural road construction, rather than on fiscal decentralization index (revenue autonomy index) and its impact on rural road construction. Local governments assert that resources and revenue autonomy should have adequate to fund their expenditure. The study will be of interest to the staff of finance management, decision makers, government officer and policymakers in Myanmar.

1.1 Statement of the Issue

As the consequences of 2010 democratization processes in Myanmar, regional governments are granted fiscal autonomy on budget allocation. This study investigates the effects of fiscal decentralization policy on regional infrastructure development. The researcher used the variations in fiscal autonomy among regions to explore the impacts of policy on infrastructure development by using a fixed effects estimation method. Findings suggest that a region of higher fiscal autonomy leads to better infrastructure development such as roads through an efficient budget allocation.

1.2 Objective of the Thesis

The main purpose of this study is to provide an empirical evidence of fiscal decentralization policy on rural infrastructure development. This study examines the importance of fiscal autonomy shared between a central government and regional government, which is policy alternatives for the government crucial to attain the balanced regional development. In developing countries, the appropriate policy agenda is vital to fill the development gap between urban and rural; however, it is still far from reaching the target in developing countries.

More specifically, this study aims:

- (1) To describe the fiscal decentralization policy on rural development in Myanmar.
- (2) To investigate the effects of fiscal decentralization policy on rural development.
- (3) To give recommendations on the problems arisen in the fiscal decentralization process.

1.3 Research Questions

- (1) Does the fiscal decentralization policy implementation in Myanmar improve rural infrastructure development?
- (2) What are the fiscal decentralization policies in Myanmar?

1.4 Hypothesis

H0: The higher fiscal decentralization index (revenue autonomy index) does not has a positive impact on government spending on rural infrastructure development such as rural road construction.

H1: The higher fiscal decentralization index (revenue autonomy index) has a positive impact on government spending on rural infrastructure development such as rural road construction.

1.5 Scope and Limitation of Study

Infrastructure development can be assumed to simultaneously determine a country's development. As a result, multiple regression method and fixed effects estimation method are mainly used in revenue autonomy and rural infrastructure development evaluation is estimated. The method assumes that infrastructure development can also be determined by other factors such as fiscal decentralization, characteristics of the country and other economic index. The model includes region dummies for controlling regions effects. The endogenous variables are also included as regression in the model.

1.6 Organization of Paper

This paper is composed of six chapters. Chapter Two deals with the theoretical concept of fiscal decentralization. It provides an overview of the basic concept of decentralization. Furthermore, it guides to the ideal view of decentralization. The three chapter expresses the institutional background.

Chapter Four examines the fiscal decentralization in Myanmar. In this chapter, a brief trend and progress of the Myanmar fiscal decentralization and rural infrastructure development will be discussed. This chapter will also lead to the concise (but adequate) understanding in the decentralization program from the past up to the present.

Chapter Five then examines how to manage the fiscal decentralization and infrastructure development better in Myanmar context. Results, issues will be discussed, so that it will be clear how to optimize the benefits of fiscal decentralization and rural infrastructure development to Myanmar.

Finally, chapter Six discusses conclusion and recommendations for the better decentralization agenda. It will figure out the existing crucial issues in Myanmar fiscal decentralization policy. Some recommendations then will be suggested as alternatives for the future decentralization policy.

CHAPTER TWO

LITERATURE REVIEW: Decentralization

Decentralization was not only for the economic benefit in developing countries - Focusing mainly on the liberalization of the market and development, but also on the devolution of central governments' functions and the public sector's political-purpose reforms. The term "decentralization" has been accepted as involving the transition of authority and accountability for public services to regional government from the central government, civil society and other NGOs by the major policy makers (Rondinelli, Nellis, & Cheema, 1999; UNDP, 2005). Practically, decentralization may differ in the forms as well as degrees greatly worldwide. According to Ramesh (2013), decentralization focused on the systemic problems in the early days of federalism and constitutional revenue and expenditure design. Eventually, it began gaining traction through the providing welfare system, the context of democratization and public policy. There are 3 ways of decentralization in common: political decentralization, administrative decentralization and fiscal decentralization.

Theoretically, decentralization of political power and fiscal responsibilities is often believed to be a good thing. After decades of dictatorial central rule, reforms for decentralization have been regarded as an important early step toward a more democratic, responsive and accountable governance system in Myanmar (Nixon, Joeline, Saw, Lynn & Arnold, 2013).

If there is the weak tradition of public participation, decentralization will become an essential initiative in periodically providing spaces for interaction between people and government. It can also increase the demand for downward accountability more channels of engagement to meet local needs. However, decentralization itself cannot be voluntarily transformed into better governance and downward accountability (Mbate, 2017).

In the traditional literature, decentralization is generally concerned with public service performance. In developing countries, the key aim of decentralization is to actively reach out to the poor (or propagate unrest among the oppressed minority groups). On the one hand, poverty reduction plan is a more critical targeting success than regional economic capital sharing efficiency in remote back ward areas.

2.1 Fiscal Decentralization

The theoretical framework concerning the fiscal decentralization's impact on infrastructure development is based on the model of its legacy (Martinez-Vazquez and Timofeev2009; Gu, Gyun Cheol, 2012). However, there is no consensus on the relationship between the two in so far as empirical literature is concerned, considering the attention it obtained in literature. Almost a lot of studies show a positive, negative and no relationship, however, the detailed review for this matter was not presented in this research.

2.1.1 Revenue Decentralization

Through the data analysis of sixty-one provinces in Vietnam, Nguyena and Anwarb (2011) found that revenues' decentralization encourages development and decentralization of expenditure contributes to deceleration. Bartolini, Stossberg and Blöchliger (2016) stated that the way of financing for the local expenditure by local revenues is better than by using resources by taking considering the importance of balancing between revenue and expenditure decentralization. The poor regions should require the more innovative framework which can lead the growth at momentum than the leading regions because there is a significant difference between current and future production in there (Blöchliger, Bartolini, & Stossberg, 2016).

Furthermore, the difference between local government expenditures and its revenues will lead to fiscal indiscipline. Theoretically, an overspending conduct on the part of regional governments with minimum tax effort will be created by the large vertical gap. The argument

for this actions is that regional governments do not internalize spending expenses and will get used to search the extra transfers.

By contrast, fiscal discipline will be improved by encouraging the regional governments to depend more on local taxes (Blöchliger & Petzold, 2009; IMF, 2009). Higher rely on central government transfers will hinder the growth opportunities of regional governments by influencing their fiscal performance, while there are improved fiscal rules in existence.

2.1.2 Expenditure Decentralization

And even a high dependence on the center transfers will negatively affect local government expenditure decentralization (Wu & Wang, 2013). Regional governments in the countries of Europe experienced improved fiscal efficiency, with higher expenditure decentralization and low transfer dependence (Escolano, Eyraud, Moreno Badia, Sarnes, & Tuladhar, 2012). Bhatt and Scaramozzino (2015) found that fiscal deficits and non-plan transfers have a positive causal bidirectional relationship in India's case.

2.2 Measurements of Fiscal Decentralization

Thornton (2007) observed that if the fiscal decentralization is restricted to taxing autonomy regional governments, its impact will be statistically insignificant on production growth through a cross sectional data for 19 OECD countries.

Regarding fiscal decentralization hypothesis, it is clear that findings are ambiguous in nature. Akai and Sakata (2002) have pointed out that cross-country studies led to a blurring of the relationship between fiscal decentralization and development if it is not taken into consideration about the variations of pooling countries with major variations in history, politics, organization and culture. Using these points of view into consideration, the researcher aims to analyze the intersection of fiscal decentralization and development for Myanmar in this study.

This was facilitated by a transfer system that focused on covering deficits of sub-national governments and where the latter are encouraged to bid for transfers to shield the gap between their proposed revenue and expenditure plans (Shotton, Yee, & Oo, 2016). This arrangement is common in a number of countries, especially those emerging from socialist management systems. The rush to shift revenue and spending to the subnational level and its general uncoordinated nature led to some ambiguity as to what these expenditures could be used for.

2.3 Rural Infrastructure and Economic Development

The third factor of Stern (1991) - “adequate infrastructure” - is recognized as essential for productivity and development since the economic development vision of Adam Smith's 1776. One of the important development factors is transport. Adam Smith stated that if there are no roads, no transport, no trade, no specialization, no economies of scale, the progress of productivity and development will not be happened (Prud'homme, 2004).

If a nation's economic conditions becomes worsen and infrastructure insufficiencies are overlap (e.g. transport and communication), the effect will be exacerbated. Based on the determinants of Stern's growth theory, Barro (1997) did a research to classify the determinants in 114 countries. The findings of Barro stretched Stern's theory to involve levles of education, fertility, rule of law, inflation, life expectancy, terms of trade and government spending. Public infrastructure means the large-sclae of civic constructions that promotes economic development directly or indirectly. Although the term dates from the 1920s, it was not given further attention until later in the last century (Prud'homme, 2004).

The definitions for infrastructure in the forms of private productions and as well as the socio- economic benefits become common nowadays. Nurske (1953) developed an earlier definition to the effect that infrastructure includes elements that providing production capability services. Nurske (1953) also expressed his opinions for infrastructure that it is large

and expensive installations. According to Hirschman (1958) and Biehl (1994), infrastructure is a capital which provides services to the public. In spite of having the nature of basis cross-sectoral aspects of supplying government or managing structure to accomplish particular objective such as education, production, health, communication, distribution, it is accepted that investing in infrastructure has a strong public involvement in the literature.

By using a panel data of Indian villages, Foster and Rosenzweig (2005) analyzed the effect of fiscal decentralization and democratization. Their findings showed that increasing a region's population weight has a positive impact public resources allocation to the construction of roads. But their research did not include significant institutional lapses in the implementation of decentralization especially in manipulating the local electoral process and the extent of power financed to the local government and making the decentralization of democracy in most parts of India not yet a reality. For example, it is not clear how much of a lee way elected local village councils have in allocation matters of projects such as road construction, which are mostly publicly funded and very bureaucratically controlled from the above. At most the local government just gets involved in deciding where to locate the road and identify the receiver workers.

The literature appears to show the research on decentralization and the development of rural infrastructure, as well as the autonomy of revenues. Since there is limited literature on regions in Myanmar, most of the examined studies are at states and regions level. Some studies analysis certain researchers used data from different countries.

These studies are important to this research because they show what has been done in the past and also indicate that this research can help fill some gaps in the literature, particularly in relation to regional government studies. The methodologies as well as the collection of variables from these studies discussed above help form those used in this study.

CHAPTER THREE

Fiscal Decentralization in Myanmar

The popularity of decentralization has been evident since 2010 in Myanmar. Myanmar has also facilitated fiscal decentralization, by equipping the state and regional governments with their own budgets, comprised of an assortment of small own-source revenue sources and fiscal transfers. The core policy focus was to increase the size of state and region budgets through intergovernmental transfers, without an accompanying emphasis on revenue or clarity of expenditure mandates.

Since 2015, the central government is greater emphasis has been given to implementing a more systematized approach to fiscal policy of states and regions. The transfer system must now conform to a medium-term fiscal framework and allocations between locations are based on a predetermined formula that attempts to account for relative needs and fiscal capacity, and away from gap-filling. While challenges remain the near future, this a promising step towards better fiscal management and greater predictability. In 2015, changes to the Constitution have added a collection of taxes to Schedule 5, which could theoretically be raised from states and regions. Although it did not have an imminent effect on fiscal decentralization, the amendment served as a framework for subsequent Union laws which may theoretically lead to major improvements. The list contains, for example, taxation on natural resources and customs; the decentralization of which will have major consequences for regional inequality between states and regions.

3.1 Fiscal decentralization and rural roads

More changes in the roads sector are already ongoing that have the ability to eliminate inequality and improve decentralization, but there are some significant unanswered questions: some responsibility for funding works on rural roads is being transferred to regional

governments. A corresponding increase in sub-regional revenue raising powers or intergovernmental fiscal transfers is currently no expectation. It risks adding more fiscal pressure to relatively small budgets for the state and region. How sub-regional governments finance rural roads and execute the centrally defined rural roads policy is uncertain. This is still uncertain if this change is an attempt to create greater decentralization or merely a transfer in responsibilities to the state and region levels.

When Myanmar seeks to shift towards more decentralized governance, reforms should aim at creating greater sub-regional autonomy and transparency in the decision-making process. In the medium term, these may entail more decentralization – aligning decision-making authorities by: experimenting with administrative models; incorporating appraisal mechanisms and data standards in the budgeting process; formalizing funding structures for national roads; allocating revenue to fund rural roads; and improving transparency by taking people closer to the decision-making process.

3.2 Budget Process and Allocation Criteria in Myanmar

The main responsibilities of Ministry of Planning, Finance and Industry (MOPFI) are collating current and capital budget, foreign exchange budget, evaluating all expenditure proposals before budget entry and coordinating with expenditure agencies at Union level. And then, MOPFI submits the budget proposals to Vice Presidents. Under Myanmar's constitution, Vice-President (1) shall review the budget proposal of union ministries and union-level organizations, and then submitted those proposed budget to the Financial Commission States and regions administrative institutions submit their budget to the budget department under the MOPFI which assigned for analyzing the current, capital and financial (debt) budget. The vice-president (2) shall review the states and regional budget proposal and shall also submit them to the Financial Commission. After that, the Financial Commission shall submit the proposals of Union budget to the Pyidaungsu Hluttaw (Parliament) which is appropriate for contribution

from the state fund to regional governments, permitting loans and approving grants as a special matter. After all the budget proposals have been discussed and approved by the Pyidaungsu Hluttaw, the President shall sign the union budget bill and promulgate it as the Union Budget Law. And also, after the budget proposals of states and regions have been approved by the respective State or Region Hluttaw, the Chief-Minister shall sign the State and Region Budget Bills and promulgate it as State Budget Laws or Regional Budget Laws.

In 2015, Budget Department established the Intergovernmental Fiscal Relations Division aiming to develop resource allocation between Union and States and regional Governments. The Union Government allocates the appropriate fiscal transfer to States and Regions by calculating with macro indicators to reduce the centralized framework. Concerned with tax sharing, 2% of additional Stamp Duty, 5% of Income Tax collected in Kyat from the individual, 15% of commercial Tax collected other than the tax levied for importing goods, 15% of Specific Goods Tax collected other than tax levied for importing goods that exclude imported special goods are transferred to State and Region Governments.

Taxes received by the Government of the Union, the State and Region Governments are set out in Schedules 1 and 5 of the 2008 Constitution. Under the Constitution, the related revenue distributions from the Union Government's collected revenues are distributed to States and Regions. The Union Government has provided funds and grants to states and regions with the recommendations of financial commission to the Pyidaungsu Hluttaw for approvals that the Public Financial Management System has been implementing to the relevant.

This is critical that States and regions are provided with appropriate funds so that they can meet their obligations for service delivery. In addition, by avoiding corruption, the effective and efficient spending of the allocated funds is also important for States and regions for the benefits of the public in that region.

3.3 States and Regions Budget Process in Myanmar

States and Regions budget system has included ministries of regional level. The first step of their budget process is that the MOPFI (Union level) provides recommendations and directions (MTFF's ceiling for union government grants) to the budget department of states and regions. The Budget Department of states and regions subject the instruction for the preparation of the budget estimates to concerning states and regional level agencies. Within these instructions, agencies and organizations at states and regions estimate their budget proposals and then submit them to their ministers concerned for getting approval. After having received the consent of the ministers involved, all organizations submit their budget proposals to the states and regional budget department for reviewing and analyzing. The financial and current budgets are scrutinized by the states and regional Budget Departments. They also scrutinize the capital budget together with the states and regional Planning Departments according to their strategic targets and states and regional plans. They will analyze how the capital budget in line with the targeted plans. The states and regional budget departments consolidate all of the current, capital and the financial budget proposals and then submit these proposals to the respective minister of MOPFI in each state and region, regional governments and till to the regional parliament (the states and regional Hluttaw) for approval after the ministers have examined the budget proposals. According to the constitution, regional budget proposals are submitted to the Vice President (2) after the states and regional Hluttaw discussed and approved them. After getting received the approval on them from Vice President 2, they are submitted to the Financial Commission. After that, the Union Budget along with the state and regional budget submit to the Union Parliament (Union Hluttaw) for the allocation of the grant by union budget. The parliament finally accepts the share of the grant required for the finances of states and regions and the implementation of union policy in states and regions. After getting approval from the Union Parliament, state and region budgets are resubmitted to the respective

states and regional hluttaw for final approval and the respective chief minister signs states and regions budget law.

3.4 Budget System in Myanmar

Starting from fiscal year of 2011-2012, Myanmar budget system was decentralized with include the Union (central) Budget, States and Regions (local) Budgets. Myanmar's fiscal year is from 1st October to 30st September Budget system reforms can be enforced in the public finance system, such as setting up a fiscal decentralization system, improving the budget transparency, establishing a reliable budget process, implementing policy bases into budget preparation through the integration of a Top-Down system by using the Medium Term Fiscal Framework (MTFF) in 2014. MTFF is a Cabinet-approved policy-based budgeting, providing instructions for budget requests which set out of budget deficit by MTFF. There are four steps for the process of budget in Myanmar; the step of budget planning and preparation; the step of budget formulation and approval; the step of budget implementation and execution; and the step of budget evaluation, reporting, and auditing (Kyaw, 2015). Previously 2011 when the democratic government system was elected in accordance with the 2008 Constitution, there was only one Union (Central) Fund Account. Because of that the central government allocated all the requested necessary budget from the ministries, departments, and agencies of the specific section. Furthermore, a bottom-up system was used in the budget system and the whole budget process was centralized by the government for budget allocation.

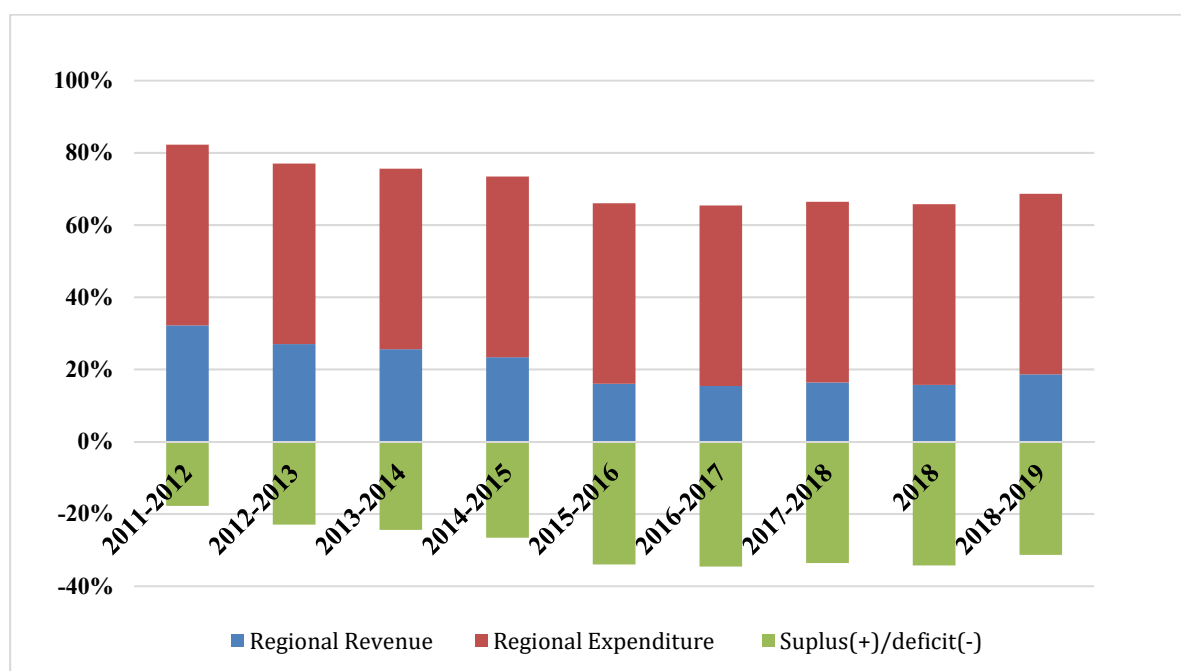
3.5 Deficit, Revenue and Expenditure of States and Regions in Myanmar

Figure 1 indicates the budget revenue, expenditure and deficit for 2011–2012 fiscal year to 2018–2019 fiscal year. The revenues and expenditure ratios of states and regional government gradually increase year after year starting from 2011-2012 FY to 2018-2019 FY. According to this figure, the amounts of expenditure had always exceeded the amount revenue that is deficit.

This is perfect for the Union government is providing more grants to the governments of states and regions.

According to the schedule 5 of the Myanmar Constitution (2008), governments of the states and regions are permitted to collect taxes for its necessary fund (Appendix). Union government provides loans and grants to state and regional governments in view of their budget deficit and special matters. The budget deficit of regional level departments should be financed by Union budget grants. States and regional level state-owned economic enterprises (SEEs) can be financed their deficit as a loan of 4 % interest rate by borrowing from the Union funds.

Figure 1: Deficit, Revenue and Expenditure in Myanmar (FY 2011-2012 to 2018-2019)



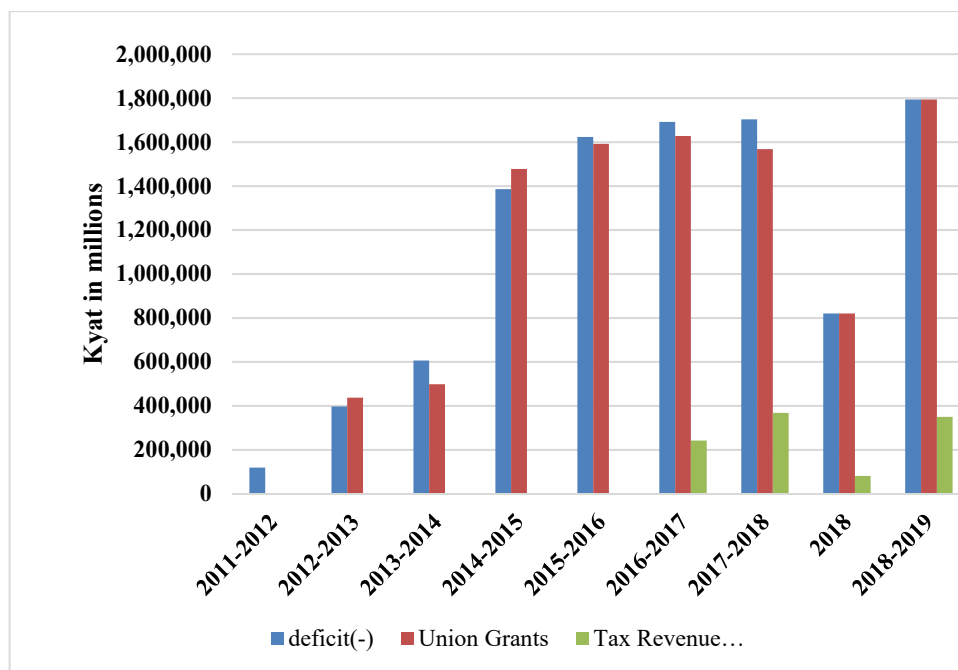
Source: Ministry of Planning, Finance and Industry, Budget Department, Myanmar

3.6 Grants and Tax share revenue from the Union Government allocation to the States and Regions Budget

Union government is providing grants to the governments of states and regions budget for their deficit. Since 2016-2017 fiscal year, Stamp tax (2%); Income tax (5%); Commercial

Tax (15%); Special goods tax (15%) is sharing tax proportion from union funds to states and region budget. Union government forecasts a Medium-terms Fiscal Framework estimate of grants to state and region governments during the budget preparing process, taking into account the following six indicators: Total population; Urban population as a percentage of total state population; Poverty index; Area; Per capita GDP and Per capita tax collection. This forecast has established since 2014, for fiscal year 2015-2016 budget request. Figure 2, provide the trends of grant and tax share revenue from Union governmental location to state and region governments during the fiscal year 2011-2012 to 2018-2019, by of states and regions.

Figure 2: Grants and Tax share revenue from the Union Government allocation to the States and Regions Budget (FY 2011-2012 to FY 2018-2019)



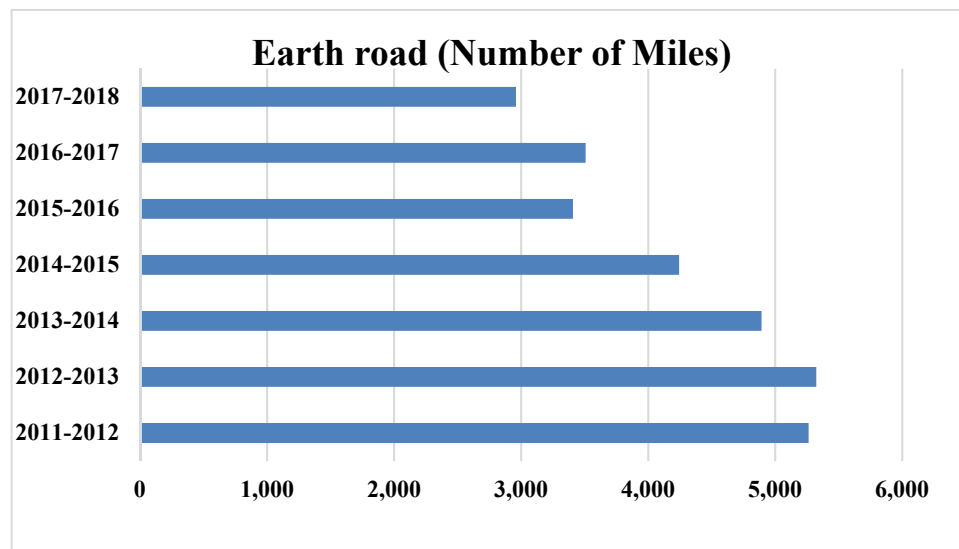
Source: Ministry of Planning, Finance and Industry, Budget Department, Myanmar

3.7 Number of Miles (Earth roads) States and Regions in Myanmar

The total miles of earth road at the country level gradually decrease over the years. (As shown in Figure 2), and the figure highlights the important policy implication of the research findings. Results of the study suggest that the total budget allocation for the rural road construction at country level decrease over time; however, the regions with higher fiscal

autonomy could still spend more budget on rural road construction compare to other regions with lower fiscal autonomy. The fiscal decentralization allows region to allocate budget effectively under the limited budget allocation.

Figure 2: Number of Miles (Earth roads) in Myanmar (FY 2011-2012 to 2017-2018)



Source: Department of Highways, Central Statistical YearBook(CSO), Myanmar

CHAPTER FOUR

Research Methodology

The main purpose of this chapter is to describe the research approach with a view to selecting the most appropriate methodology and detailed discussion on the data used in this study. The nature of this research suggests that a quantitative methodology is the most appropriate method. Type of data collected is secondary data. The secondary data is collected from the Ministry of Planning, Finance and Industrial and the Department of Highways. As this study aims to figure out the relationship between the fiscal decentralization and rural infrastructure development, multiple regression method and fixed effects estimation methods are mainly used.

4.1 Data Selection

The data from the panel includes fourteen states and regions of Myanmar. The number of miles (Earth Road) includes as dependent variable, regional budget deficit, the number of population size, area, poverty index, rural population ratio, per capita GDP and per taxation as control variables, and nine fiscal decentralization indicators (revenue autonomy). All variables were constructed from regional and central government revenue data. Fiscal Decentralization Methodological approach to studies was focused on the application to fiscal indicators (Martinez-Vazquez and Timofeev 2009; Gu, Gyun Cheol, 2012). The data time span a time frame from 2011 to 2018. Overall there are 83 observations in total.

4.2 Fiscal Decentralization Index

The right way to measure the degree and extent of the different aspects of fiscal decentralization has been a long-debated, yet underdeveloped issue. The fiscal decentralization indicators are symmetric in terms of the relative effects of revenue and expenditure

decentralization. Fiscal decentralization is referred to as the multi-faceted multi-dimensional process of the central government's (CG) transferring decision-making powers concerning public finance to subnational government (SNG), covering both expenditure and revenue sides of decentralization. For practice purposes, however, there has been diversity of approaches to measuring fiscal decentralization. In this study, revenue fiscal decentralization and regional budget deficit are mainly used to measure the variations of fiscal decentralization across regions in Myanmar.

To calculate the revenue autonomy as a fiscal decentralization index (Martinez-Vazquez and Timofeev 2009; Gu, Gyun Cheol, 2012), this study uses the following equation:

$$\textit{Revenue Autonomy} = \frac{\textit{Regional government revenue}}{\textit{Total regional government expenditure}}$$

4.3 Empirical Strategies

Fiscal decentralization of revenue and expenditure time series data are from various issues of Ministry of Planning, Finance and Industry (MOPFI). The Rural infrastructure development series is collected from central statistical organization books of Myanmar year (CSO) and the Department of Highways data sources. Ordinary Least Square (OLS) is performed using the time series data to find the stationary and non-stationary series and to avoid the spurious regression. Fixed effects and random effects estimate is applied to test the unit root from the data.

4.3.1 Ordinary Least Square (OLS) Estimates

To identify the relationship between the variations in fiscal decentralization across regions and rural infrastructure development, firstly this study uses Ordinary Least Square

(OLS) estimation method. Total number of miles of Earth road constructed in a fiscal year is used as a proxy for rural infrastructure development. To estimate the relationship between variations in Revenue Autonomy and number of miles of Earth Road in a region implemented in a fiscal year, the following equation is used:

$$Y_{it} = \beta_0 + \beta_1 \text{RevenueAutonomy} + X'_{it}\beta_2 + \delta_t + \varepsilon_{it} \quad (1)$$

where, “i” denotes a region and “t” represents year. Y_{it} indicates the outcome variable which is the total number of miles of Earth road in a region constructed in a fiscal year. X'_{it} denotes regional characteristics and δ_t represents year fixed effects. The summary statistics of variables used in this study are described in **Table 1**.

Table 1: Summary Statistics

	Mean	Sd.Dev	Min	Max
Log of number of miles (Earth road)	4.929	1.501	0.000	7.669
Fiscal Decentralization Index (Revenue Autonomy)	0.344	0.252	0.016	1.289
Log of regional budget deficit	10.931	1.023	7.814	12.320
Population size of a region (Thousand)	2436.929	1625.535	160.000	4994.000
Area of region (Squared Kilometers)	47820.370	38582.540	10170.890	155795.700
Poverty Index of a region	27.964	15.385	11.400	73.300
Rural population ratio of a region	0.767	0.134	0.318	0.861
Per capita GDP of a region		0.013	737.643	2812.670
Per taxation of a region	2.026	1.843	0.422	7.829
Number of observations		83		

4.3.2 Fixed Effects and Random Effects Estimates

The estimates from OLS regression may be biased due to omitted variables, this study use the Fixed Effects Model to purge biased estimators caused by time-constant unobserved variables. Under a certain assumption, the following fixed effects estimation equation is used to estimate the relationship between the variations in Revenue Autonomy of a region and the number of mile of Earth road of a region constructed in a fiscal year:

$$(y_{it} - \bar{y}_i) = \beta_1(x_{it} - \bar{x}_i) + (u_{it} - \bar{u}_i), \quad t=1,2,\dots,T \quad (2)$$

This study also uses the Random Effects model by using the following equation to estimate the effect of higher fiscal autonomy on rural infrastructure development:

$$(y_{it} - \theta \bar{y}_i) = \beta_0(1 - \theta) + \beta_1(x_{it1} - \bar{x}_{i1}) + \dots + \beta_k(x_{itk} - \bar{x}_{ik}) + (v_{it} - \theta \bar{v}_i), \quad (3)$$

CHAPTER FIVE

Main Results

This chapter discusses the results obtained from the equations mentioned in chapter 4. This study uses by both the revenue decentralization indicator and the expenditure decentralization indicator as proxies of the fiscal decentralization index. This chapter includes two sections. Section one describes the estimates from OLS regression, fixed effects regression and random effects regression by using the Revenue Autonomy as a proxy for the fiscal decentralization index.

5.1 Revenue Autonomy as a Fiscal Decentralization Indicator

The estimates from equation (2) are presented in Table 2. Column (1) & (2) report the OLS estimates from a simple regression and a multiple regression respectively. In Column (1), the coefficient of Fiscal Decentralization Index indicates that one percent higher of fiscal decentralization index is associated with 1.256 percentage points increase in the number of miles of Earth road constructed in a region during a fiscal year. In Column (2), we control for regional characteristics such as population, area of the region, poverty index of a region, GDP per capita, rural population ratio and per capita taxation; however, the magnitude and size of the coefficient remain unchanged. The results suggest that if a region has higher revenue autonomy, the regional government will invest more on rural development such as building rural road – generally the Earth road.

Table 2: Regression on Fiscal Decentralization Index and Rural Infrastructure

	(1)	(2)
	Log of number of miles (Earth road)	Log of number of miles (Earth road)
Fiscal Decentralization Index (Revenue Autonomy)	1.256*** (0.392)	1.256*** (0.392)
Population size of a region		-0.003*** (0.000)
Poverty Index of a region		0.151*** (0.023)
Area of region (Squared Kilometers)		0.000*** (0.000)
Rural population ratio of a region		64.555*** (10.647)
Per capita GDP of a region		0.013*** (0.002)
Per taxation of a region		3.197*** (0.577)
Year FE	Yes	Yes
Number of observation	83	83

Note: Coefficients are reported with standard errors in parenthesis. The unit of observation is a region. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

As it is mentioned above, the estimates from OLS regression may not be reliable because of the omitted variable biased. To mitigate the omitted variable problem, this study use panel data method such as Fixed Effects and Random Effects estimation methods by using equation (2) & (3) respectively. The estimates are reported in Table (3). Column (1) & (2) report the Fixed Effects estimates and Random Effects respectively. The coefficients of the Revenue Autonomy are consistent with OLS estimates and support the validity of OLS

estimates. The Hausman test suggest that the difference between the Fixed Effects estimates and Random Effects estimates are not systematically difference and the estimates are purged from the time-constant omitted variable problems.

Table 3: Regression with Fixed Effect Model

	(1)	(2)
Log of number of miles (Earth road)	FE	RE
Fiscal Decentralization Index (Revenue Autonomy)	1.256*** (0.392)	1.220*** (0.391)
Population size of a region		-0.000 (0.000)
Total area of region (Squared Kilometers)		0.000*** (0.000)
Poverty Index of a region		0.000 (0.021)
Rural population ratio of a region		5.430 (6.608)
Per capita GDP of a region		-0.001 (0.001)
Per taxation of a region		0.291 (0.532)
Number of observations	82	82


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	—— Coefficients ——		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fe_results	(B) est2		
Revenue_au~y	1.256342	1.220377	.0359651	.0360221

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(1) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 1.00
Prob>chi2 = 0.3181

5.2 Regional Budget Deficit as a Fiscal Decentralization Indicator

This study also uses another proxy variable – fiscal deficit of a region, which is the absolute difference between the regional own revenue and total regional expenditure for Fiscal Decentralization indicator to support the validity of the baseline estimates. In Myanmar, the central government contributes to the regional government budget upon the amount of regional budget deficit; therefore, this study assumes that higher regional budget deficit is associated with a lower fiscal autonomy of a region.

Table 4 reports the estimates from equation (2) by using the absolute amount of regional budget deficit as a proxy for the fiscal decentralization indicator. Estimates from the simple OLS regression are reported in Column (1) and multiple regression are presented in Column (2). The results in both columns suggest that higher regional budget deficit is associated with lower spending on rural infrastructure.

Table 4: Regression on Regional Fiscal Deficit and Rural Infrastructure

	(1)	(2)
	Log of number of miles (Earth road)	Log of number of miles (Earth road)
Fiscal Decentralization Index (Regional Budget Deficit)	-0.202*** (0.072)	-0.202*** (0.072)
Population size of a region		-0.002*** (0.000)
Poverty Index of a region		0.152*** (0.024)
Total area of region (Squared Kilometers)		0.000*** (0.000)
Rural population ratio of a region		64.017*** (11.220)
Per capita GDP of a region		0.013*** (0.002)
Per taxation of a region		3.247*** (0.603)
Year FE	8.543***	-69.831***
Region FE	(0.829)	(12.615)
Number of observation	82	82

The results from Fixed Effects and Random Effects estimation by using the absolute regional budget deficit are reported in Table (5). The estimates are consistent with OLS estimates and reassure the negative relationship between regional budget deficit and spending on rural infrastructure development.

Table 5: Regression with Fixed Effect Model

	(1)	(2)
Log of number of miles (Earth road)	FE	RE
Fiscal Decentralization Index (Regional Budget Deficit)	-0.202*** (0.072)	-0.194*** (0.073)
Population size of a region		-0.001 (0.000)
Total area of region (Squared Kilometers)		0.001*** (0.0001)
Poverty Index of a region		0.003 (0.019)
Rural population ratio of a region		4.454 (5.959)
Per capita GDP of a region		-0.001 (0.001)
Per taxation of a region		0.286 (0.480)
Number of observations	82	82

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	Coefficients		(b-B)	sqrt(diag(V_b-V_B))
	(b)	(B)	Difference	S.E.
	fe_results	est2		
ln_deficit	-.201631	-.1941882	-.0074428	.0048513

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(1) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 2.35
Prob>chi2 = 0.1250

CHAPTER SIX

CONCLUSION AND POLICY RECOMMENDATIONS

The effective and efficient allocation of scarce resources in developing countries bring prosperity of the people particularly for those who live under poverty. In developing countries, a large proportion of the poor live in rural area, the policies of taking those poor out of poverty are always at the top of the policy agenda. To effectively alleviate poverty, the government needs to know who are the poor, where they live, how they do business, and what challenges they face. The regional governments have better understanding on what are the challenges local people have than the central government and it allows them to deliver a better and time consistent service. The decentralization fiscal autonomy allows regional governments to deliver a better service to the public.

The findings of this study supports the evidence of existing literature. The results indicate that a higher Fiscal Decentralization Index (FDI) is associated with higher spending on rural road construction e.g., one percent higher of FDI is associated with 1.256 percentage points increase in the number of miles of Earth road. After controlling the regional characteristics which are important to budget allocation decision in a government, the results remain unchanged.

We conclude - based on the findings of this study that a region with higher revenue autonomy will invest more on rural development such as building rural road e.g., earth road which are important catalyst for economic development in rural area and to take poor out of poverty.

The main purpose in this study was to contribute the research evidence on how the policy of fiscal authority decentralization allows regional governments to address more

effectively the needs of the public than the central government, with special attention to the budget allocation on rural infrastructure development as one of the best policies to take poor out of poverty.

The key practical contribution of the research is that total budget allocation for the rural road construction is decreasing over time; however, the regions with higher fiscal autonomy could still spend more budget on rural road construction compare to other regions with lower fiscal autonomy. As the fiscal authority decentralization policy allows regional governments to allocate budget with special attention to the greatest needs of public, it could be one of the effective policies to implement in developing countries to alleviate the poverty.

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Appendix A

SCHEDULE FIVE

Taxes Collected by Region or States

(Refer to Section 254)

The Constitution of the Republic of the Union of Myanmar (2008)

1. Land revenue.
2. Excise revenue.
3. Water tax and embankment tax based on dams and reservoirs managed by the Region or State and tax on use of electricity generated by such facilities managed by the Region or State.
4. Toll fees from using roads and bridges managed by the Region or State.
5. (a) Royalty collected on fresh water fisheries.
(b) Royalty collected on marine fisheries within the permitted range of territorial water.
6. Taxes collected on vehicles on road transport and vessels on inland waterway transport, in accord with law, in a Region or a State.
7. Proceeds, rent fees and other profits from those properties owned by a Region or a State.
8. Fees, taxes and other revenues collected on services enterprises by a Region or a State.
9. Fines imposed by judicial courts in a Region or a State including Region Taya Hluttaw or State Taya Hluttaw and taxes collected on service provision and other revenues.
10. Interests from disbursed by a Region or State.
11. Profits returned from investment of a Region or State.
12. Taxes collected on extraction of the following items from the forests in a Region or a State:
 - (a) Taxes collected on all other woods except teak and other restricted hard woods;
 - (b) Taxes collected on firewood, charcoal, rattan, bamboo, bird nests, catch, thanetkha, turpentine, eaglewood and honey-based products.
13. Registration fees.
14. Taxes on entrainments.
15. Salt tax.
16. Revenue received from the Union Fund Account.
17. Contributions by development affairs organizations in a Region or State concerned.
18. Unclaimed cash and property.
19. Treasure trove.