

Conference Paper

The Impact of Road Construction Program: Evidence from East Java, Indonesia

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Abstract

The purpose of the Jalan Lintas Selatan (JLS) construction program is to reduce the inequality between the southern and the northern area in East Java. In order to measure the success of the road construction program, this study aims to evaluate the socioeconomic impact on villages passed by the JLS. Especially in Pacitan, Trenggalek and Tulungagung districts. This study uses Propensity Score Matching (PSM) and Difference in Difference (DID) to evaluate the causal impact, while the data are obtained from survey Potensi Desa (PODES) in 2008, 2011 and 2014.

The findings of this study show that the road construction program has a positive impact to the regions. Due to the construction, population density, investment and job opportunities increased. It also shortens the distance of schools to the village center, especially senior high school. Interestingly it is also decreased length to karaoke. However, we also find that the road construction reduce the Own-Source Revenue (*Pendapatan Asli Daerah*) of the village government.

Keywords: road construction program, *Jalan Lintas Selatan*, *Propensity Score Matching*, *Difference in Difference*, village socioeconomic.

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1. Introduction

The East Java regions can be grouped by the location into two groups, the northern area and the southern area. The northern part consists of eight regions, which are Tuban, Lamongan, Gresik, Sidoarjo, Pasuruan, Probolinggo, Bondowoso, Situbondo, Surabaya, Pasuruan, and Probolinggo. The southern part also consists of eight regions, which are Pacitan, Trenggalek, Tulungagung, Blitar, Malang, Lumajang, Jember, and Banyuwangi. Although East Java categorized as developed province relative to the other province outside Java according to its macroeconomics indicator value, there is still a quite wide inequality between southern and northern area due to the different ability to develop (Warda, 2013). One of the most important infrastructure to boost the regions' economy


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is a road. A well-built road could be a good investment to reduce the inequality, since it can increase economic activity in the regions that will lead to poverty alleviation (Lokshin and Yemtsov, 2005).

Bina Marga Public Service of East Java (2015) says that several potential areas in southern East Java still lagged behind because of the limited road across the regions. Besides this fact, the government is struggling to reduce the inequality by making more roads in the southern. They try to design a road construction program called Jalan Lintas Selatan (JLS). The JLS has started to build since 2002. In 2015, the roads already 673,88 km long and targeted to be done in 2019. Picture 1.2 shows the JLS that lay across eight districts in southern East Java. Three of eight districts that already got the roads are Pacitan, Trenggalek, and Tulungagung. The construction program in Pacitan is about 95.90%, while in Trenggalek is 31.48% and Tulungagung is 15.52%.



Figure 1: Map of the South Cross Road through eight districts in the south of East Java (Sumber: Dinas PU Bina Marga Jawa Timur, 2015).

The JLS construction program is expected to develop East Java equally and eliminate the gap between the southern and northern area, as well as improving the socioeconomic conditions of the community. However, the road construction program does not always have a positive impact (Warda, 2013). Therefore, the objective of this research is to evaluate the impact of the JLS construction program, especially the socioeconomic

impact, on villages in three districts of southern East Java i.e. Pacitan, Trenggalek, and Tulungagung.

2. Literatur Review

Based on the literature studies, road infrastructure benefits the community economically and socially. The New Growth Theory explains that infrastructure is kind of input which could drive the economy (Hulten and Schwab, 1991). The availability of the roads infrastructure increase the efficiency in production activity by improving the location accessibility and reducing the input and distribution cost (Barro, 1990: 53; Khanker et al., 2009). This means that the road construction have a positive economic impact to the society.

Socially, the road infrastructure provides a lot of amenities such as (1) serves the individual or the society, (2) clarify the information exchange, (3) makes people easier to access the entertainment, (4) expands the social program's scope, (5) cuts down the distances between housing area, public facilities, and offices, also (6) facilitates the social assistance programs (Nasution, 1994; Siregar, 1990).

Farris and Harding in Anwar and Tito (1996) says that the construction of road infrastructure can generate social benefits as well as social costs. The social benefits are: (1) growing number of job opportunities, which in turn can increase the income; (2) reduce time consumptions; (3) expands the agricultural commodity markets; (4) exchanges barter with market transactions; and (5) changes the community behavior. While the social costs faced by rural community are (1) road accidents, (2) community discharge, (3) natural resource exploitation, and lifestyle changes of rural society (Adler 1983: 65).

Empirical studies put the same things as the literature studies. It stated that road construction can reduce poverty by increasing quantity of agricultural production, wages, and output prices (Khandker et al., 2009). It is even can increase women's wages in regions (Lokshin and Yemtsov, 2005). On the other hand, Lokshin and Yemtsov (2005) says that the existence of roads led to sectoral changing from agricultural base to industrial base, marked with the increasing number of industrial job opportunities. That kind of reality forces people to move from agricultural to non-agricultural sectors (Mu and Walle, 2009).

3. Data and Method

The data uses in this study are obtained from survey Potensi Desa (PODES) in 2008, 2011, and 2014. The survey conducted by Central Bureau of Statistics at village level (including nagari in West Sumatra, kelurahan, and UPT) in all sub-districts or districts on Indonesia. Villages classified as an operational village if they have a clear boundary, resident, and government.

Using Propensity Score Matching (PSM) and Difference-in-Difference (DID) methods, we evaluate the impact of the road construction program to the villages in Pacitan, Trenggalek, and Tulungagung. At first, we use Probit model to estimate the Propensity Score (PScore). Then, the PScore uses to determine the villages that have a similar characteristics. Villages that have similar PScore considered to have a similar characteristics. The group then labelled as “common support”. After getting the common support group, we do the balancing property test to separate the common support into two groups, treated group and untreated group. The treated group is for villages passed by the JLS, while the untreated group is for the others which do not. Some basic characteristics uses to match villages shown in Appendix 1. Therefore, we can only use sample that have very similar characteristics for the next step.

The second step in this study exploit Difference-in-Difference (DID) method to estimate the average program’s impact on socioeconomic outcomes such as population density, total village’s income, and many more. We estimate all the socioeconomic outcomes that available on the PODES 2011 and PODES 2014. Using the DID methods, we can minimize the bias result by controlling the unobserved time-invariant heterogeneity. DID model is down below:

$$Y_{it} = \alpha_1 + \beta_1 t + \beta_2 D^{2011} + \beta_3 D^{2014} + \beta_4 (t \cdot D^{2011}) + \beta_5 (t \cdot D^{2014}) + \beta_6 X_{it} + \epsilon_{it} \quad (1)$$

Where, Y_{it} = socioeconomic outcome variables

α_i = region fixed effect

t = dummy group (1=treated group; 0=untreated group)

D^{2011} = dummy time 2011 (1=2011; 0=2008)

D^{2014} = dummy time 2014 (1=2014; 0=2008)

ϵ_{it} = error

The β_1 is the outcome difference between the treated group and untreated group. The β_2 is the outcome difference in terms of time, between 2008 and 2011. The β_3 is the outcome difference in terms of time, between 2008 and 2014. While β_4 and β_5 are the

coefficient that reflect the outcome difference in terms of intervention and time. Those coefficient show the impact of the program.

TABLE 1: The DID Estimation Results.

Outcome Variables	Coef.	Robust Std. Err.
Demography:		
Density (2011)	52.7443***	15.1015
Density (2014)	37.0739**	18.8649
Sosial:		
Closest distance to nearest highschool (2011)	-1.0542**	0.5380
Closest distance to nearest highschool (2014)	-0.8550*	0.5192
Closest distance to nearest highschool SMK(2011)	-3.7964***	1.3587
Closest distance to nearest highschool SMK(2014)	-2.8995***	0.9102
Closest distance to nearest Karaoke(2011)	-8.6767***	2.3928
Closest distance to nearest Karaoke (2014)	-17.1038***	2.6702
Ekonomi:		
Total Income of the village (2011)	-0.0197***	0.0051
Total Income of the village (2014)	-0.0178**	0.0079
Notes: *** significancy 1%; ** significancy 5%; * significancy 10%		

4. Result and Discussion

The PSM estimation generate the Propensity Score (PScore) that will be used in balancing property test. The result of balancing property test obtain a common support which consists of 599 villages in Pacitan and 539 villages in Trenggalek and Tulungagung. Furthermore, using the 539 villages that have similar characteristics as a sample we employ DID to value the impact. The identical sample could drop probability of biased results. So if there is a different outcomes between the two groups, it must be caused by the intervention or the program.

Using the DID, we estimate all the socioeconomic variables in PODES but only several variables remain significant. The outcomes are population density, distance to school facility, distance to karaoke, and the total income of the village as we can see in Table 1. There are three findings in this study. First, the road construction program significantly affect the population density in each village. In 2011 number of residents increased by 53 people per km², while in 2014 increased by 37 people per km². This because the increasing number of workers on construction sector that come into the region along with the programs. Mostly, they come from other region. Second, the program significantly cut off the distance from the residence to school (especially SMA and SMK) and karaoke (entertainment facility). So it just takes little time to get

TABLE 2: Lampiran 1 Statistik Deskriptif Variabel Outcome Desa Sebelum dan Sesudah Proyek.

Variabel Outcome	Observasi	2008				2014			
		Mean	SD	Min	Max	Mean	SD	Min	Max
Variabel demografi									
Kepadatan (jiwa/km ²)	599	1290	1127	63	9674	1265	1146	48	8824
Jumlah TKI	599	0.0222	0.0362	0	0.2790	0.0212	0.0332	0	0.2571
Variabel social									
Jarak ke SMP terdekat (km)	599	1.4190	2.3388	0	15	1.7319	2.1115	0	16.7
Jarak ke SMA terdekat (km)	599	4.1337	5.6781	0	29	5.5876	5.3242	0	34
Jarak ke SMK terdekat (km)	599	7.0594	10.0794	0	68	7.6013	8.4789	0	95
Jarak ke Perguruan Tinggi terdekat (km)	599	19.1189	15.8900	0	85	19.0503	15.9249	0	85
Jarak ke Rumah Sakit Umum terdekat (km)	599	18.9766	15.9703	0	73	17.3765	15.3724	0	75
Jarak ke Rumah Sakit Bersalin terdekat (km)	599	14.2513	15.9438	0	75	16.4387	14.7327	0	75
Jarak ke Puskesmas terdekat (km)	599	4.1105	5.1166	0	73	5.3239	10.3687	0	65
Jarak ke Dokter terdekat (km)	599	3.6479	4.2060	0	36	3.3833	4.0770	0	28
Jarak ke Bidan terdekat (km)	599	0.8659	2.3699	0	18	0.4265	1.5070	0	13
Jarak ke Apotek terdekat (km)	599	9.1551	10.2189	0	56	5.8259	7.7888	0	57
Jarak ke tempat karaoke terdekat (km)	599	25.5289	19.8848	0	98	14.5190	14.8263	0	99.8
Angkutan umum (variabel dummy:1=ada; 0=tidak)	599	0.5876	0.4927	0	1	0.6394	0.4806	0	1
Jarak dari desa ke kantor administrasi kecamatan (km)	599	5.2321	4.2466	0	26	5.4190	4.4050	1	28
Jarak dari desa ke kantor administrasi kabupaten (km)	599	20.7386	15.2815	0	73	20.8748	14.9375	1	73
Pencurian (variabel dummy:1=ada; 0=tidak)	599	0.2755	0.4471	0	1	0.2654	0.4419	0	1
Variabel ekonomi									
Jumlah pasar nonpermanen (unit)	599	0.0001	0.0002	0	0.0019	0.00003	0.0001	0	0.0007
Jumlah minimarket (unit)	599	0.00003	0.0001	0	0.0012	0.0002	0.0008	0	0.0117
Jumlah toko (unit)	599	0.0088	0.0078	0	0.0718	0.0103	0.0084	0	0.0680
Jumlah warung (unit)	599	0.0022	0.0026	0	0.0258	0.0023	0.0026	0	0.0194
Jumlah restoran (unit)	599	0.0001	0.0004	0	0.0052	0.0001	0.0003	0	0.0023
Jumlah hotel (unit)	599	0.00001	0.0001	0	0.0009	0.00002	0.0001	0	0.0010
Jumlah penginapan (unit)	599	0.000003	0.0006	0	0.0148	0.0001	0.0001	0	0.0014
Jumlah PAD (juta/jiwa)	599	0.0341	0.0303	0.0002	0.2141	0.0395	0.0936	0	2.0210

onto school or karaoke, since the roads make the facilities accessed easily. Third, the program significantly reduce the amount of village's own-source income because the construction wipe out the village's income source like the crooked land.

5. Conclusion and Suggestion

The socioeconomic impact of road construction program in southern East Java, especially in Pacitan, Trenggalek and Tulungagung, increase the population density, the attractiveness to investment, and reduce the distance to the senior high school (SMA and SMK) and karaoke (entertainment facility). Unfortunately, it also decrease of the village's own-source income. Based on these findings, the government is expected to complete the construction immediately, since the roads still partially done due to the limited budget from central and regional government. To overcome the problem, the government need to get an extra loan to finance the road construction.

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