

RESEARCH ARTICLE

## Examining the Significance of the Luzon W-Growth Corridor to Agricultural Agglomeration and Labor Productivity

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### Abstract

Economic corridors are transport routes that form a strategic access network for economic hubs to reinforce regional growth. Transport corridors ensure the decisive movement of people and goods. The Philippines made its initial corridor development efforts aimed at prioritizing local industries and trade activity within its geographical confines. The W-Growth corridor (LWGC) on the island of Luzon passes through the provinces in Central Luzon and extends to the CALABARZON region. This research established the significance of the institutionalization of LWGC on agricultural agglomeration and labor productivity by applying particular measurements for corridor utilization and effects. Annual data on production sectors per region were utilized for corridor monitoring and agriculture productivity were utilized for corridor evaluation. The structural form of the proposed economic models appraised endogeneity bias, so the Two-Stage Least Square procedure was applied. This procedure revealed non-incidence of regional agriculture agglomeration, but that competition for agriculture labor is evident. Trade activity was also found to boost both output and labor productivity in agriculture.

**Keywords:** transport corridor, institutionalization, agglomeration, labor productivity in agriculture

### 1. Introduction: Spatial Development Initiatives and Economic Corridors

Spatial Development Initiatives (SDI) combine spatial and development planning to ensure that areas of untapped economic potential contribute to regional growth. SDI's seek balanced development among smaller enterprises and larger corporate investors in the community (da Silva Oliveira, 2015 & Rogerson, 2012). Economic corridors or development corridors, a type of SDI intended for integrated planning (Nogales, 2014), are transport routes made up of integrated highways, ports, and rails that form an access network for economic hubs identified in fostering social and economic development efforts. Transport corridors contribute to sectoral growth by facilitating the flow of people and goods. Corridors can geographically function within a country (domestic transport/trade corridors) or between countries (foreign transport/trade corridors). Historically utilized trade routes are expected to evolve from a basic transport corridor into a multi-modal institutionalized economic corridor. Examples of these are Thailand's Eastern Economic Corridor, as well as the China-Indochina Peninsula economic corridor (formerly known as the Nanning-Singapore Economic Corridor), which has been included in China's Belt and Road Initiative. It is anticipated that economic units in the immediate area of the transport corridor benefit within a short period of time, which are then succeeded by adjacent areas. Corridor benefits,

particularly in the form of economic clustering and agglomeration, are evidenced by improvements in production efficiencies.

The long history of corridors did not result in standardized means of how to plan, design, and analyze the effect of corridor projects. One reason for this is the absence of any clear differences among corridor types (Brunner, 2013; Henning & Saggau, 2012; Srivastava, 2012; Arvis, 2011; Buiter & Rahbari, 2011). Economic corridors are faced with challenges equally unique to each physical construction as each one was built based on different opportunities or advantages. It is therefore imperative to come up with a minimum benchmark for estimating whether the positive spillover effects are adequate to effect positive impacts that fuel the growth process (Brunner, 2013).

New patterns of interdependence among regions are formed with institutionalization (Colyvas and Jonsson, 2011). Parnini (2010) proposed that the need for creating regional linkages is founded on economic motives. The after effects of institutionalization are reinforced trade relations leading to positively affected investments and trade flows. Cross-border institutionalization of participatory governance takes a functional approach in determining the significance of effect (Ulrich, 2016). Institutionalized corridors are intended to encourage investments in the rural agricultural sector to increase sector productivity (Buseth, 2017). Governance, enacted through consistent discourse among interest groups, relates institutionalization to how impactful the SDI is (Buseth, 2017). The institutionalization of new SDI's become significant in regions with uneven development of general resilience (Wilson, 2013).

A long-established network of highways and roads have connected the provinces on the island of Luzon and systematically used as transport networks for people and goods. This same highway network connects Luzon with the rest of the archipelago via the Philippine Nautical Highway. The 1992 launching of the W Growth corridor refers to the institutionalization of a portion of this highway network that links two regions and local governments, recognizing the actual and potential sectoral growth borne from road access. Onwards from the year 1992, sectoral growth projects anchored to the already existing highway network were supposedly developed. The Central Luzon Growth Corridor (renamed the W Growth Corridor as its highway network forms a W – as seen from Figure 1) refers to the transport and logistics network connecting Central Luzon (Region III: Aurora, Bataan, Bulacan, Nueva Ecija, Pampanga, Tarlac and Zambales) and CALABARZON (Region IV-A: Cavite, Laguna, Batangas, Rizal, and Quezon) to production and processing zones within the corridor and beyond. It is composed of highways and road networks, connecting the mentioned provinces and passing through provinces long associated with agriculture production and processing. Bulk transfers of agriculture products to various destinations remain highly visible along this corridor. Central Luzon is also the sole region in the Philippines accessible through three international airports, thus compliant to that particular Access and Intermodal Connectivity Feature (Alstadt, Weibrod, and Cutler, 2012). However, most of its provinces are landlocked, making the land transfer of products and resources fundamental to the region, as Central Luzon accounts for more than forty percent (40%) of Luzon's food supply, with Nueva Ecija long heralded as the Food Bowl and Rice Granary of Luzon. Eighteen percent (18%) of Central Luzon's labor force is employed in agriculture and, yet, the average labor productivity of the region is 272,152. CALABARZON exhibits the same: relatively low agricultural labor

incidence at twelve percent (12%) but complemented with labor productivity of 198,119. Returns from capital investments in agriculture are evidenced by the high productivity levels.

**Figure 1**

*The Luzon-W-Growth Corridor*



This research analyzed the effect of the institutionalization of the LWGC on the regional agglomeration and efficiencies in agricultural output and labor productivity. Data archived by government agencies were utilized as deviation from precedent research on corridor effects that entailed primary data collection (Galvez Nogalez, 2014; Menon & Melendrez, 2011; Warr, Menon & Yusuf, 2009). Measuring corridor effects must be capable of being repeated for the same or other corridor cases and can also be applied to various geographical locations (Brunner, 2013; Henning, & Saggau, 2012, Roberts et al, 2012). In addition to that, the performance or monitoring measurement must be able to make use of datasets ordinarily sourced from public agency sources just as Prabir De and Kavita Iyengar used in their 2014 study on economic corridors in South Asia. Establishing the relationship between economic corridors and agricultural productivity provides policy with reason to either sustain efforts in regional-corridor development planning or to evaluate the expected effect of transport connectivity in the region.

## **1.2. Anticipated Agricultural Agglomeration in the W-Growth Corridor**

It is theorized in agglomeration economies that knowledge and ideas proliferate across a specific space (Chauvin, Glaeser, Ma & Tobio, 2017). Clustering anticipates the growth of small and medium enterprises potentially, resulting from the collaborative efforts of national and local government agencies and the private sector.

The spread of regional shares in a specific industry is referred to as geographic concentration (Gerasymeko & Zhemoyda, 2009); a specific industry is “concentrated” when a significant part of its production is conducted in a relatively small area. Localization economies occur when the same industry firms gain from clustering together (Quigley, 2013). Examples of these benefits are labor pooling (Storper, 2013) and knowledge spillovers (Hazledine et al., 2013). It is typically measured with the Location Quotient (LQ) which is the ratio between the share of industry employees in the region and the share of the industry employees in a country where a higher value reveals higher localization economies of the specific industry in the region (Azhari, Musdholifah, & Arsyad, 2017; Smith et al. ,2015; Looijen & Heijmanbi, 2013). The density of firms in a region, regardless of size, is an essential determinant of agglomeration economies (Faggio

& Silva, 2014), but a standard method for measuring industry agglomeration using a geographic perspective has yet to be developed (Cong, Wu, Morrison, & Xi, 2014).

Competition, described as the number of firms per employee in a specific industry, is a key indicator of innovation activity in agglomerated regions (Ghosal & Ni, 2014; Alvarez & Campusano, 2014; Kim, Trimi, & Chung, 2014; Ferraresi, dos Santos, Frega, & Pereira 2012). Higher competition, contextually the degree of intra-industry firm-clustering, was negatively related to intra-industry innovation. This is because, as spillover benefits become evident, it has become a disincentive for firms to innovate due to their own research and development findings becoming readily available to other rival firms (Ferraresi, dos Santos, Frega, & Pereira, 2012).

### **1.3. Labor Productivity in Agribusiness**

Agriculture is the production of agricultural food, fuel, and fiber products, as well as agricultural raw materials which, in turn, refer to the inputs used in producing agricultural products (e.g., feeds for livestock and fertilizer). Agriculture is a strategic employment generator and contributor to rural household income. Labor productivity in agriculture is the ratio of agricultural outputs (using the market value of final output) to agricultural inputs (labor units).

In measuring productivity in agriculture, Dorward (2013) prescribed that the monitoring indicator to be used must first be relevant to the policy goals and targets. The chosen indicator must also remain applicable through time and allow for cross-comparisons across countries and regions. The preferred indicator must also be regularly available for historical analysis and comparison. Productivity, a measure of efficiency, is typically defined in terms of any unit of economic activity—an individual firm, a specific industry or even the entire economy—covering a specified region, state or nation (Stein et al., 2014). Labor productivity, or the rate of output per worker, is a function of the sector's innovation in technology, capital investments and, of course, labor sources. Agricultural labor productivity is positively affected by an enhanced capital-labor ratio, land-labor ratio, and education level. Capital input complements workers' abilities to produce more output thereby increasing productivity. Land input provides workers with more area to cultivate more output thus, is also expected to raise productivity.

### **1.4. Research Significance**

The findings from this research, particularly establishing the relationship between economic corridor development and agglomeration, can aid policymakers in enhancing regional development planning. As corridor development reinforces agglomeration, this can be taken as a cue to sustain investments in corridor infrastructure development. A negative relation, on the other hand, can prompt evaluation and assessment measures with regards to the anticipated effects of transport connectivity in the region. It is possible that there is an optimal amount of corridor investments that bolster economic clustering and that incremental corridor development can lead to diminishing agglomeration.

## **2. Anticipating Corridor Effects**

Corridor operation must be closely monitored to ensure that it remains in line with its purpose. However, using only time and distance surveys only assesses its performance as a transport route and not as a broader economic corridor (Srivastava, 2011). Although social development, poverty reduction, and employment generation are equally important objectives for

corridor development, these remain secondary to the pursuit of economic goals set. Accessibility characteristics brought about by the corridor include: (1) combined travel times and costs affected by the logistics chain efficiency, (2) comprehensive transit conditions and capabilities (Felipe et al., 2012), (3) developments in market access capabilities (Bender, 2013), which remains a challenge particularly in landlocked areas (Trung and Thanh, 2013), and (4) availability of finance and financial market capabilities as to support medium and small-scale enterprises (Dionelis et al., 2012).

Nogales (2014) focused on the impact of economic corridors onto the development of agriculture businesses in Africa, Latin America, and South Asia by utilizing the following evaluation criteria and measurements: (1) share of agribusiness sector to total agricultural exports for trade activity, (2) private sector investments within the agribusiness hubs for trade facilitation, (3) the number of non-agribusiness locators in the hub for the functioning of markets, and (4) historical public works infrastructure expenses for the corridors for physical connectivity. These criteria revealed the capability of corridor development to affect growth in agriculture and the emergence of modernized markets.

## **2.1. Access to Structural Consequences**

Education (which is normally the privilege of the generation next to the farming parents) is identified as a means of improving labor quality and productivity; however, agricultural labor is generally expected to decline through time. Suphannachart (2017) observed a declining trend in agricultural employment as a consequence of the structural change in the Thai economy: the shift from agriculture-based to industrialized, drawing agricultural labor towards factories and office buildings. With economic growth, the ratio of the labor force employed in agriculture decreases as an expanding economy creates employment opportunities outside the farm (Devkota and Upadhyay, 2013 & van Den Ban, 2011). Earnings from trade and transport services and manufacturing, especially agro-processing, were observed to be often close to, and sometimes exceed, agriculture's. It has then been inferred that growth led by these nonagricultural subsectors just might be as impactful as agriculture at reaching the poor (Dorosh & Thurlow, 2018). This is also evidenced in Central Luzon and CALABARZON where agricultural labor is significantly low because the proximity of these regions to city-centers has enticed much of its local labor force to alter the nature of their work. Woldemichael et al. (2017) and Gollin (2014) also found the same result in their respective researches in Africa; physical infrastructure remained critical for developing a competitive agro-industry, with most of its raw materials bulky and highly perishable. These included, but were not limited to, roads and railways, public utilities, and communications at the lowest possible cost. Gollin (2014) argued that rural non-farm employment has been growing in importance and that agriculture's share of total employment has been falling steadily; however, productivities remain significant in most regions. This was because in locations with good access to large markets, large farms may become competitive even without subsidy or support.

The most straightforward effect of improvements in transportation infrastructure is on the cost of transportation operations, such as faster speeds and reduced incident delays. These reduce labor, equipment, and operating costs for both travel and freight shipments. These can also lead to broader effects on businesses as transportation cost savings can lower the price of production inputs and even lower the cost of product (and/or service) distribution to markets (Stein et al., 2014).

Research on transport investment and economic development focus on benefits derived from improved access and external factors that affect transport efficiency. Most studies view transport as a primary catalyst due to its ability to open markets to rural areas. Road access provides economic and social benefits to rural areas and can, therefore, be aligned with agricultural development and productivity. Based on this view, the most preferable areas for road improvements are in regions at moderate distances from urban areas within reach of urban markets (Asomani-Baoteng, Fricano, & Adarkwa, 2015). The most economic, influential, and best connected provinces benefit from the transport infrastructure of the other provinces (Alvarez & Blazquez, 2014). It was observed, however, that in some cases, such as the case in Ghana, the unit cost of passenger and freight transportation by both passengers and freight increased before and after the road improvement program and this is totally contrary to the anticipated benefit reaped from improved road conditions.

### 3. Research Design and Method

This research estimated the effect of the extended W Growth Corridor's institutionalization on agriculture agglomeration and on labor productivity controlled for indicators of corridor development, expansion, and for corridor utilization.

#### 3.1. Calculating Agglomeration and Competition

The variable LQ (Location Quotient) measures the degree of agglomeration in the region. It is the ratio between the share of industry (agriculture) employees in the region and the share of industry (agriculture) employees in the country (Azhari, Musdholifah & Arsyad, 2017; Smit & Musango, 2015; Looijen & Heijmanbi, 2013). A higher value reveals higher localization economies (of agriculture) in the region:

$$localization = \frac{\left(\frac{E_{ij}}{E_j}\right)}{\left(\frac{E_{ip}}{E_p}\right)}$$

Where:

$E_{ij}$  = total employment in industry  $i$ , in region  $j$

$E_j$  = total employment in region  $j$

$E_{ip}$  = total employment in industry  $i$ , in the Philippines  $p$

$E_p$  = total employment in the Philippines  $p$

The Competition Index is the number of firms per employee in a specific industry per region divided by its national equivalent (Van der Panne & van Beers, 2006). A value more than 1.00 suggests aggressive competition for labor among firms within the region:

$$competition = \frac{\left(\frac{F_{ij}}{E_{ij}}\right)}{\left(\frac{F_{ip}}{E_{ip}}\right)}$$

Where:

$E_{ij}$  = total employment in industry  $i$ , in region  $j$

$E_j$  = total employment in region  $j$

### 3.2. Functional Relationships

The function  $Agri\ Output = f(new\ construction, transportation, trade)$  hypothesized that the value of new construction (Nogales, 2014; Hartmann, 2013; Bender, 2013; Felipe, 2012), availability of transportation (Lin, 2017; Bender, 2013; Hartmann, 2013; Glaeser, 2010; Warr, Menon & Yussuf, 2009) and the amount of wholesale and retail trade (Nogales, 2014, Menon & Melendrez, 2011) affect agricultural output.

The amount of wholesale and retail trade is an indicator for corridor utilization and agglomeration effects contextual to the research scope. Agglomeration effects are measured with the Location Quotient (Pinch & Sunley, 2016; Mukim, 2012; Farhauer & Kroll, 2012; Beule & Bevern, 2011; Plunket, 2009) for agriculture. The forward linkage from active trading are the availability of financial services and the flourishing of such transactions within the cluster region (Nogales, 2014 & Dionelis et al., 2012):  $Trade = f(HHI, Competition\ Index, Finance)$ .

The categorical objective of this research related manifested institutionalized corridor utilization and its effects on regional agriculture's clustering & labor productivity (Suphannachart, W., 2017; Stein et al, 2014; Brunner, 2013; Dorward, 2013; Devkota & Upadhyay, 2013; van den Ban, 2011). Agglomeration represents an improvement in the economic organization within a particular sector, thereby implying efficiencies in output delivery as well as optimization of available technology, knowledge and skills. Therefore, the function  $Agri\ Labor\ Prod = f(agri\ output; trade)$  presents agricultural output and trade as instrumental variables for corridor and agglomeration effects.

The following economic models are the structural forms of the preceding functions and were empirically tested:

$$Y_1AO = \beta_0 + \beta_1 CONS + \beta_2 TRANSPO + \beta_3 TRADE + u_i \quad [3.1]$$

$$Y_2TRADE = \alpha_0 + \alpha_1 LQ + \alpha_2 CI + \alpha_3 FIN + v_t \quad [3.2]$$

$$Y_3AGRILABPROD = \delta_0 + \delta_1 Y_1AO + \delta_2 Y_2TRADE + \theta alp \quad [3.3]$$

Equation 3.1 represents the relationship between economic corridor development and utilization of agriculture. Equation 3.2 identifies that the amount of trade activity in the cluster is a function of agglomeration as well as the eventual growth of markets in the local economies. Equation 3.3 extends corridor effects on agglomeration by then estimating the effect of the latter on agricultural labor productivity, thereby revealing the efficiency of the effects of corridor development on the agricultural sector of the cluster.

### 3.3. Treatment of Data

This research combined elements from descriptive and causal methods: The corridors were described and compared in terms of what Philippine provinces were covered by each of the corridors, the geographical condition in said area, who or what use the corridors most often, and whether the corridors have been institutionalized in Development Plans or simply accustomed

routes for trade and traffic. The causal aspect was the estimation of an empirical model on the hypothesized relationships between corridor development and the anticipated conditioning and instrumental variables representative of the corridor, as well as sectoral agglomeration effects. The significance of the hypothesized effects of the W-Growth's institutionalization on agricultural agglomeration and productivity are whether these are consistent with the anticipated effects of transport corridor development as SDI.

Data on sectoral output and employment for the two regions covering the period 1986 to 2019 were obtained from the Philippines Statistics Authority. Per region data for each measurement were then combined to represent the cluster where the SDI is operating in. The System of National Accounts identified the sectoral output data able to measure the corridor characteristics as well as the corridor evaluation criteria applied in this research.

The models were initially estimated using Ordinary Least Squares (Smit, 2015; Ganau, 2014; Morrissey, 2014; Farhauer & Kroll, 2012; Azhar, Ata & Adhil, n.d.); however,  $\delta 2Y2TRADE$  was a predictor in the first and third equations making simultaneity an issue (Navarrete et al., 2018). Because of this, the Two-Stage Least Squares (TSLS) procedure was utilized as both equations are overidentified based on order condition (Gujarati & Porter, 2009).

#### **4. Results and Discussion**

The aggregate contribution of the agriculture sector to the value of aggregate regional domestic product (RGDP) was irregular and arbitrary through the covered period and exhibited a downtrend. Aggregate agricultural labor productivity within the corridor, on other hand, exhibited an observable uptrend in its real values.

The average annual aggregate contribution of new construction to RGDP is less than one percent (1.00%) with no indication of a significant uptrend. The transport sector contributed an annual average of almost two percent (1.8%) to RGDP, exhibiting a consistent uptrend in its production value and indicating more investment uptake in land transport services. The complementary activities of transport and trade showed no indication of abatement. This can be attributed to the routinely maintained and reliable highway networks of the LWGC. Business, financial, and real estate activities within the covered region are also on the uptrend, contributing an annual average of four percent (4%) to regional gross domestic product. Business and financial activities represent flourishing regional economies and evolving markets. Both the Agglomeration indicator for intra-industry concentration and the Competition Index exhibited decreasing and increasing values respectively, which was the same as observed by Ghosal and Ni (2015), Chung et al. (2014) and Ferraresi et al (2012).

##### **4.1. Establishing Relevance of Variables**

This research endeavored to develop a model capable of exhibiting the relationship of particular economic corridor development, utilization, and effects with the agricultural agglomeration and labor productivity in Central Luzon. Trade was a predictor variable in the Agri Output Equation 3.1 as well as in the Agri Labor Prod Equation 3.3, indicating probable endogeneity bias, and, therefore, must be simultaneously estimated in order to come up with correctly estimated parameters.



Since the OLS structural equation was overidentified (Gujarati & Porter, 2009), a Two-Stage Least Squares (2SLS) or the Instrumental Variable method was applied.

#### 4.1.1. The First Stage Consisted of Estimating the Reduced Form of Equations by OLS:

$$AgriOutput = \beta_0 + \beta_1 Const + \beta_2 Transpo + \beta_3 LQ + \beta_4 Comp + \beta_5 Fin + u_i \quad [4.1]$$

$$Trade = \alpha_0 + \alpha_1 Const + \alpha_2 Transpo + \alpha_3 LQ + \alpha_4 Comp + \alpha_5 Fin + v_t \quad [4.2]$$

All measurements from the revised System of National Accounts are in monetary ratios of the combined value of sector output to combined RGDP. Agricultural output also includes the value-added of raw crops processing. Construction includes construction output attributable to national and local government public works, housing, and social infrastructure projects, as well as those undertaken by privatized corporations and public projects contracted to a construction enterprise. Transportation is the movement of both people and goods conducted by domestic carriers servicing the region. These carriers do not assume ownership of the goods or resources; they are commissioned to move but are hauling service providers. The transportation industry includes the operation of land, sea, and air transport terminals, as well as the temporary housing of in-transit goods, i.e. the service enterprise of providing storage facilities to customers. Self-transport and self-storage are not accounted for in this measurement. Trade is described as a margin industry comprising the value added from the handling of goods. At every phase of wholesale and retail trade activity (e.g. manufacturer sells to a wholesaler, who sells to a retailer, then to a final customer), a mark-up amount is charged. Packaging costs, at both wholesale and retail, is part of trade. Higher trade values indicate enterprising activities. Finance constitutes transactions involving money and payment and may or may not be prerequisite to a change of ownership, e.g. banking services (from deposit to loans), renting, real estate, and other business activities.

**Table 1**

#### *OLS Procedure Results on the Equations in Reduced Form*

Variable	AGRI OUTPUT		TRADE	
	Coefficient	Prob.	Coefficient	Prob.
C	0.748337	0.0000	0.215238	0.0000
Construction	-1.065433	0.0174	-0.004647	0.9792
Transpo	-1.728117	0.0824	-0.056760	0.8889
LQ	-0.088744	0.0859	-0.013038	0.5394
Competition	0.002554	0.6271	0.004999	0.0301
Finance	-2.282974	0.0205	-0.804129	0.0489

New construction and Finance had negative effects on Agricultural Output; with Transportation, Localization and Competition were statistically insignificant. For the reduced form on Trade, Competition and Finance were both statistically significant but wielded positive and negative effects respectively on Trade.

Equations in reduced form were used to set up the fitted or estimated values for Agri Output and for Trade. These were integrated or substituted for the same variables in the structural equation for the second stage estimation.

Table 2 summarizes the ensuing results:

**Table 2**  
*Regression Results of the 2SLS*

Variable	AGRI OUTPUT		TRADE		
	Coefficient	Prob.	Variable	Coefficient	Prob.
C	0.195359	0.0314	C	0.216743	0.0000
Construction	-1.137864	0.0051	LQ	-0.016172	0.2895
Transpo	-2.005434	0.0060	Competition	0.004849	0.0230
Trade	1.983042	0.0018	Finance	-0.792875	0.0101

All variables were statistically significant for Agricultural Output. New Construction and Transport have negative effects while Trade had a positive effect on the same. Competition and Finance were statistically significant for Trade with positive and negative effects, respectively.

**4.1.2.** The estimated fitted or estimated values from the 2SLS procedure summarized in Table 3 were then applied to the following equation:

**Table 3**

$$AgriLaborProd = \chi_0 + \chi_1 AgriOutput + \chi_2 Trade + \varrho_{alp} \quad [4.3]$$

Labor Productivity in Agriculture		
Variable	Coefficient	Prob.
C	92045.37	0.0473
AgriOutput	-1147111	0.0000
Trade	2646010	0.0000

Agricultural Output and Trade were both statistically significant but wielded divergent effects on labor productivity in agriculture.

## 5. Discussion

Accessible transport services are a positive reinforcement to agriculture output as this ensures a farther market reach for the goods. It also safeguards perishable products from contamination and deterioration with storage services accounted for in transport services. In the LWGC, this includes land transport, hauling, and cold supply chain services operated by either

private firms or public agencies. Increased transport indicates expanded service availability, thereby encouraging agricultural firms to produce more.

The contractionary effect of construction on the value of agricultural output is not necessarily a land utilization issue, but more of a reflection of a local economy in transition. This is particularly evidenced in CALABARZON where only 12% of its total labor force remains in agriculture, signifying labor shifting from agriculture to other productive sectors.

Boosts in trade output are an indication of a flourishing regional economy in general; however, increased value added from trade propels agriculture output as farm gate intermediaries become more willing to take on the risk of transport and reselling of the products. This eagerness to trade transcends farm gate wholesale through the many phases of wholesale and retail trade that it takes to reach the households.

Competition for labor in agriculture is an indication of a thriving and even prospering industry. This leads to either bigger harvest volume, better harvests, or possibly both. Value added from trade rises in response to either large traded volumes or higher margins from better-quality crops. Consequently, trade enhances labor productivity in agriculture as the sector's labor-capital ratio improves in response to taking advantage of emerging trading opportunities

Both finance and trade are indicative of evolving local markets and economies; however, the region's business sector can only allocate money amounts in either of the two. More money invested in financial transactions may lead to enhanced trading (say, a bank loan for capital), but specific amounts still have to be paid out as payments and not reinvested.

## 6. Conclusion

This research endeavored to establish the significance of the institutionalization of the LWGC on the agglomeration and labor productivity of the agricultural sector. The anticipation of this research was to manifest the effects of this edict, if any, on the economic organization efficiencies of the agricultural sector within the LWGC. The highway and road networks in Central Luzon and in CALABARZON have been dependably servicing the regions long before the 1992 formal establishment of the LWGC. The results revealed that agricultural agglomeration is nonexistent in the LWGC as evidenced by the statistical insignificance of the Location Quotient and yet agricultural firm concentration and demand for agricultural labor are relevant. Labor productivity in agriculture is also on headway in both Central Luzon and CALABARZON, and this is apparently not brought about by sector agglomeration. It is also perceivable that other productive or economic sectors allied to agriculture are prolific in the emerging local economies. It appears that the actuality of the LWGC did not lead to agricultural agglomeration but, nonetheless, contributed to the sector's efficiency in terms of labor productivity.

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