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ABSTRACT

This paper focuses on structural changes that have taken place in the Philippine economy using input-output data. The analysis will be undertaken for the Input Output Table (IO) for the years 1969, 1974, 1979, 1985 and 1994. Technical coefficient will be used to measure changes.

The paper also focuses on the decline of output. Changes in the composition of gross output and value added will be examined. Forward and Backward linkages, production multiplier, input coefficient and measures of import content of final demand output will be calculated, taking into account direct and indirect transactions.

I. Objectives

The paper aimed to analyzed the following:

- 1.) Determine whether changes in the inter-industry relationships, which reflect technological change have taken place in our economy.
- 2.) Determine whether there is a pattern of coefficient change and the level of industry output during the period of the study.

II. Introduction

The Philippine economy is sick in terms of any economic definition. In the 1950's our economy was higher and even better compare to other Asian countries. However, there were periods when our economy seems to deem its future. The poor performance of the country was blamed to the successive crises that occurred since 1985, which have had adverse effects on business and investors confidence. In 1994, our per capita GDP was among the lowest and it continues to fail in 1998. In addition to these, the political turmoil experienced in the late 80s made the country unstable. The continuous corruption in the government adds up to the continuing deterioration of the economy.

Economic development is essentially a process of activities re-organizing themselves in such a way that they will grow. Change in the connections between the elements within the productive system – firm, industry or economy – becomes the focus of attention because these connections cannot remain

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constant with growth. Structural change becomes a necessary condition for further growth. Structural change is therefore a cause of growth and development and not an outcome. It is defined as change in the composition of output.

Structural transformation comes about through the ability of a complex system to re-organize itself so as to achieve a higher order of organization. The structural changes were reflected in the connections between the elements within an economic system. It is the entrepreneurial ability to embody within the organizational structure the conditions, which encourage learning, problem solving and development of technical skills that underpin production transformation.

III. Method of Analysis

The study is concerned with the role that changes in the specific connections between the elements of an industry system. The economic model that focuses upon the specific connections between the elements of the economic system, both at the industry and the economy level, is the technical coefficient matrix of an Input-Output Table. It is this matrix that showed direct effect within and among industries. Structural change at the industry level is therefore measured by changes in the vector of the technical coefficients. In comparing IO tables over time, a number of steps were required to ensure their comparability. The following were undertaken in the studies:

- 1.) Comparison of the changes in the cost structures of the different IO tables. The comparison will be mainly on domestic technical coefficient matrix for each year. The domestic matrix is used to enable domestically produced intermediate inputs be separated from imports as this distinction is important in assessing the consequences of change. The technical coefficient is used rather than the inverse because the former coefficient is much more likely to reflect any changes in the production process that is taking place. Inverse on the other hand is advantageous where classifications of firms may be sensitive to the particular mix of products characterizing their output. However, in the present format of the tables, the secondary outputs were re-allocated to sectors to which they were consistent. The problem of sensitive classifications should no longer be a serious problem.
- 2.) Alignment of the number of industries and commodities in the tables.
- 3.) Adjustment of the tables for price changes over time. It is necessary to deflate all the basic information to a common price basis. To accomplish this, price indices based on producer prices and or wholesale prices (in the case of some services and retail trade) were derived for each of the sector's output. This would give control totals for each sector's deflated

total outputs and inputs. The final demand and primary inputs control totals will be derived using the residual approach. However, these will be further adjusted using Implicit Price Index Number (IPIN).

IV. Results of Analysis

Patterns of Change in the Output Coefficients

The country's Gross Domestic Product (GDP) continued to increase in the years 1969, 1974, 1979, 1985 and 1994. The Philippine economy appeared to show growth of GDP in 1974 by 185.5 percent; in 1979 by 117.1 percent; in 1985 by 180.9 percent; and in 1994 by 177.8 percent.

Combined Gross Value Added (GVA) for agriculture, fishery and forestry was highest in the years 1974 at 29.5 percent and 1985 at 31.2 percent while GVA for manufacturing was highest in 1979 at 23.1 percent and 1994 at 23.3 percent. Lowest GVA was observed in electricity, gas and water for the years 1974, 1979 and 1985 at 0.9, 0.9, and 1.7 respectively. In 1994 mining and quarrying had the least GVA share at 1.0 percent.

While agricultural industries perform negative growth on GVA share for the years 1979 and 1994, the main contributor to the overall growth in GVA in 1979 were construction industries at 158.2 percent and in 1994 were housing and finance/commerce industries at 281.5 percent. (See Table 1)

Table 1. Percent Share of Gross Value Added by Sectors: 1974 to 1994

Sectors	1974	1979	1985	1994
AFF	0.2949	0.2296	0.3121	0.2200
Mining	0.0311	0.0248	0.0221	0.0098
Manufacturing	0.2470	0.2305	0.2891	0.2326
Construction	0.0473	0.1220	0.1080	0.0564
EGW	0.0094	0.0093	0.0167	0.0265
TCS	0.0368	0.0622	0.0735	0.0489
Real Estate & Banking	0.2254	0.2206	0.0639	0.2437
Other Services	0.1082	0.1011	0.1146	0.1621

Table 2 demonstrates the coefficient output by major sectors in 1969 to 1994. Output from manufacturing industries contributed the highest share to the country's total output with 38.5 percent in 1961, 39.9 percent in 1965, 34.9 percent in 1969; 41.0 percent in 1974; 43.0 percent in 1979; 36.6 percent in 1985; and 37.7 percent in 1994. The percentage increases in the output share of these industries were evident in the years 1965, 1974, 1979 and 1994. However, in 1969 and 1985 there was a decrease in the output share of manufacturing industries by 12.3 percent and 15.0 percent, respectively. Industries with the highest percentage increase in output share were electricity gas and water industries.

Agriculture, fishery and forestry industries are the second largest contributor in terms of the country's output with 17.3 percent in 1961; 21.1 percent in 1965; 19.4 percent in 1969; 20.3 percent in 1974; 17.6 percent in 1979; 17.3 percent in 1985; and 14.2 percent in 1994. Output share of these industries are increasing in the years 1965 and 1974 while percentage decrease in output share were observed in 1969, 1979, 1985 and 1994. In 1969 and 1985 electricity, gas and water Industries had the highest output share percentage increase. As agriculture, fishery and forestry industries percentage share decreased in 1979, industries in construction had the highest output share percentage increase.

Industries contributing the least output were mining and quarrying except for the years 1974 and 1979 wherein electricity gas and water industries shared less. These industries shared 1.0 percent in 1961; 0.4 percent in 1965; 1.5 percent in 1969; 2.6 percent in 1974; 1.9 percent in 1979; 1.9 percent in 1985; and 0.9 percent in 1994.

Table 2. Output Coefficients: 1969–1994.

Sector	1994	1985	1979	1974	1969
AFF	0.14158	0.17295	0.17608	0.20316	0.19408
Mining	0.00941	0.01867	0.01925	0.02569	0.01530
Mfg	0.37704	0.36591	0.43021	0.41059	0.34935
Construction	0.05283	0.05674	0.08380	0.04872	0.04356
EGW	0.02687	0.02361	0.01251	0.01192	0.09071
TCS	0.05709	0.06304	0.04496	0.03635	0.03390
W/R trade	0.11522	0.12469	0.10584	0.11538	0.09218
Banking	0.03997	0.02575	0.04986	0.02987	0.02291
Real Estate	0.04379	0.04186	A/	0.02968	0.04305
Private	0.08122	0.06694	0.05367	0.06011	0.08204
Government	0.05498	0.03985	0.02383	0.02853	0.03292

A/ included in Banking.

Changes in the Intermediate Input Coefficients

The changes in the intermediate input coefficients were mostly illustrated in the lack of technological competence (failure to generate a coherent increasing division of labor). In constructing the measure, each industry's coefficient of change was calculated from the standard deviation of the changes in the technical coefficients, weighted by the share that the particular input comprised of total intermediate inputs. The coefficients of change were calculated for short term and long term and shown in Table 3. In order to assess the tendency for an industry to reverse its pattern of coefficient change, the ratio of the shorter term to long-term variance was calculated. The results of this statistical analysis were contained in column 3 of Table 3. Out of the 23 sectors, there were 6 sectors where the ratio of the variance of long-term was greater than one. Five of these

sectors occurred in the manufacturing sector and one from the non-manufacturing sector (Construction).

However, this measure of technical competence was inadequate. In order to show the extent of the change in the coefficients, both short term and long-term variances were converted to standard deviations and the difference were shown in columns 4 and 5 of Table 3. The extent to which each industry's standard deviation varied below or above the standard deviations of those industries demonstrating productivity change (variance more than one) was then compared. The results of that comparison were the following:

1. Technical coefficient change in industries that underwent development transformations was within the range of -0.9188 to -0.7940 in the case of short-term variance and -0.9624 to -0.7865 in the case of the long-term variance. The only industry with coefficient changes within those range and did not show development transformations was Professional Services. All the other 20 industries was outside those ranges.
2. The only industry that shows the least variance in the group was Wholesale Trade. The variance accounted for 0.2641 (short-term) and 0.2964 (long term). As a result, wholesaling costs per unit of output tended to comprise an increasing share of intermediate input costs over the long-term for virtually all industries rising to as high as five times the cost per unit of output for similar industries.
3. The agricultural industries were split into two groups. One group was the crop industries with coefficient change similar to Palay with an average variance of 0.80. Another group was the group comprising Coconut and Copra farming and the animal husbandry industries of Hogs and Poultry. The group showed a variance of more than one. The higher variance of Coconut & Copra farming maybe attributed by the marked decline in own sector input. While in the case of both Hog and Poultry farming, the high coefficient variance was associated with a shift from agricultural to manufactured sources of animal feeds. This movement was particularly marked in the case of the Chicken for Meat a branch of Poultry farming. This sector did show a structural change wherein the industry is dependent on manufactured animal feeds. However when the unit cost of the manufactured animal feeds increases the industry was affected badly and they begun to move back again in using agricultural sources of animal feeds.
4. It was in the manufacturing sectors that the coefficient changes were high. Most of the industries within the sectors showed a pattern of coefficient change. The average variance of the sectors was approximately one or more.

Table 3. Relative Short Term and Long Term Variance of the Intermediate Input Coefficients: 1969-1994

Industries	Variance of Short Term Col 1	Variance of Long Term Col 2	Ratio Col 3 = Col 1/Col 2	Difference in the Std. Deviation (Short Term) Col 4	Difference in the Std. Deviation (Long Term) Col 5
Palay	0.4496	0.6990	0.6432	-0.7940	-0.7865
Banana	0.4854	0.8014	0.6057	-0.7602	-0.7182
Sugarcane	0.5351	0.8102	0.6605	-0.7134	-0.7124
Coconut	1.4727	4.5340	0.3248	0.1707	1.7704
Hogs	2.2743	3.1395	0.7244	0.9265	0.8406
Poultry	1.9778	4.4608	0.4434	0.6469	1.7216
Construction	0.5156	0.3587	1.4374	-0.7318	-1.0134
Electricity	1.9630	3.9754	0.4938	0.6330	1.3980
Wholesale Trade	0.2641	0.2964	0.8910	-0.9689	-1.0549
Communication	0.3172	0.4352	0.7289	-0.9188	-0.9624
Banking	0.4806	0.8929	0.5382	-0.7648	-0.6572
Professional	0.3615	0.4820	0.7500	-0.8771	-0.9312
Rice&Corn Milling	1.1525	2.8864	0.993	-0.1312	0.6719
Sugar&Refine Mill	1.0447	0.3699	2.8243	-0.2329	-1.0059
Coconut & Oils	3.5462	4.9951	0.7099	2.1258	2.0778
Basic Chem	0.6874	1.7736	0.3876	-0.5698	-0.0700
Fertilizer	1.6812	1.2582	1.3362	0.3673	-0.4137
Drugs & Med	0.6507	0.3880	1.6771	-0.6044	-0.9939
Soap & Deter.	1.2726	1.2500	1.0181	-0.0180	-0.4191
Textiles	1.1131	1.9691	0.5596	-0.1684	0.0736
Wearing Apparel	1.3328	3.1640	0.4212	0.0388	0.8570
Iron & Steel	1.4111	1.5244	0.9257	0.1126	-0.2362
Agricultural Mach	4.7194	2.7248	1.7320	3.2320	0.5641

V. Conclusion

The Philippine economy had undergone technological changes however there were no enough evidence to conclude.

The growth in industrial output that took place in the 70s and early 80s arose because of the new economic elite that was the famous Marcos cronies. Philippine industrialization over this period was not a driver of economic development, but a passenger in the socio-economic power struggle that took place.

VI. Recommendation

Innovation involved development as well as institutional change. The non-integrability of behavioral relationships under economic development implies that the relationships cannot be separated into distinct social and economic. When behavioral outcomes cannot be derived from the inter-relationships established within each theory, the geometry of their respective spaces were considered

separately. Policy measures, such as trade liberalization, implemented only at a national level, need to be abandoned. Such policies should only be adopted in a specific context, where their impact can be seen to be a necessary condition for bringing about the development of a particular industry/region.

The importance of seeing economic activity as operating within an institutional environment implies severe limitations on the ability to alter economic outcomes by acting on economic variables alone. The institutional environment that governs business will also pervade other social and administrative institutions generating a self-reinforcing socio-economic system. Changing any behavior pattern therefore means changing that system, which cannot be done by trying to change the behavior of any single institution within it. A multi-faceted approach needs to be adopted that focuses on as many of the institutional components of that system as possible, aimed at changing their behavior in a way that is consistent with development objectives being pursued. Development policy therefore needs to be seen as a coordinated strategy aimed at achieving a well conflict of objectives implicit in any management issue and carefully monitoring and controlling all aspects of institutional behavior that assist in achieving the particular objectives being pursued.

The policy implications of these were on the broad-based macro policies – such as trade liberalization. On the other hand adopting local policy programs and initiatives will only be successful if a clear set of priorities is established and a consistent resolution of the conflicting objectives can be maintained. The specific programs and initiatives might be the national objectives of greater food security and poverty alleviation at specific local and regional level.