There are conceptual and practical issues involved in delineating freight flow and flow of passengers across regions in an archipelago like the Philippines. Pinpointing these flows provides useful benchmarks for analyzing transport routes, determining optimal points of intermodal transport systems, minimizing transport cost of goods and people across space and tracing interregional flows of income and expenditure. All of these ultimately result in higher welfare levels for Filipinos.

This paper will address methodology issues involved in linking commodity and passenger flow data from origin-destination (O-D) tables of a recent JICA-DOTC survey in the Philippines to interregional commodity flow and income flow as depicted in a multiregional social accounting matrix for the Philippines. Empirical examples will be cited from data derived from a primary database which is the JICA-DOTC survey of freight and commodity flows and from a secondary database which is multiregional social accounting matrix constructed by the authors for the Philippines. The paper will merge primary data derived from OD survey to secondary data derived from Philippines statistical agencies such as the National Statistics Office and the National Statistical Coordination Board. The derived database will provide concrete basis for a general equilibrium model of intraregional and interregional economic activity in the Philippines. The database also will provide concrete benchmarks for assessing the economic impact of transport infrastructure investment on regional economic welfare in the Philippines.

There are similarities in O-D tables of commodities and interregional input-output tables which trace the flow of goods from place of origin to place of destination. Interregional I-O matrices which capture interregional movements of goods are also alternatively known as production-consumption matrices. However, there are certain improvements which maybe undertaken to link the two tools. Certain methodologies maybe devised which can integrate the two tools.

The difference between transport planning studies and economic impact studies is that expenditure flows in the latter are valued in purchasers’ price or consumer prices rather than than producer price (exclusive of taxes and profit margins). Another point of
difference between O-D pairs and I-O data is that changes in O-D zone pair matrix of shipments are highly influenced by changes within the transport and distribution sectors. On the other hand, changes in production-consumption matrix or I-O matrix are influenced by changes outside the transport and distribution sectors. Origin-destination tables have been utilized by transport planning studies to estimate the effects of transport sector on logistic structure and distribution channel of goods. On the other hand, I-O data or interregional data can be used to establish the pattern of trade from the initial producer to the final consumer. Connecting the two datasets would enable transport planners to measure the impact of trends in logistics and the responsiveness of logistics to policy changes.

With regards to interregional passenger flow, these can be effective indicators of interregional income flows. First, passenger-respondents in the survey need to be classified as short-term or long-term. The long-term travelers’ movement may be an indication of interregional flow of labor income, remittances, transfers, dividends and taxes. Stylized movements of factors of production may be delineated from these. While our Philippine census data does not delineate between night-time and day-time population as in Japan migration data may give broad indicators of potential flows of income across regions.

The ideal benchmark for commodity flow survey is that of the US CFS and Japan CFS. To reconcile the two, the stylized distribution channel of goods should be known. From raw material stage, the good reaches the manufacturing factory or warehouse, then it goes to the manufacturing depot, the warehouse depot, the retailing depot, the department store and finally to the consumer. It is here where the critical link between OD tables and I-O tables contained in social accounting matrix . The economic contribution is the conversion of volume-distance variables into monetary terms. From the raw material stage to the manufacturing & warehouse depot, flows are in producer prices and henceforth, prices expressed in consumer prices.

The following are the issues which need to be resolved: gross flows versus net flows. Generally, commodity flows in input-output tables take the form of gross flows. Also included in units of measurement would be the usage of a conversion coefficient table between weight and money. Central to the methodology issue would be the conversion of value of trade of goods to volume of trade of goods and vice versa. This also holds for passenger flow data wherein volume of passenger flow is translated into monetary value and vice-versa.

A methodology must be derived wherein the O-D matrices and I-O matrices are interconnected if reliable transport demand forecasts are to be made. This methodology should merge the strong points of origin-destination tables and input-output tables. This can be used for transport planning and economic impact analysis of transport projects. This methodology should convert economic growth into changes in demand for transport services. This could later relate changes in value of trade to changes in volume of trade. Furthermore, it should represent increased lengths of haul. According to a recent study of SCGE models in Sweden by Williams et al, it is the length of haul and not the number of tons lifted which has stimulated increased demand for transport services. The length of haul which is depicted in O-D movements is greatly influenced by logistic structure; which is in turn influenced by patterns of trade.

A methodology for conversion of volume into value of Philippine commodity flows and passenger flows would be as follows. First, classification of freight in O-D table will be realigned with classification of commodities in input-output tables. Philippine input-output tables use Philippines Standard Industrial Classification (PSIC) classification. Secondly, O-
D flows which are expressed in terms of volume-distance can be converted into monetary terms, using regional producer price indices for the year when the flows were surveyed. Currently, commodity flows from O-D tables are expressed in producer prices. This is the same monetary unit as commodity flows in SAM. Thirdly, the zonal classification of origin-destination areas will be converted into administrative disaggregation of regions as filed in Philippines statistical sources. Fourthly, all commodities transported by different transport mode from different O-D pairs should be added up together to get total commodities transported from one point to the other. Fifthly, since the current I-O data are in 1994 prices, the monetary conversion of volume-distance in CFS from 1994 to 2004 prices have to be undertaken. Alternatively, monetized volume data of commodity flow in O-D tables can be converted from 2004 to 1994 prices, depending on availability of conversion data.

Initial empirical results of this study indicate that trends depicted in O-D tables and interregional I-O tables in the Philippine regions are in the same direction. The monetary values of cell entries in O-D matrices and I-O matrices were compared to the latest year when comparable regional data are available in the Philippines. This was the year 1994. Another significant empirical finding is that the magnitude of flows is substantially greater in the database using I-O flows or production-consumption matrices than those contained in O-D matrices. This can be attributed to the following reasons:

- interregional I-O data includes transport costs from point of production to point of disembarkation while O-D includes only monetary value of commodities transported excluding transport margins, profit margins etc and other intermediation costs
- the interregional flows from I-O data includes monetary value of intangibles like services which are excluded from actual interregional flow of goods in O-D tables. Therefore flows tend to be overstated
- the O-D tables exclude intraregional flow of goods within NCR and have assigned a zero value to National Capital Region (NCR) to NCR transactions and
- the concept of "quantity" in expressed differently in freight flows in O-D tables (metric tons) as compared to quantity in interregional I-O tables;
- I-O interregional flows are also higher than OD flows because the non-survey method used (simple location quotient) does not adjust national technical coefficients (used as proxy for regional technical coefficients) if the region is export-oriented. Domestic imports are assumed to be zero

The excess of monetary values of cell entries in I-O table over those in O-D matrix holds true not only for flow of freight but also for passenger-flow data. The total value of passenger trips made in 1994 is 68.4 million pesos which is 3.9% of nominal GDP. The official nominal GDP figure in 1994 was 1.742 trillion pesos. A comparative analysis of aggregate monetary value of passenger trips indicate that the passenger flow data estimated in multiregion SAM more closely approximates values reflected in national income accounts data. The big differential between passenger-flow data of JICA-DOST Survey and multi-regional SAM data maybe due to underestimation of passenger flows in primary data collected by JICA-DOST Survey. This is because a big bulk of passenger-trips measured in JICA-DOTC Survey is for short-term purpose, mainly business trips. Only a small percentage accounts for long-term trips due to migration. Total monetary value of secondary data (I-O data) is 834 times bigger than primary data (O-D data)
In the end, the above results indicate that there is a way of linking freight flows from origin-destination tables of surveys and interregional commodity flows of I-O table contained in SAM. This is also true for passenger-flow data. A methodology was devised utilizing database from both I-O and O-D tables, so that interregional flows of goods and people can be reliably estimated. Initial empirical results indicate that the O-D tables used in engineering and I-O tables used in economics can be reconciled so that a comprehensive and reliable database for spatial computable general equilibrium modeling can be established.