



Toward Understanding Philippine Trade in Services: A Demand Approach

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Introduction

As international trade in services grows, it occupies an increasing portion of the trade policy agenda of countries. Indeed, further liberalization in services is a central component of the prevailing Doha trade round of multilateral negotiations. Despite being generally considered a feature of developed, post-industrial economies, the Philippines and several other developing countries are regarded as possessing great potential in tradable services, particularly those intensive in labor relative to physical capital and which require crucial sets of skills (such as computer literacy and facility in English).

The Philippines, with its abundance of relatively adaptable and generally well skilled and educated English-speaking workers, is striving to harness this “edge” toward the attainment of its socio-economic development goals. However, success here—particularly if a strategic approach is to be adopted by policymakers—will in crucial part rely on a close understanding of the elements comprising this comparative advantage as well as other factors, namely, demand factors, that have an impact on services trade.

Noteworthy studies of the country’s services sector do exist, such as those of Lamberte (1996), Mehta (1996), and Avila (1998), one of the few to focus specifically on services trade. Unfortunately, however, a comprehensive investigation of the underlying determinants of services

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trade is, to our best knowledge, yet to be carried out. Perhaps this explains why no strategic approach to, for example, the Doha services negotiations, has yet emerged in the form of a set of position papers and proposals. This is plainly unsatisfactory in view of the potential stakes for the Philippines. This paper hopes to make a modest contribution to rectifying the situation and calling for further research and study.

Whether or not Philippine trade in services is in fact based on comparative advantage, which in turn should be observable in the data, is beyond the scope of this paper. (It is, however, discussed substantially in an unpublished work. See Barns 2002.) Such comparative advantage would, in line with the predominant Heckscher-Ohlin theory of trade, infer that the correct "mix" of endowments comprising physical capital, labor and human capital is present and aligned with production (and hence, in the absence of barriers and distortions, external trade). Ultimately, these endowments form the determinants of trade from the standpoint of supply.

Adopting a demand perspective to uncover some of the factors influencing Philippine exports and imports of services is this paper's concern. For this purpose we draw on demand theory and adopt a framework and methodology as applied to services trade by Hsueh, Lin, and Wang (2000) for estimating and analyzing the demand functions.

Philippine services trade: The impact of globalization and miscellaneous services

This paper briefly examines the Philippine services trade data to draw out some key observations for use in this paper. While the principal source of services trade data is the balance-of-payments (BOP) statistics published by the Bangko Sentral ng Pilipinas, for purposes of this analysis, the paper uses the data of the National Income Accounts (derived from the BOP statistics), given in constant (1985) pesos and commencing in 1980. Table 1 shows exports and imports of total goods and total services and its five components. Figure 1 graphs the data in the table, using a logarithmic scale to show clearly the relative movements in trend. Table 2 gives the growth rates according to selected time periods within the last two decades.

With respect to aggregate goods trade, the data show exports suffering a sharp reverse in 1982, and recovering before another steep fall in 1985. Thereafter, until 2000, despite the 1998 Asian crisis, goods exports posted significant growth. Imports took a big dip from 1980 to 1986, only to regain their 1980 levels in 1987. Imports also posted strong growth thereafter (except in 1991) although, unlike goods, the effects

of the events of 1997-1998 can be clearly seen until a positive reversal in 2000.

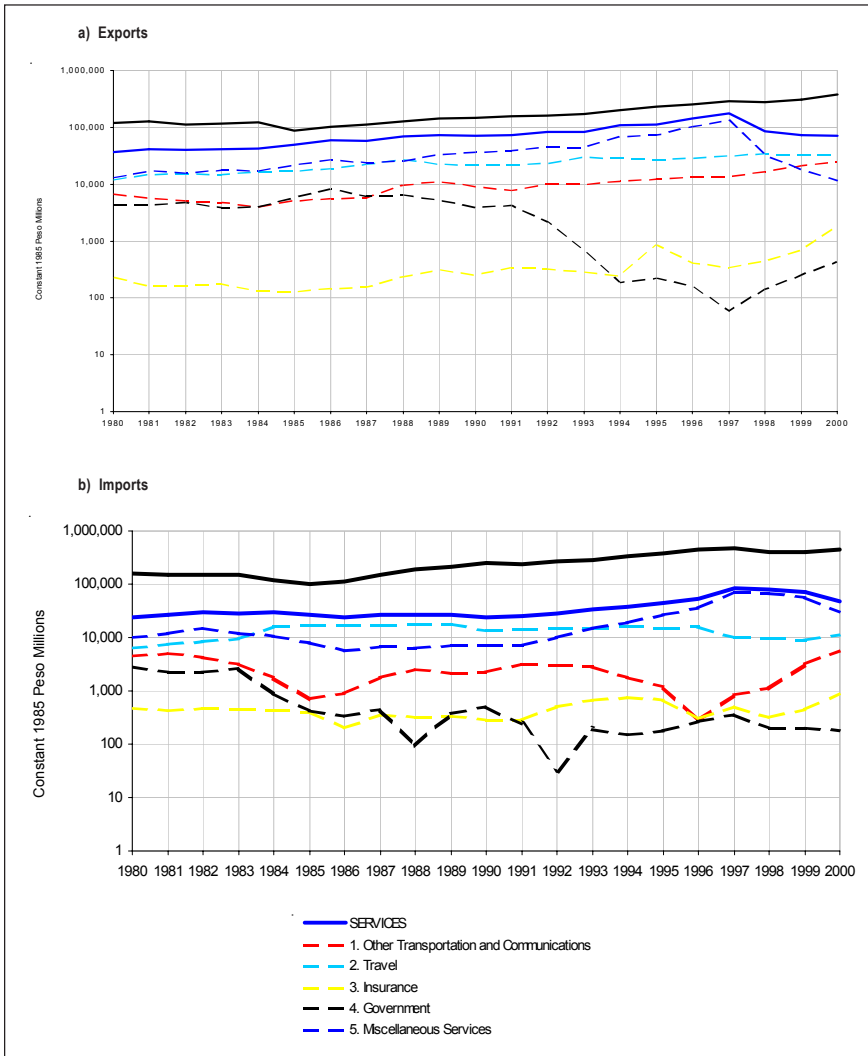
An explanation of these movements is simple, and includes the balance of payments crisis between 1983 and 1985 (from which the effects of foreign exchange restrictions can be inferred), the political and economic difficulties of the Aquino administration, the continued reforms and growth of most of the Ramos administration, and lastly the events flowing from

Table 1. Philippine services trade, with goods trade: 1980 to 2000
(levels in constant 1985 peso millions)

Exports											
ITEM	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
GOODS	118,707	127,438	110,986	115,356	121,588	88,020	101,461	113,076	127,657	141,100	146,860
SERVICES	36,041	41,873	40,321	41,169	42,050	49,321	59,110	58,455	68,801	72,788	71,005
1. Other Transport/ Comms.	6,580	5,774	5,052	4,763	4,021	5,013	5,498	5,655	9,497	11,196	9,082
2. Travel	11,764	14,519	14,926	14,729	16,612	16,876	18,475	22,252	27,060	22,337	21,745
3. Insurance	227	159	166	174	132	127	147	155	234	307	248
4. Government	4,320	4,189	4,760	3,813	4,032	5,798	8,359	6,151	6,464	5,248	3,850
5. Miscellaneous Services	13,150	17,232	15,417	17,690	17,250	21,507	26,631	23,979	25,546	33,700	36,080
ITEM	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
GOODS	157,837	159,747	172,328	198,501	230,591	252,003	286,111	283,195	307,716	377,430	
SERVICES	73,678	81,684	84,123	108,704	113,590	145,198	179,211	84,252	73,039	70,634	
1. Other Transport/ Comms	7,863	9,847	10,007	11,234	12,377	13,224	13,551	16,573	21,382	24,268	
2. Travel	22,012	23,512	29,189	28,318	27,329	28,328	31,807	34,277	32,770	32,424	
3. Insurance	342	317	280	242	850	406	336	453	674	1,839	
4. Government	4,269	2,195	658	188	225	159	58	142	254	428	
5. Miscellaneous Services	39,192	45,813	43,989	68,722	72,809	103,081	133,459	32,807	17,959	11,675	
Imports											
ITEM	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
GOODS	155,447	150,899	151,746	148,598	114,784	98,550	114,784	151,462	185,892	217,269	245,562
SERVICES	24,030	27,158	30,668	28,243	23,237	26,655	23,237	26,070	26,465	27,321	23,586
1. Other Transport/ Comms.	4,376	4,908	4,210	3,234	900	715	900	1,783	2,564	2,146	2,216
2. Travel	6,469	7,327	8,568	9,695	16,335	16,980	16,335	16,978	17,332	17,295	13,569
3. Insurance	463	411	461	456	203	394	203	348	318	326	284
4. Government	2,802	2,287	2,234	2,675	327	415	327	445	92	371	491
5. Miscellaneous Services	9,920	12,225	15,195	12,183	5,472	8,151	5,472	6,516	6,159	7,183	7,026
ITEM	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
GOODS	240,944	260,815	288,843	331,878	384,769	448,596	483,481	406,329	400,201	440,987	
SERVICES	25,195	28,458	33,705	37,447	43,706	51,598	84,191	77,906	70,472	48,493	
1. Other Transport/ Comms	3,196	2,998	2,859	1,757	1,164	283	830	1,123	3,138	5,734	
2. Travel	14,481	15,099	15,352	15,664	15,333	15,594	10,244	9,176	9,035	11,200	
3. Insurance	274	507	657	734	669	299	491	323	450	884	
4. Government	239	31	186	146	176	260	361	203	200	183	
5. Miscellaneous Services	7,005	9,823	14,651	19,146	26,364	35,162	72,265	67,081	57,649	30,492	

Source: National Statistical Coordination Board (National Income Accounts)

Figure 1. Philippine services trade, with goods trade: 1980 to 2000 (levels in constant 1985 peso millions)



Source: National Statistical Coordination Board (National Income Accounts)

the Asian crisis and the Estrada government. Indeed, the growth rates of these five general periods, shown in Table 2, make for useful broad categories.

For aggregate services, the trends do not exactly follow total goods. There was no negative effect on imports and exports during the early 1980s. In exports, there was similar growth to goods during the Aquino years, though imports were far more modest. During the period

of relatively high growth under the Ramos administration, both exports and imports substantially outpaced goods. Most dramatically, services exports sharply reversed in the subsequent crisis, returning to levels at the beginning of the 1990s. Imports also fell but slumped most notably in 2000.

For further analysis, this paper reviews the main reported components of the services aggregate. Figure 1 shows exports of transport and communications services growing steadily throughout the 1990s, as did exports of travel services over the entire period.¹ Imports of the former sharply declined in the mid-1990s and afterwards recovered, whereas imports of travel services dropped away later in the decade.

The levels of insurance exports and imports, which consist mainly of nonmerchandise insurance, are almost negligible throughout and do not seem to exhibit a consistent or discernible trend. Government services trade is not expected to be governed by principally economic

Table 2. Philippine services trade, with goods trade: 1980 to 2000
(rates of growth for selected periods in percent)

Exports										
ITEM	1980 - 1985		1985 - 1993		1993 - 1997		1997 - 2000		1980 - 2000	
	Total	Avg	Total	Avg	Total	Avg	Total	Avg	Total	Avg
GOODS	-25.85	-4.76	95.78	8.85	66.03	13.54	31.92	10.10	217.95	6.57
SERVICES	36.85	6.80	70.56	7.18	113.03	21.24	-60.59	-23.20	95.98	5.34
1. Other Transport/Comms.	-23.81	-4.28	99.62	11.63	35.42	7.94	79.09	21.61	268.81	8.41
2. Travel	43.45	7.86	72.96	7.95	8.97	2.37	1.94	0.77	175.62	5.73
3. Insurance	-44.05	-9.73	120.47	12.88	20.00	42.05	447.32	85.49	710.13	23.95
4. Government	34.21	8.04	-88.65	-16.29	-91.19	-36.15	637.93	97.40	-90.09	2.87
5. Miscellaneous Services	63.55	11.49	104.53	10.12	203.39	33.30	-91.25	-51.89	-11.22	5.80
Imports										
ITEM	1980 - 1985		1985 - 1993		1993 - 1997		1997 - 2000		1980 - 2000	
	Total	Avg	Total	Avg	Total	Avg	Total	Avg	Total	Avg
GOODS	-36.60	-8.29	193.09	14.77	67.39	13.80	-8.79	-2.42	183.69	6.23
SERVICES	10.92	2.60	26.45	3.58	149.79	27.26	-42.40	-16.07	101.80	5.12
1. Other Transport/Comms.	-83.66	-26.09	299.86	23.52	-70.97	11.33	590.84	99.15	31.03	20.02
2. Travel	162.48	22.91	-9.59	-0.86	-33.27	-8.17	9.33	4.00	73.13	4.35
3. Insurance	-14.90	-2.85	66.75	14.38	-25.27	2.94	80.04	33.85	90.93	10.71
4. Government	-85.19	-24.14	-55.18	79.10	94.09	21.40	-49.31	-17.92	-93.47	27.20
5. Miscellaneous Services	-17.83	-1.64	79.74	10.53	393.24	51.82	-57.81	-22.78	207.38	10.75

Source: National Statistical Coordination Board (National Income Accounts)

¹Definition of travel services: travel items consisting of direct purchases in the domestic market by nonresident households and direct purchases abroad by resident households (i.e., tourist expenditures).

but rather political mechanisms, and, based on its fall to negligible levels after the 1980s, will not be considered further in this paper.²

Clearly, however, the key determinant of the trends in aggregate services is the miscellaneous services component.³ This is by far the greatest contributor to the total. After an unspectacular growth in the period to 1993, miscellaneous services seemed to take a life of its own and supported the rapid growth (1993 to 1997) and sharp decline (1998 to 2000) of both total exports and imports.

The data confirm the assumption that periods of high growth, such as what the country enjoyed from 1993 to 1997, should give rise to more travels—whether inbound or outbound. Increased spending by travelers is reflected as higher imports and exports for this item. In such a scenario of favorable economic outlook and especially increased economic activity, the same assumption should hold with transport services (the bulk of which consists of freight) but is not really borne out in the period rate of growth. In constant pesos, total growth over the entire period from 1980 to 2000 of imports of transport services was by far the least of all the items: just over 30 percent. Indeed, on this measure, the relative flatness of most of the services import curves in relation to the goods import curve, as well as the corresponding services export curves, prompts one to infer the presence of a high degree of protection in those sectors, which finds support in Avila (1998). His comments on services sector restrictions are worth noting:

Approximately 85 percent of the Philippine service industry is at least partially, if not completely restricted . . . maritime cabotage [internal shipping], air transport, basic telecommunications, life insurance, and research and development in the natural sciences are completely restricted in the Philippines. Partial restrictions also exist in construction, real estate, and education services.

²Definition of government services: direct purchases of foreign governments and extra-territorial bodies (such as foreign embassies, international organizations, and foreign armed forces) in the domestic market of a country.

³Definition of miscellaneous services: include 1) reimbursement of the cost of home office services of parent companies from foreign branches and subsidiaries; 2) other services such as those related to construction activities; 3) subscription and cable charges; and 4) film and real estate rentals.

According to the 1995 PECC [Pacific Economic Cooperation Council] survey, the most regulated industries in the Philippines are pipeline transport, space transport, maritime cabotage, recreational services, health and social services, environmental services, education, distribution, construction, audio-visual services, basic telecommunications, postal services, rental services, real estate, [research and development], computer, professional and other business services. Substantial restrictions were also noted for value-added telecommunications, tourism, banking, insurance, and transport services.

Such restrictions can certainly account for the import trends we have seen, but what about miscellaneous services and their bubble? Understanding the behavior of services in the period under study plainly necessitates an understanding of this residual item. Is “miscellaneous services” the child of globalization, given increased impetus by the reforms undertaken by Aquino and Ramos—which reaped their fruit in the period 1993-1997 and dissipated in the years afterward? Yet many of types of services found in this category are mentioned above by Avila (1998) as being among the most regulated and restricted sectors.

Nevertheless, the level of trade in miscellaneous services reflected the favorable outlook toward the Philippines and the robust growth of the Philippine economy in the years of the Ramos administration, and dropped sharply with the onset of the regional crisis and political-economic events in the country since. It would be logical to expect that a booming economy, which led to high levels of inward foreign investment and capital flows, would increase the demand for many services—from local service providers by foreign investors establishing and conducting operations (export), and vice versa (import). In addition, local partners of foreign investors or local businessmen operating in increasingly open and globalizing markets might purchase certain services offshore (import).

The definition of miscellaneous services in the National Income Accounts provides a clue. This includes reimbursements made by foreign branches and subsidiaries in the Philippines for services rendered by the head office abroad (an import, and vice-versa, an export) as well as real estate rentals made to Philippine landlords (an export, and vice-versa, an import). These could well have contributed to the trends we see, particularly exports. The definition also includes the catch-all statement, “other services such as those related to construction activities,” which effectively covers all professional, technical, financial, and merchanting (cross-border commissions transactions involving dealers, brokers, and agents) services.

The definition of miscellaneous services supports the view that the prevailing economic environment during the Ramos years, marked by high growth, a favorable outlook, and increased economic activity (conducive as it was to foreign investment as well as to the arrival and presence of tourists, business travelers, investors, and expatriate professionals), was related to the dramatic rise in the exports and imports of such services. Likewise, the rapid deterioration in the same environment since 1997 could have been related to the equally large fall in the years since.

It would seem that the existence of the restrictions on many services in the Philippines affects only their performance within the country: they pertain principally to the commercial establishment within the Philippines of the foreign service provider. Yet, services trade can take place through offshore consumption, and there is little to preclude this. This was necessary, in both directions, given the many types of cross-border ventures that proliferated before the regional crisis.

In short, Philippine trade in services benefited, as trade does, from efforts to open and liberalize the economy. However, this is so in large part only when the precondition of a stable political-economic outlook was present. This is consistent with the oft-observed double-edged blade of globalization. An econometric analysis of the behavior of services trade necessarily includes appropriate variables to account for this.

A demand approach: The imperfect substitutes model

Hsueh et al. (2000) examine some of the factors which may have affected the growth of Taiwan's services trade from 1951 to 1999. They write: "In this regard the economic theory of demand for a commodity can be applied to explain the demand for imports of services as well as the demand for exports of services." Specifically, income (output) and relative price are two typical determinants to be considered, but other variables, such as trade in goods, industrial structure, and government policy were *a priori* considered relevant and must be included.

As is conventional in this type of analysis, we adopt the imperfect substitutes model of trade (Goldstein and Kahn 1985) to specify and estimate the export and import demand functions underlying Philippine trade in services. This model draws from traditional consumer demand theory, which is premised on the idea that, with identical preferences, utility maximization by consumers and its dual of cost minimization by producers results in demand and expenditure functions, which depend mainly on income and relative prices (Bowen et al. 1998).

The imperfect substitutes model provides the standard framework for analyzing the supply of and demand for commodity exports and imports (Hong 1999; Portugal 1993; Warr and Wollmer 1996). It is a two-

country model that makes the key assumption that imports and exports are not perfect substitutes for the consumption of nontraded domestic commodities. According to Cantavella et al. (2000), this assumption of imperfect substitutes implies that an import or export demand function can be calculated as the outcome of maximizing utility subject to a budget constraint.

If a homogeneity assumption is made, the demands can be defined as a function partially of relative, rather than absolute, prices. Thus, the structure of the demand functions is a demand equation representing the quantity demanded, which depends on relative prices and levels of income. This structure has been expanded to include other variables, such as real foreign exchange reserves (Dutta and Ahmed 1999), liberalization (Dutta and Ahmed 1999; Hsueh et al. 2000), and for services, the size of the services sector and trade in goods (Hsueh et al. 2000).

Using the model, we can adopt the conventional definition of the import demand function, as found in, for example, Sinha (1997):

$$M_t = f(Y_t^D, P_t^M/P_t^D)$$

Here, M_t is imports in time t , P_t^M is the import price in time t , P_t^D is the domestic price in time t (the ratio between the two being the relative price), and Y_t^D is domestic real income at time t . With specific reference to imports of services (M^S), this becomes:

$$M_t^S = f(Y_t^D, P_t^M/P_t^D)$$

More explanatory variables can be added to the function, in line with Dutta and Ahmed (1999), and Hsueh et al. (2000). In the same way, we can derive the regression equation for estimating the Philippine export demand function for services. We define the general export demand function thus:

$$X_t = f(Y_t^F, P_t^X/P_t^F)$$

Here, X_t is exports in time t , P_t^X is the export price in time t , P_t^F is the foreign price in time t (again, the ratio between the two represents the relative price), and Y_t^F is foreign real income at time t . In terms of exports of services, which we denote by X_t^S , we rewrite this as:

$$X_t^S = f(Y_t^F, P_t^X/P_t^F)$$

As before, more explanatory variables can be added to the function. The specifications for both functions are given below.

Estimating the import demand function

In estimating the Philippine aggregate import and export demand functions, we broadly follow the reasoning and methodology of Hsueh et al. (2000) in the selection of our variables. Imports will be examined first, followed by exports.

For imports, the dependent variable is total *Real Imports of Services* (SERVSM85). This variable is taken from the National Income Accounts, and is based on constant 1985 Philippine pesos. The explanatory variables represent domestic real income, the relative price of the services import, real imports of goods, foreign perception of the Philippines, the size of the domestic services sector, and the presence of substantive restrictions on foreign exchange. These variables, and the expectations concerning their effect on services imports, are discussed here in turn.

Domestic Real Income (GDPPC85)

Services imports are purchased for intermediate or final use. Higher income or output can be expected to give rise to higher consumption of imported services. Hsueh et al. (2000) write that a per capita is more effective than an aggregate measure as an indicator—both in terms of representing economic welfare and empirical performance. Therefore, per capita gross domestic product, in constant 1985 Philippine pesos, will be used as proxy for this variable, and is expected to have a positive effect on SERVSM85. GDPPC85 is taken from the National Income Accounts.

Relative Price of Services Imports (RPM)

If imported services and domestic services are substitutable, then the level of imports should be affected by the relative price between the two. The relative price can be measured by taking the ratio of the implicit deflator of real total services imports to the implicit real GDP deflator for the domestic services sector. The data are taken from National Income Accounts.

Relative price is the link between the different concepts of comparative advantage and demand. If a country specializes in the production and export of commodities intensive in those factors in which it is relatively abundantly endowed, then it can be said to be trading in accordance with its comparative advantage. Intuitively, the price of a commodity produced by a country according to its prevailing comparative advantage (however determined) should be favorable relative to the import of the same commodity. If the Philippines has a comparative advantage in tradable (and therefore substitutable) services, and assuming that these services are effectively represented by aggregate service imports and the aggregate domestic services sector (whose relative price levels can then be expected to

represent relative “competitiveness”), then this should be reflected in the RPM ratio, which should be expected to have a negative effect on SERVSM85. Foreign exchange rate fluctuations, which are important to relative price, are also factored into this variable.

Issues regarding the aggregate domestic services sector, and whether it in fact comprises services that are substitutable by imports, are discussed below.

Real Imports of Goods (GOODSM85)

Hsueh et al. (2000) give the following reasons for including this variable. Firstly, more imports of goods should give rise to higher demand for more transport, storage, and insurance services. Secondly, growth in goods trade, representing as it does an expansion of economic activity, should lead to higher demand for communications, travel, and financial services. Thirdly, imports of goods, particularly equipment and materials, may lead to higher imports of services in the form of business services and payments of royalties (licensing fees). Lastly, goods trade can reflect current economic outlook and so represent a good proxy for the output variable, which is principally represented here by GDPPC85. From all of this, the effect of GOODSM85 on SERVSM85 is expected to be positive. However, Hsueh et al. (2000) note that the relationship between the two variables may be nonlinear, and therefore includes an additional quadratic term for real imports of goods. The effect of this quadratic term on SERVSM85 cannot be determined at this point.

In the Philippine case, such an expected relationship between imports of goods and services would have been enthusiastically embraced before 1998. However, the evident divergence between the two trends after 1997 raises questions about the precise nature and significance of this relationship. It could be argued that since a very large proportion of goods imports (i.e., electronics) are destined for re-export, goods trade is not a good proxy for the Philippine economic outlook, which deteriorated rapidly after 1997. However, it is a much better proxy for the outlook on certain large Philippine goods export markets. That is why a Philippine-specific variable for economic outlook or foreign perception is included below.

That is not to say that such a relationship between goods and services does not exist at a much lower trend level. Though it might be difficult to capture by this methodology, we nevertheless accept the reasoning of Hsueh et al. (2000)—better suited as it probably is to Taiwan—and adopt these variables. The data for real imports of goods are also taken from the National Income Accounts, and expressed in constant 1985 Philippine pesos.

Foreign outlook on the Philippines (TARRIV or BARRIV)

This variable is included in line with the observations drawn earlier. There we introduced the idea that the prevailing economic environment must have had an impact on aggregate services trade (by way of the residual item, miscellaneous services). No other explanation for the sharp movements during the 1990s—both the marked rise and fall—can be more easily offered, particularly in view of the large role of the particular services within miscellaneous services.

The prevailing economic environment of a country at any given moment is determined by policy and local factors. There is also, in a cross-border context, the factor of a country's relative attractiveness to others and its relative openness and integration with the world. All these things, if favorable, could generate foreign interest in that country, which can ultimately be made economically manifest in activities such as tourism, foreign direct investment, and portfolio investment.

One proxy for foreign interest or foreign outlook that can be used is the level of (nonresident) travelers to a country. This is especially useful because not only does it capture general confidence abroad as to domestic policy and economic performance, but it also facilitates a study of the role of trade through consumption abroad in the specific context of services.

TARRIV, the annual volume of nonresident visitor arrivals can be taken from the statistics of the Department of Tourism, which are based on the arrival cards of the Bureau of Immigration. Only arrivals by air, which comprise over 95 percent of the total are used. Here the variable should be taken as representing general confidence. Given a bright outlook, Filipinos could be expected to consume more imported services.

Because the particular services that can reasonably have been expected to be the principal determinants of the trend of miscellaneous services were business services, the volume of nonresident business travelers arriving in the Philippines, BARRIV, will be used as an alternate. This may perhaps prove a better proxy. This statistic can be derived from the total volume of arrivals by way of the "Purpose of Visit" portion of the mandatory arrival cards. As for TARRIV, BARRIV can be taken as representing general confidence. In addition, it can represent general business confidence and interest. Furthermore, businesspeople may be visiting the Philippines to induce Filipino clients or prospective clients to purchase imported services, or alternatively to explore business ventures, in which case their Filipino counterparts for their part may have to consume imported services or travel abroad. BARRIV is also expected to be a better indicator in this respect because business-related services are more likely to be paid for by remittances through the banking system, and are thus more likely to be captured in the official data (the balance of payments).

Unfortunately, the statistics on visitor arrivals and purpose of visit (no longer published, it seems) at the Department of Tourism are inconsistent in presentation. In some years, business travelers were indicated as a volume, in others as a share of total air arrivals. The statistics are also incomplete, though manageably so. However, several estimates in two areas had to be made. The first was in the proportion of air arrivals to total arrivals (air and sea, the Philippines being an archipelago). Where this share could not be obtained, the midpoint of the shares of the previous year and succeeding year was used. The second area was in the share of business arrivals to total air arrivals. Again, a midpoint was used in estimating the share when unobtainable. The data are available only on an annual basis.

TARRIV and BARRIV are expected to have a positive effect on services imports.

Size of the domestic services sector (SS85)

If imported and domestic services are substitutable, then expansion of the domestic services sector may negatively affect demand for imports. The proxy is Philippine services sector real Gross Value Added (GVA) as a share of total real Gross Domestic Product, taken from the National Income Accounts and expressed in constant 1985 Philippine pesos.

Here again, the Philippine context raises questions. Hsueh et al. (2000) use this measure to express the relative maturity of Taiwan's economy and its stage of economic development. The large size of the Philippine services sector does not, in the aggregate, reflect the same phenomenon. Though the Philippines can be characterized as a services economy, it has not arrived at that point by way of an economic shift from industry, and previous to that, from agriculture. A significant portion of the size and growth of the total services sector stem from informal retail services (market or street vending) and private services (household employ). Therefore, the extent to which imported and domestic services in the aggregate are substitutable, given the fact that such informal services are essentially nontradable, is not expected to be very large. Furthermore, since growth in the services sector is principally in these areas, any econometric bearing that such growth may have on services trade should be closely scrutinized before attaching any meaning or significance to such a relationship. The diminished expectations now attached to this variable must also be attached to RPM, which uses the price deflator of the aggregate domestic services sector.

As for goods trade, we cannot assume that there exists no relationship between SS85 and SERVSM85. Again, however, deriving the precise nature of such a relationship, limited as it must be to substitutable services, might be difficult to capture by this methodology. Nonetheless, by intuitive reasoning as set out in Hsueh et al. (2000), the expectation is that SS85 will have a negative effect on SERVSM85.

Presence of foreign exchange restrictions (FXR)

Restrictions on foreign exchange, if substantive, are known to negatively affect imports. The impact can be on services imports directly, or indirectly, through the impact on imports of goods.

The Philippines suffered a balance of payments crisis in 1983. As a consequence, severe foreign exchange restrictions were placed in October of that year, and were not lifted until August 1985. To capture the effect that this may have had on services trade, we include a dummy variable for the restrictive regime that existed from 1983 to 1985. FXR is expected to have a negative effect on SERVSM85.

We include these variables into the empirical model, and specify the services import regression equations:

$$(1) \ln(\text{SERVSM85}_t) = \beta_0 + \beta_1 \ln(\text{GDPPC85}_t) + \beta_2 \ln(\text{RPM}_t) + \beta_3 \ln(\text{GOODSM85}_t) + \beta_4 (\ln(\text{GOODSM85}_t))^2 + \beta_5 \ln(\text{TARRIV}_t) + \beta_6 \text{SS85}_t + \beta_7 \text{FXR}_t + \varepsilon_t$$

$$(2) \ln(\text{SERVSM85}_t) = \beta_0 + \beta_1 \ln(\text{GDPPC85}_t) + \beta_2 \ln(\text{RPM}_t) + \beta_3 \ln(\text{GOODSM85}_t) + \beta_4 (\ln(\text{GOODSM85}_t))^2 + \beta_5 \ln(\text{BARRIV}_t) + \beta_6 \text{SS85}_t + \beta_7 \text{FXR}_t + \varepsilon_t$$

The specification is in log-linear form, with the dependent variable and explanatory variables, except domestic services sector size and the dummy for foreign exchange restrictions, expressed in log form. The data cover the years from 1982 to 2000, representing 18 observations. This admittedly small sample is regrettably the largest obtainable, and any valuation of the regression results should consider this. A possible alternative to garner more observations, which was to use quarterly data adjusted for seasonality, is not feasible here since the travel arrival data is available only on an annual basis. There is no other comparable statistic that can be expressed by quarter. Furthermore, we are not entirely confident that any meaningful relationships between the variables will be manifested on a quarterly basis.

As is imperative in time-series analysis, evidence of possible nonstationarity in the variables or absence of cointegration in the regressions will be sought to indicate the possibility of spurious regression. The Augmented Dickey-Fuller unit root test will be used for this purpose. The possibility of the autocorrelation will also be addressed.

Estimating the export demand function

For the export demand function, the dependent variable is total *Real Exports of Services* (SERVSX85). As with real imports, the statistics are taken from the

National Income Accounts and is expressed in constant 1985 Philippine Pesos. The explanatory variables to be included are foreign real income, relative price of services exports, total real exports of goods, foreign outlook on the Philippines, and the size of the domestic services sector. Each of these is discussed below.

Foreign real income (USGDPPC85)

As with imports, higher income or output in the world outside the Philippines can be expected to increase consumption and demand for Philippine services. The per capita real gross domestic product of the United States will be used as a proxy, following Hsueh et al. (2000). They base their reasoning on the fact that the United States plays an influential role in the world economy and is Taiwan's most important trading partner—something also true for the Philippines.

The variable is expressed in constant 1985 Philippine pesos. To derive this, nominal American GDP per capita was multiplied by the implicit GDP deflator with base year adjusted to 1985, and multiplied again by the average dollar-peso exchange rate for 1985. The United States data are taken from that country's Bureau of Economic Analysis and the data for the exchange rate data from the statistical database of the Philippine Institute for Development Studies. This variable is expected to have a positive effect of real exports of services from the Philippines. As for the corresponding variable in the import regression, USGDPPC85 is expected to have a positive effect on SERVSX85.

Relative price of services exports (RPX)

This is included for reasons similar to the corresponding variable in the import regression. The variable is derived from the ratio of the implicit deflator of total services exports to that of total services imports, which represents here the world services price. This should be a better variable for the relative price of tradable (and hence substitutable) services than RPM, since the potential flaws of using aggregate services GVA are avoided here. As before, the data are derived from the National Income Accounts, and the effect of RPX on SERVSX85 is expected to be negative.

Real exports of goods (GOODSX85)

Again, this is included for the same reasons (and with similar reservations) as the corresponding variable in the import regression, with a quadratic term likewise included. Taken from the National Income Accounts and stated in constant 1985 Philippine pesos, the effect on SERVSX85 is expected to be positive.

Foreign outlook on the Philippines (TARRIV or BARRIV)

The general rationale for the inclusion of this variable is the same as for imports. Both total arrivals and business arrivals will be used alternately, as before. TARRIV and BARRIV are expected to have a positive effect on SERVSX85.

Size of the domestic service sector (SS85)

This variable is identical to what was used in the import regression. The rationale is of course, the opposite, though the caveats given above unfortunately still hold. SS85 is expected to have a positive effect on SERVSX85.

Taking our empirical model, the following regression can be specified:

$$(3) \ln(\text{SERVSX85}_t) = \beta_0 + \beta_1 \ln(\text{USGDPPC85}_t) + \beta_2 \ln(\text{RPX}_t) + \beta_3 \ln(\text{GOODSX85}_t) + \beta_4 (\ln(\text{GOODSX85}_t))^2 + \beta_5 \ln(\text{TARRIV}_t) + \beta_6 \text{SS85}_t + \varepsilon_t$$

$$(4) \ln(\text{SERVSX85}_t) = \beta_0 + \beta_1 \ln(\text{USGDPPC85}_t) + \beta_2 \ln(\text{RPX}_t) + \beta_3 \ln(\text{GOODSX85}_t) + \beta_4 (\ln(\text{GOODSX85}_t))^2 + \beta_5 \ln(\text{BARRIV}_t) + \beta_6 \text{SS85}_t + \varepsilon_t$$

The specification is also in log-linear form, with the dependent variable and explanatory variables, except domestic services sector size, in log form. Again, the data cover the years from 1982 to 2000. Analysis of the results will include the necessary tests of stationarity, cointegration, and autocorrelation.

The data for the variables of both the import and export regression equations can be found in Tables 3a and 3b. The principal computations by which the several of the variables were derived are also shown.

Results

The ordinary least squares estimations of the demand functions are given in Table 4. The left half of the table reports the results for the two import regressions. The income variable is positive and the relative price variable negative. Only the former is statistically significant—and only in regression (1). Real imports of goods bear a negative sign, while their quadratic carries a positive sign. This implies that the more imports of goods lead to fewer imports of services—a proportion which increases. Defying expectations, these results are furthermore statistically highly significant in the case of regression (1). Visitor arrivals are positive in sign and statistically significant—more so in the case of business arrivals in regression (2). The size of the domestic services sector bears a positive sign, which is contrary to expectations

but which shows no significance. As expected, foreign exchange restrictions have a negative effect, though no significance is shown here either.

The coefficients of determination are very good, as are the F-statistics, which indicate that at least some of the coefficients in the regressions are statistically nonzero. The Durbin-Watson statistic places us in the zone of indecision regarding the presence of either positive and negative serial correlation. The level of that statistic with respect to the coefficient of determination indicates that the regressions are not likely to be spurious. To be more assured of this last point however, we must demonstrate that the individual series are either stationary or that they are cointegrated within the regression.

Regarding individual stationarity, the Augmented Dickey-Fuller tests (with intercept and trend lagging one period) indicate that the variables for domestic real income, real imports of goods (both variables), and the foreign exchange restrictions dummy have no unit root; that they are nonstationary. However, a cointegration test that applies the unit root tests (appropriately including neither intercept or trend) to the residual series of both import regressions shows that both residual series are overwhelmingly likely to be stationary. This implies that the regressions are cointegrated and most likely

Table 3a. Estimating the Philippine services import demand function (dependent and explanatory variables: 1981 to 2000)

Year	1. Real Imports of Services		2. Domestic Real Income		3. Relative Price of Services Imports		
	Total Services Imports	GDP Per Capita	Total Services Imports	Total Services Imports (A)	Total Services Sector	Total Services Sector (B)	Relative Price Import to Local (A/B=C)
	Constant 1985 PHP Millions	Constant 1985 PHP	Implicit Price Index	Implicit Deflator	Implicit Price Index	Implicit Deflator	Annual Ratio
	SERVSM85	GDPPC85					RPM
1981	27,158	12,761	39.10	-	45.25	-	-
1982	30,668	12,906	42.28	8.13	50.22	10.98	0.7402
1983	28,243	12,828	57.10	35.06	56.21	11.92	2.9411
1984	29,801	11,602	86.20	50.96	83.10	47.83	1.0655
1985	26,655	10,492	100.00	16.02	100.00	20.34	0.7873
1986	23,237	10,590	128.63	28.63	105.00	5.00	5.7303
1987	26,070	10,784	138.60	7.75	112.10	6.76	1.1462
1988	26,465	11,179	151.76	9.49	123.40	10.08	0.9413
1989	27,321	11,601	156.17	2.91	135.19	9.55	0.3044
1990	23,586	11,595	201.42	28.98	154.38	14.19	2.0417
1991	25,195	11,210	231.80	15.08	184.22	19.33	0.7801
1992	28,458	10,967	242.14	4.46	198.98	8.01	0.5567
1993	33,705	10,923	263.00	8.61	213.54	7.32	1.1774
1994	37,447	11,132	273.41	3.96	233.95	9.56	0.4139
1995	43,706	11,390	293.39	7.31	255.46	9.19	0.7950
1996	51,598	11,773	363.00	23.73	279.49	9.41	2.5226
1997	84,191	12,111	404.58	11.45	306.87	9.80	1.1694
1998	77,906	11,780	438.68	8.43	342.97	11.77	0.7164
1999	70,472	11,923	445.27	1.50	372.94	8.74	0.1718
2000	48,493	12,142	431.30	-3.14	401.59	7.68	-0.4083

Table 3a. Continued

Year	4. Real Imports of Goods	5. Foreign Outlook on the Philippines		6. Domestic Services Sector Size			Presence of Foreign Exchange Restrictions
	Total Goods Imports	Non-Resident Air Arrivals in the Philippines		Gross Domestic Product (D)	Services Sector GVA(E)	Services Sector (ED=F)	Dummy
	Constant 1985 PHP Millions	Total Arrivals	Arrivals on Business	Constant 1985 PHP Millions	Constant 1985 PHP Millions	% Share Real GDP	1 = Yes 0 = No
	GOODSM85	TARRIV	BARRIV			SS85	FXR
1981	150,899	904,587	112983	630,642	223,618	35.4588	0
1982	151,746	859,094	116064	653,467	238,869	36.5541	0
1983	148,598	828,680	111457	665,717	252,144	37.8756	1
1984	116,133	791,452	97269	601,962	235,677	38.1996	1
1985	98,550	743,747	87539	571,883	230,781	40.3546	1
1986	114,784	751,401	91521	591,423	240,534	40.6704	0
1987	151,462	7,654,04	99656	616,923	253,120	41.0294	0
1988	185,892	1,011,925*	127806*	658,581	271,237	41.1851	0
1989	217,269	1,162,412	142163	699,448	290,309	41.5054	0
1990	245,562	1,001,878*	125636*	720,690	304,408	42.2384	0
1991	240,944	9,311,46	116766*	716,522	304,867	42.5482	0
1992	260,815	11,332,15	145505	718,941	307,986	42.8388	0
1993	288,843	1,353,686	177197	734,156	315,644	42.9941	0
1994	331,878	1,551,589	223739	766,368	329,006	42.9306	0
1995	384,769	1,740,047	278582	802,224	345,518	43.0700	0
1996	448,596	2,019,385	379241	849,121	367,544	43.2852	0
1997	483,481	2,177,780	432725	893,151	387,458	43.3810	0
1998	406,329	2,092,245	408406	887,905	400,918	45.1533	0
1999	400,201	2,123,993	406107	918,160	417,046	45.4219	0
2000	440,987	1,963,680	362888	954,962	435,645	45.5877	0

* Author's estimate.

not spurious. This is confirmed, albeit less strongly, by the results generated from the performance of a Phillips-Perron test as an additional test for cointegration.

The regression results, especially those for regression (2), where the coefficient of determination is high but where there is only one significant partial slope coefficient (for business visitor arrivals), seem to indicate the presence of a high degree of multicollinearity in our sample. Thus, in the Appendix we include two diagnostic devices for locating and measuring the degree of multicollinearity among the explanatory variables. The tables of pairwise correlations unsurprisingly show near-perfect correlations between the two variables for goods, both exports and imports. In addition, high correlations exist between goods exports and imports and both types of visitor arrivals, and again between goods exports and imports and the size of the domestic services sector and goods. This observation can be made across all regressions. In the estimation of the export-demand functions—regressions (3) and (4)—foreign income as measured by real U.S. per capita GDP is highly correlated with all the other variables except relative price.

To determine whether an explanatory variable is highly collinear with other explanatory variables in our regression models, we estimate a series of auxiliary regressions, regressing each explanatory variable on all the others,

including the intercept. The result for all four regressions shows a range of values for the coefficient of determination ranging to virtually 1 for the two goods variables, and which, with the sole exception of the relative price variable, is always statistically significant.

What is the impact of this evidently high degree of multicollinearity on the results? High multicollinearity is regarded as undesirable because it leads to large standard errors and can seriously impair the accuracy of the estimated coefficients and lead to very low significances. Yet regressions (1), and to a lesser degree (4) and (3), show most of the variables as being significant. Furthermore, the standard errors between regression (2), which displays classic multicollinearity “symptoms,” and regression (1) are not much different. We do not regard the near-perfect collinearity between the two goods variables as being serious, since the intent is to uncover the impact of the goods trade—the two variables *together*—on services trade.

Multicollinearity is a feature of a sample, not of a population, and the most common remedial measure is to either alter, expand or change the sample, or modify the model specification—in *toto* or by dropping a variable. As has been discussed, however, the sample used here is the only possible one obtainable, and we are not inclined to alter the model, based on the literature as well as on the reasoning presented above, which we believe

**Table 3b. Estimating the Philippine services export demand function
(dependent and explanatory variables: 1981 to 2000)**

Year	1. Real Exports of Services			2. Foreign Real Income		
	Total Services Exports	United States GDP Per Capita	United States Implicit GDP Deflator	United States Real GDP Per Capita (AxB=C)	PHP/USD Exchange Rate (D)	United States Real GDP Per Capita (CxD=E)
	Constant 1985	(A)	(B)	Constant	Annual Average	Constant
	PHP Millions	Current USD	1985=100	1985 USD	1985	1985 PHP
	SERVSX85					USGDPPC85
1981	41,873	13,614	84.64	16,085	18.62	299,447
1982	40,321	14,035	89.90	15,611	18.62	290,628
1983	41,169	15,085	93.47	16,138	18.62	300,443
1984	42,050	16,636	96.95	17,160	18.62	319,461
1985	49,321	17,664	100.00	17,664	18.62	328,845
1986	59,110	18,501	102.20	18,103	18.62	337,018
1987	58,455	19,529	105.28	18,550	18.62	345,335
1988	68,801	20,845	108.85	19,151	18.62	356,520
1989	72,788	22,188	113.00	19,635	18.62	365,544
1990	71,005	23,215	117.40	19,775	18.62	368,140
1991	73,678	23,630	121.67	19,421	18.62	361,556
1992	81,684	24,618	124.63	19,753	18.62	367,732
1993	84,123	25,544	127.63	20,014	18.62	372,598
1994	108,704	26,799	130.29	20,569	18.62	382,924
1995	113,590	27,784	133.13	20,871	18.62	388,541
1996	145,198	28,993	135.70	21,365	18.62	397,744
1997	179,211	30,497	138.35	22,043	18.62	410,375
1998	84,252	31,822	140.05	22,723	18.62	423,017
1999	73,039	33,204	142.01	23,381	18.62	435,273
2000	70,634	34,950	145.26	24,061	18.62	447,932

Table 3b. Continued

Year	3. Relative Price of Services Exports					4. Real Exports of Goods Total Goods Exports Constant 1985 PHP Millions GOODSX85
	Total Services Exports	Total Services Exports (F)	Total Services Imports	Total Services Imports (G)	Relative Price Export to Foreign (F/G=H)	
	Implicit Price Index	Implicit Deflator	Implicit Price Index	Implicit Deflator	Annual Ratio RPX	
1981	45.18	-	39.10	-	-	127,538
1982	49.53	9.63	42.28	8.13	1.1846	110,986
1983	54.18	9.40	57.10	35.06	0.2682	115,356
1984	83.52	54.14	86.20	50.96	1.0623	121,588
1985	100.00	19.74	100.00	16.02	1.2323	88,020
1986	100.09	0.09	128.63	28.63	0.0030	101,461
1987	103.24	3.15	138.60	7.75	0.4058	113,076
1988	107.95	4.57	151.76	9.49	0.4816	127,657
1989	118.24	9.53	156.17	2.91	3.2754	141,100
1990	136.55	15.49	201.42	28.98	0.5345	146,860
1991	162.33	18.88	231.80	15.08	1.2520	157,837
1992	173.70	7.00	242.14	4.46	1.5707	159,747
1993	185.45	6.76	263.00	8.61	0.7851	172,328
1994	201.57	8.69	273.41	3.96	2.1969	198,501
1995	218.00	8.15	293.39	7.31	1.1152	230,591
1996	238.71	9.50	363.00	23.73	0.4004	252,003
1997	253.32	6.12	404.58	11.45	0.5340	286,111
1998	254.53	0.48	438.68	8.43	0.0566	283,195
1999	255.67	0.45	445.27	1.50	0.3003	307,716
2000	279.95	9.49	431.30	-3.14	-3.0265	377,430

Table 3b. Continued

Year	5. Foreign Outlook on the Philippines		6. Domestic Services Sector Size		
	Nonresident Air Arrivals in the Philippines		Gross Domestic Product (I)	Services Sector GVA(J)	Services Sector (J/I=K)
	Total Arrivals	Arrivals on Business	Constant 1985 PHP Millions	Constant 1985 PHP Millions	% Share Real GDP
	TARRIV	BARRIV	SS85		
1981	904,587	112,983	630,642	223,618	35.4588
1982	859,094	116,064	653,467	238,869	36.5541
1983	828,680	111,457	665,717	252,144	37.8756
1984	791,452	97,269	616,962	235,677	38.1996
1985	743,747	87,539	571,883	230,781	40.3546
1986	751,401	91,521	591,423	240,534	40.6704
1987	765,404	99,656	616,923	253,120	41.0294
1988	1,011,925*	127,806*	658,581	271,237	41.1851
1989	1,162,412	142,163	699,448	290,309	41.5054
1990	1,001,878*	125,636*	720,690	304,408	42.2384
1991	931,146	116,766*	716,522	304,867	42.5482
1992	1,133,215	145,505	718,941	307,986	42.8388
1993	1,353,686	177,197	734,156	315,644	42.9941
1994	1,551,589	223,739	766,368	329,006	42.9306
1995	1,740,047	278,582	802,224	345,518	43.0700
1996	2,019,385	379,241	849,121	367,544	43.2852
1997	2,177,780	432,725	893,151	387,458	43.3810
1998	2,092,245	408,406	887,905	400,918	45.1533
1999	2,123,993	406,107	918,160	417,046	45.4219
2000	1963,680	362,888	954,962	435,345	45.5877

* Author's estimate.

to be sound. However, the interpretation relating to the validity and strength of the results should take into account the fact that all the regressions—and not just regression (2) in particular—indicate signs of multicollinearity.

Evidence of multicollinearity aside, it would seem then from these results that the Philippines' aggregate imports of services are income-elastic but price-inelastic. However, relative price, as has been derived here, is not statistically significant, which may imply that imported services and *aggregated* domestically produced services are not substitutable to a large extent. This is also indicated perhaps by the very small coefficient (or very strong inelasticity). It also means that the role of comparative advantage, which should be borne out in relative price, is not clear. Goods trade is indicated as having a counter-intuitive effect, highly significant in one regression but not at all in the other, which may give weight to the reservations expressed above on the nature of the relationship between goods and services in the Philippine context. The importance of the economic outlook—the perception from abroad as to domestic policy and performance—is clearly indicated. We note, however, that the significances seem to be lower when business arrivals are used rather than total arrivals, and the effects of all the other variables are greater in the latter case. The growth of the domestic services sector as a whole, which bears a sign that is anyway contrary to expectations, does not seem to be a significant factor. This may be due to the caveats laid out above. Lastly, restrictions on foreign exchange would seem to have a negative impact on service imports, though the relationship indicated here is not significant.

The results for the two export regressions are found in right half of Table 4. The income and relative price variables show the expected coefficients, with the exception of relative price in the second export regression, but all lack statistical significance in both regressions. Real exports of goods exhibit the expected positive effect, while the quadratic bears a negative sign. Both show a degree of statistical significance. This implies that more exports of goods induce more exports of services, but in decreasing proportion. Both total visitor arrivals and business arrivals are positive and significant. Only the domestic services sector size shows a counterintuitive sign, though this sign seems insignificant.

The coefficients of determination are relatively good, though less than those generated on the imports side. The F-statistic is also much lower but still highly significant. The Durbin-Watson statistic places us once more in the zone of indecision with respect to positive serial correlation, but there is clear evidence of the absence of negative serial correlation in both export regressions.

Again, the rule of thumb regarding the Durbin-Watson and the coefficient of determination would indicate that both regressions are not spurious. The ADF unit-root tests, however, indicate that the foreign income variable is nonstationary. However, when the appropriate unit-root tests (both

Table 4. Regression results: Philippine services import and export demand functions

	Imports of Services	(1)	(2)
<i>Dependent Variable</i>			
log(ServsM85)	ADF-statistic*		-2.2371
<i>Explanatory Variables</i>			
C	coefficient	506.2938 ^A	253.8314
	standard error	181.5784	195.2143
	t-statistic	2.7883	1.3003
	p-value	0.0192	0.2227
log(GDPPC85)	coefficient	2.6117 ^B	1.2618
	standard error	1.0196	1.0548
	t-statistic	2.5615	1.1963
	p-value	0.0283	0.2592
	ADF-statistic		-3.7323 ^B
log(RPM)	coefficient	-0.0463	-0.0386
	standard error	0.0487	0.0389
	t-statistic	-0.9495	-0.9918
	p-value	0.3647	0.3447
	ADF-statistic		-3.2680
log(GoodsM85)	coefficient	-39.4654 ^A	-18.9514
	standard error	13.9183	15.3371
	t-statistic	-2.8355	-1.2357
	p-value	0.0177	0.2448
	ADF-statistic		-4.4145 ^B
log(GoodsM85)	coefficient	0.7520 ^A	0.3563
	standard error	0.2702	0.2968
	t-statistic	2.7833	1.2004
	p-value	0.0193	0.2577
	ADF-statistic		-4.3980 ^B
log(TArriv)	coefficient	0.6451 ^C	
	standard error	0.4497	
	t-statistic	1.4345	
	p-value	0.1819	
	ADF-statistic	-2.9323	
log(BArriv)	coefficient		0.7884 ^A
	standard error		0.2945
	t-statistic		2.6771
	p-value		0.0232
	ADF-statistic		-3.1375
SS85	coefficient	0.0525	0.0242
	standard error	0.0399	0.0360
	t-statistic	1.3186	0.6722
	p-value	0.2167	0.5167
	ADF-statistic		-2.7891
FXR	coefficient	-0.0705	-0.0088
	standard error	0.1244	0.1075
	t-statistic	-0.5664	-0.0823
	p-value	0.5836	0.9360
	ADF-statistic		-3.5338 ^C
R²		0.9449	0.9613
Adjusted R²		0.9064	0.9342
Standard Error of Regression		0.1279	0.1072
F-statistic		24.5078 ^A	35.4970 ^A
Durbin-Watson**		1.7948	2.0154
ADF-statistic of Residuals***		-5.3723 ^A	-4.6780 ^A
PP-statistic of Residuals***		-3.6222 ^A	-4.0417 ^A
n		18	18

Table 4. Continued

	Exports of Services	(1)	(2)
<i>Dependent Variable</i>			
log(ServsX85)	ADF-statistic*		-1.5139
<i>Explanatory Variables</i>			
C	coefficient	-526.4573 ^C	-836.4823 ^B
	standard error	376.7076	412.9983
	t-statistic	-1.3975	-2.0254
	p-value	0.1898	0.0678
log(USGDPPC85)	coefficient	2.7411	2.8660
	standard error	3.7934	3.5703
	t-statistic	0.7226	0.8027
	p-value	0.4850	0.4391
log(RPX)	ADF-statistic	-3.3298 ^C	
	coefficient	-0.0088	0.0039
	standard error	0.0443	0.0415
	t-statistic	-0.1993	0.0947
log(GoodsX85)	p-value	0.8457	0.9263
	ADF-statistic		-2.2418
	coefficient	39.6245 ^C	64.2248 ^B
	standard error	28.5208	31.7814
log(GoodsX85)²	t-statistic	1.3893	2.0208
	p-value	0.1922	0.0683
	ADF-statistic		-2.0941
	coefficient	-0.7822 ^C	-1.2702 ^B
log(Tarriv)	standard error	0.5551	0.6241
	t-statistic	-1.4091	-2.0352
	p-value	0.1864	0.0667
	ADF-statistic		-2.0441
log(Barriv)	coefficient	1.1764 ^C	
	standard error	0.7242	
	t-statistic	1.6243	
	p-value	0.1326	
SS85	ADF-statistic	-2.9323	
	coefficient		1.1585 ^B
	standard error		0.5776
	t-statistic		2.0057
SS85	p-value		0.0701
	ADF-statistic		-3.1375
	coefficient	-0.0375	-0.0107
	standard error	0.1382	0.1340
SS85	t-statistic	-0.2713	-0.0800
	p-value	0.7912	0.9377
	ADF-statistic		-2.7891
R²		0.7668	0.7883
Adjusted R²		0.6395	0.6728
Standard Error of Regression		0.2489	0.2371
F-statistic		6.0270 ^A	6.8248 ^A
Durbin-Watson**		1.3603	1.5192
ADF-statistic of Residuals***		-3.9305 ^A	-3.6415 ^A
PP-statistic of Residuals****		-2.8201 ^A	-3.1162 ^A
n		18	18

Table 4. Continued

Notes					
A: Significance level of 1%					
B: Significance level of 5%					
C: Significance level of 10%					
* Augmented Dick-Fuller Tests of Unit Root (for Stationarity) with constant and trend, lagged one period					
MacKinnon critical values for rejection of hypothesis of a unit root:					
			1%	5%	10%
			-4.5743	-3.6920	-3.2856
** Durbin-Watson Statistic (for First-Order Serial Correlation)					
Significance points (Positive):			Significance points (Negative):		
	Imports	Exports		Imports	Exports
d_L	0.6030	0.5020	4 - d_L	3.3970	3.4980
d_U	2.2570	2.4610	4 - d_U	1.7430	1.5390
*** Augmented Dickey-Fuller (ADF) Tests of Unit Root (for Cointegration) without constant or trend, lagged one period					
MacKinnon critical values for rejection of hypothesis of a unit root:					
			1%	5%	10%
			-2.7275	-1.9642	-1.6269
**** Phillips-Perron (PP) Tests of Unit Root (for Cointegration) without constant or trend, lagged one period					
MacKinnon critical values for rejection of hypothesis of a unit root:					
			1%	5%	10%
			-2.7158	-1.9627	-1.6262

ADF and Phillips-Perron) are applied to the residual series of both regressions, we are reassured by the indication (again, less strong in the case of the Phillips-Perron statistic) that both residuals have a unit root, and hence both export regressions are cointegrated.

In summary, Philippine exports of services as a whole seem to be income-elastic but price-inelastic (the opposite result was found for Taiwan), though no statistical significance can be attached to this conclusion. Again, because of the weak result for relative price, the role of comparative advantage in this respect is not clear. Goods exports have a positive effect on services exports: if a large part of goods imports is reexported with the addition of value from the Philippines, and goods imports are not positively related to services imports while goods and services exports are positively related, then it could be reasonably concluded that what is demonstrated is that a significant portion of the value-added in the Philippines to the reexported good represents a services component. The precise nature of this relationship should be further explored, for it may be that increasing goods trade, which may call for further export-oriented policies and perhaps greater market liberalization, will have a positive impact on services balance, as the results of the demand function estimation indicate that services exports will increase and services imports will not.

A strong positive relationship between economic outlook and services exports is clearly demonstrated. It seems that if ever there was a panacea to be applied to the many economic challenges facing the country, this would be it. Improving the policy environment and establishing political and economic stability can only result in an enhanced foreign perception and outlook for the country, and this is clearly one of the most significant positive determinants of Philippine trade in services. Contrary to the case with imports, the significances of the variables, with the exception of relative price, improve with the use of business arrivals rather than total arrivals. The effects of many of the variables also increase. Stated another way, the number of businessmen traveling to the Philippines, as a proxy for foreign perception of Philippine policy and performance or as a direct impact in their own right as consumers of Philippine services (by way of the mode of consumption abroad), contributes to a good explanation of the historical behavior of Philippine services export trade. This cannot apply to the size of the aggregate domestic services sector, which, along with the imports results, demonstrates at best a very weak link with services trade.

Whether the importance of the role of travel as indicated here, should be better emphasized given prevailing efforts to promote Philippine services trade through information technology (which is intensive in physical capital) may be considered worthwhile.

One further insight that can be drawn from the results is that while both services imports and exports seem to be income-elastic and price-inelastic, exports seem to be *more* income-elastic and *less* price-inelastic than imports. Lack of statistical significance in these results notwithstanding, this may be part of the reason why for most of the period between 1982 and 2000, the balance of payments shows the Philippine services balance in surplus.

Conclusion

It should be reiterated that due to the small number of observations used in this analysis, caution should be brought to bear in the strength of the results and the insights flowing from them, especially since the presence of a high degree of multicollinearity is indicated. However, these results are similar to those of Hsueh et al. (2000), who faced no such constraints or problems. Where they differ can be reasonably explained by referring to readily apparent differences between the Philippines and Taiwan based on respect to economic structure, the nature of their trade, and their respective data.

Either way, it can be stated that demand theory and the variables we have used as possible determinants of services trade provide a promising starting point in the efforts to explain the patterns of Philippine services trade, and thereby give further support to the country's efforts to prosper in a globalizing world.

Appendix. Multicollinearity diagnostics

a) Pairwise correlations of explanatory variables

Regression (1)

	log(GDPPC85)	log(RPM)	log(GoodsM85)	log(GoodsM85) ²	log(TArriv)	SS85	FXR
log(GDPPC85)	1.00000	-0.04565	0.23736	0.23709	0.25343	-0.26758	0.09063
log(RPM)	-0.04565	1.00000	-0.31543	-0.31378	-0.35696	-0.35224	0.19369
log(GoodsM85)	0.23736	-0.31543	1.00000	0.99997	0.95074	0.80711	-0.60201
log(GoodsM85) ²	0.23709	-0.31378	0.99997	1.00000	0.95254	0.80756	-0.59892
log(TArriv)	0.25343	-0.35696	0.95074	0.95254	1.00000	0.78767	-0.47464
SS85	-0.26758	-0.35224	0.80711	0.80756	0.78767	1.00000	-0.56813
FXR	0.09063	0.19369	-0.60201	-0.59892	-0.47464	-0.56813	1.00000

Regression (2)

	log(GDPPC85)	log(RPM)	log(GoodsM85)	log(GoodsM85) ²	log(TArriv)	SS85	FXR
log(GDPPC85)	1.00000	-0.04565	0.23736	0.23709	0.31345	-0.26758	0.09063
log(RPM)	-0.04565	1.00000	-0.31543	-0.31378	-0.30923	-0.35224	0.19369
log(GoodsM85)	0.23736	-0.31543	1.00000	0.99997	0.92763	0.80711	-0.60201
log(GoodsM85) ²	0.23709	-0.31378	0.99997	1.00000	0.93004	0.80756	-0.59892
log(TArriv)	0.31345	-0.30923	0.92763	0.93004	1.00000	0.74916	-0.43608
SS85	-0.26758	-0.35224	0.80711	0.80756	0.74916	1.00000	-0.56813
FXR	0.09063	0.19369	-0.60201	-0.59892	-0.43608	-0.56813	1.00000

Regression (3)

	log(USGDPPC85)	log(RPX)	log(GoodsX85)	log(GoodsM85) ²	log(TArriv)	SS85
log(USGDPPC85)	1.00000	-0.04528	0.88864	0.88878	0.87563	0.97314
log(RPX)	-0.04528	1.00000	0.02885	0.02606	0.04512	-0.07696
log(GoodsM85)	0.88864	0.02885	1.00000	0.99998	0.97362	0.80904
log(GoodsM85) ²	0.88878	0.02606	0.99998	1.00000	0.97395	0.80898
log(TArriv)	0.87563	0.04512	0.97362	0.97395	1.00000	0.78767
SS85	0.97314	-0.07696	0.80904	0.80898	0.78767	1.00000

Regression (4)

	log(USGDPPC85)	log(RPX)	log(GoodsX85)	log(GoodsM85) ²	log(TArriv)	SS85
log(USGDPPC85)	1.00000	-0.04528	0.88864	0.88878	0.84570	0.97314
log(RPX)	-0.04528	1.00000	0.02885	0.02606	-0.02091	-0.07696
log(GoodsM85)	0.88864	0.02885	1.00000	0.99998	0.97086	0.80904
log(GoodsM85) ²	0.88878	0.02606	0.99998	1.00000	0.97179	0.80898
log(TArriv)	0.84570	-0.02091	0.97086	0.97179	1.00000	0.74916
SS85	0.97314	-0.07696	0.80904	0.80898	0.74916	1.00000

b) Auxiliary regressions for R_i^2 and F_i

i	Regression (1) auxiliary regressions	Value of R_i^2	Value of F_i	P-value of F_i
1	$\log(\text{GDPPC85}) = C + \log(\text{RPM}) + \log(\text{GoodsM85}) + \log(\text{GoodsM85})^2 + \log(\text{TArriv}) + \text{SS85} + \text{FXR}$	0.72538	4.84264 ^A	0.01178
2	$\log(\text{RPM}) = C + \log(\text{GDPPC85}) + \log(\text{GoodsM85}) + \log(\text{GoodsM85})^2 + \log(\text{TArriv}) + \text{SS85} + \text{FXR}$	0.40721	1.25936	0.34964
3	$\log(\text{GoodsM85}) = C + \log(\text{GDPPC85}) + \log(\text{RPM}) + \log(\text{GoodsM85})^2 + \log(\text{TArriv}) + \text{SS85} + \text{FXR}$	0.99998	94.572.64000 ^A	0.00000
4	$\log(\text{GoodsM85})^2 = C + \log(\text{GDPPC85}) + \log(\text{RPM}) + \log(\text{GoodsM85}) + \log(\text{TArriv}) + \text{SS85} + \text{FXR}$	0.99998	97.332.18191 ^A	0.00000
5	$\log(\text{TArriv}) = C + \log(\text{GDPPC85}) + \log(\text{RPM}) + \log(\text{GoodsM85}) + \log(\text{GoodsM85})^2 + \text{SS85} + \text{FXR}$	0.96981	58.89229 ^A	0.00000
6	$\text{SS85} = C + \log(\text{GDPPC85}) + \log(\text{RPM}) + \log(\text{GoodsM85}) + \log(\text{GoodsM85})^2 + \log(\text{TArriv}) + \text{FXR}$	0.89206	15.15194 ^A	0.00010
7	$\text{FXR} = C + \log(\text{GDPPC85}) + \log(\text{RPM}) + \log(\text{GoodsM85}) + \log(\text{GoodsM85})^2 + \log(\text{TArriv}) + \text{SS85}$	0.57730	2.50387 ^B	0.08890

i	Regression (2) auxiliary regressions	Value of R_i^2	Value of F_i	P-value of F_i
8	$\log(\text{GDPPC85}) = C + \log(\text{RPM}) + \log(\text{GoodsM85}) + \log(\text{GoodsM85})^2 + \log(\text{BArriv}) + \text{SS85} + \text{FXR}$	0.81975	8.33794 ^A	0.00142
9	$\log(\text{RPM}) = C + \log(\text{GDPPC85}) + \log(\text{GoodsM85}) + \log(\text{GoodsM85})^2 + \log(\text{BArriv}) + \text{SS85} + \text{FXR}$	0.34720	0.97506	0.48510
10	$\log(\text{GoodsM85}) = C + \log(\text{GDPPC85}) + \log(\text{RPM}) + \log(\text{GoodsM85})^2 + \log(\text{BArriv}) + \text{SS85} + \text{FXR}$	0.99999	163.494.21103 ^A	0.00000
11	$\log(\text{GoodsM85})^2 = C + \log(\text{GDPPC85}) + \log(\text{RPM}) + \log(\text{GoodsM85}) + \log(\text{BArriv}) + \text{SS85} + \text{FXR}$	0.99999	167.276.66302 ^A	0.00000
12	$\log(\text{BArriv}) = C + \log(\text{GDPPC85}) + \log(\text{RPM}) + \log(\text{GoodsM85}) + \log(\text{GoodsM85})^2 + \text{SS85} + \text{FXR}$	0.97581	73.94829 ^A	0.00000
13	$\text{SS85} = C + \log(\text{GDPPC85}) + \log(\text{RPM}) + \log(\text{GoodsM85}) + \log(\text{GoodsM85})^2 + \log(\text{BArriv}) + \text{FXR}$	0.90703	17.88575 ^A	0.00004
14	$\text{FXR} = C + \log(\text{GDPPC85}) + \log(\text{RPM}) + \log(\text{GoodsM85}) + \log(\text{GoodsM85})^2 + \log(\text{BArriv}) + \text{SS85}$	0.60230	2.77655 ^B	0.06774

i	Regression (3) auxiliary regressions	Value of R_i^2	Value of F_i	P-value of F_i
15	$\log(\text{USGDPPC85}) = C + \log(\text{RPX}) + \log(\text{GoodsX85}) + \log(\text{GoodsX85})^2 + \log(\text{Tarriv}) + \text{SS85}$	0.97929	113.48751 ^A	0.00000
16	$\log(\text{RPX}) = C + \log(\text{USGDPPC85}) + \log(\text{GoodsX85}) + \log(\text{GoodsX85})^2 + \log(\text{Tarriv}) + \text{SS85}$	0.25793	0.83421	0.54988
17	$\log(\text{GoodsX85}) = C + \log(\text{USGDPPC85}) + \log(\text{RPX}) + \log(\text{GoodsX85})^2 + \log(\text{Tarriv}) + \text{SS85}$	0.99997	80.638.07279 ^A	0.00000
18	$\log(\text{GoodsX85})^2 = C + \log(\text{USGDPPC85}) + \log(\text{RPX}) + \log(\text{GoodsX85}) + \log(\text{Tarriv}) + \text{SS85}$	0.99997	81.748.07271 ^A	0.00000
19	$\log(\text{Tarriv}) = C + \log(\text{USGDPPC85}) + \log(\text{RPX}) + \log(\text{GoodsX85}) + \log(\text{GoodsX85})^2 + \text{SS85}$	0.95593	52.05615 ^A	0.00000
20	$\text{SS85} = C + \log(\text{USGDPPC85}) + \log(\text{RPX}) + \log(\text{GoodsX85}) + \log(\text{GoodsX85})^2 + \log(\text{Tarriv})$	0.96603	68.24295 ^A	0.00000

i	Regression (4) auxiliary regressions	Value of R_i^2	Value of F_i	P-value of F_i
21	$\log(\text{USGDPPC85}) = C + \log(\text{RPX}) + \log(\text{GoodsX85}) + \log(\text{GoodsX85})^2 + \log(\text{BArriv}) + \text{SS85}$	0.97878	110.67883 ^A	0.00000
22	$\log(\text{RPX}) = C + \log(\text{USGDPPC85}) + \log(\text{GoodsX85}) + \log(\text{GoodsX85})^2 + \log(\text{BArriv}) + \text{SS85}$	0.23188	0.72453	0.61800
23	$\log(\text{GoodsX85}) = C + \log(\text{USGDPPC85}) + \log(\text{RPX}) + \log(\text{GoodsX85})^2 + \log(\text{BArriv}) + \text{SS85}$	0.99998	110.293.96099 ^A	0.00000
24	$\log(\text{GoodsX85})^2 = C + \log(\text{USGDPPC85}) + \log(\text{RPX}) + \log(\text{GoodsX85}) + \log(\text{BArriv}) + \text{SS85}$	0.99998	113.810.93841 ^A	0.00000
25	$\log(\text{BArriv}) = C + \log(\text{USGDPPC85}) + \log(\text{RPX}) + \log(\text{GoodsX85}) + \log(\text{GoodsX85})^2 + \text{SS85}$	0.96923	75.59125 ^A	0.00000
26	$\text{SS85} = C + \log(\text{USGDPPC85}) + \log(\text{RPX}) + \log(\text{GoodsX85}) + \log(\text{GoodsX85})^2 + \log(\text{BArriv})$	0.96717	70.70644 ^A	0.00000

Notes:

A: Significance level of 1%

B: Significance level of 5%

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