THE PROVISION OF SERVICES TO BUNKER CALLERS IN THE PORT OF DURBAN – A SURVEY OF THE ECONOMIC IMPACT ON THE DURBAN METROPOLITAN ECONOMY

Trevor Jones
Centre for Maritime Economics & Law
University of KwaZulu-Natal
Howard College Campus
Durban
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1 Introduction and context

In addition to its principal focus as a major, diversified cargo-handling port, the port of Durban has, virtually throughout its history, fulfilled a strategic function as one of the pivotal bunkering ports in the southern hemisphere. A number of accidents of history have conspired to sustain this role for well over a century. The first accident, which was of central importance in the late-19th and early-20th centuries, was the ready availability of coal from the coalfields of northern KwaZulu-Natal. Since coal was the dominant maritime fuel source at the time, Durban was quick to establish facilities to supply coal bunkers to the international maritime industry from the 1880s.

The second factor is Durban's strategic location on the south-eastern seaboard of the African continent. This has made the port readily accessible to vessels passing on east-west trade routes, as well to ships bound for the terminal facilities of the port itself. This allowed Durban port to retain its bunker-supply status when oil superseded coal as the premier maritime fuel source from the 1930s. This ability to cater to the needs of transit vessels was to be exploited to the full during two periods during the second half of the 20th century when the Suez Canal was closed to shipping: during the Suez "crisis" of 1956-57 and during the more protracted closure of the canal from 1967 to 1975. During this eight-year period, the South African ports handled a total of some 24,000 transit callers, and Durban routinely serviced the needs of 180-200 Suez "diverts" per month[1]. The re-opening of the canal obviously witnessed a fall-off in transit callers, but by no means heralded the end of this bunker-supply activity. By the mid-1990s, Durban was still servicing some 100 bunkers per month[2], and an ability to provide services to vessels calling solely for the purposes of taking on bunker fuel and stores remains a significant dimension of the port's activities to the present day.

Durban port's sustained propensity to service bunker callers is reinforced by a third accident of history and economics. This is found in the structure of demand and supply in the domestic petroleum industry in general and in the extensive Durban-based oil-refining industry in particular. As part of the refining or fractionating process, this industry regularly produces an excess supply of the heavier fractions of petroleum products that cannot easily be absorbed into the local industrial economy, but which are eminently suitable for the marine fuel needs of the maritime transport industry. A trade in ships' bunkers consequently offers the industry a ready vent for surplus for a basically redundant domestic commodity. This domestic demand/supply skewness possibly also accounts for the fact that Durban ranks among the world's cheaper sources of bunker fuels, offering heavy marine fuel oil (MFO) to vessels at prices comparable to those associated with such dominant maritime (and in the latter case also oil-refining) centres such as Singapore and Rotterdam, and at prices generally well below those ruling in other African, South American, Mediterranean, Australasian and Far Eastern ports[3].

Despite this combination of virtuous influences, and despite Durban's long history as a bunker-supply location, numbers of bunker callers have shrunk over the last decade, and so has the volume of locally-based economic activity associated with this category of port traffic. It is not the particular purpose of this report to analyse the specific

[1] Numbers of transit callers attributed to the canal closure were enumerated as a separate category of port callers in the various Annual Reports of the former South African Railways & Harbours Administration over this period.

[2] Jones, T: *The Port of Durban and the Durban Metropolitan Economy*, University of Natal, 1997, pp, 42-43.

[3] See, for reference, the regular presentation of bunker prices in publications such as *Fairplay*. As an example, in the issue of 21 October 2004, only four of the 38 global bunker supply centres enumerated (Rotterdam, Antwerp, Hamburg and Aden) supplied MFO at a price lower than the Durban price.

reasons for this decline, although contributing factors may include recent appreciation of the South African Rand, which has little impact on dollar-based bunker costs, but which does impact on the cost of Rand-denominated port services demanded by bunker callers; a shrinking residual of berths in the port of Durban available for bunker callers, notably larger callers; periodic bouts of congestion in the port, which impact negatively on the timeous delivery of pilots, tugs and other marine services; and the recent removal of certain tariff incentives previously directed at the particular category of transit callers.

Rather, the purpose of this study is to attempt to understand and quantify some of the economic benefits to the Durban metropolitan economy that may be associated with the servicing of bunker callers in the port of Durban. At its most basic, this report seeks to throw some light on a set of two very simple and related questions: when bunker callers are serviced in the port of Durban, what economic activity is energised as consequence, which economic actors gain and how much do they gain; or, conversely, if bunker traffic is diverted away from Durban to other ports, what economic activity is lost, who are the losers, and how much are they likely to lose?

Section two, below, will set out recent trends in numbers of port callers utilising Durban over the 1996-2004 period, as well as a somewhat shorter-term view of patterns of bunker supply over the period from 2001 to mid-2005. Section three will make some remarks about economic activity in what may broadly be termed the port-ancillary sector, and will set out the particular methodology that will be used to assess levels of expenditure associated with Durban's bunker traffic. Section four will present the results of a survey of expenditure patterns associated with bunker callers to the port of Durban over the 2004-5 period, and finally Section five will offer some brief concluding comments concerning the value of this bunker-supply business to the wider Durban-based economic community.

2 Recent patterns in vessel activity and bunker supply in Durban port

The changing pattern of vessel arrivals, disaggregated by broad vessel type, in the port of Durban over the 1996-2004 period is shown in Table 1 and Figure 1, below. The total number of ocean-going vessels calling at the port fell by some 10 percent, from 4393 callers of all major types (excluding local trawlers and small non-commercial vessels) in 1996 to 3937 vessels by 2004. This decrease is not indicative of a port that is less active in a cargo-handling sense, as average vessel size, measured by gross registered tonnage (grt) per piloted vessel movement in the port rose from 15,399 grt to 18,778 grt over the same period[4]. Within the major vessel types, numbers of container/unitised vessels increased – albeit unevenly – from 1996 to peak nominally in 2002, and are then shown as falling over the last two years, although this is likely to be explained by the separate classification of pure car carriers by the NPA after 2003. In this exercise, these vessels (which accounted for over 200 calls in 2004) have been included in the rising "other" category. The category of general cargo vessels exhibits the greatest overall stability in numbers, while numbers of both bulk carriers and tankers have recorded significant variability about falling trends.

The category that forms the principal focus of this study is that of bunker callers, and here quite significant overall decreases in vessel numbers are shown, from 991 calls (or on average some 2.7 vessels per day) in 1996 to 601 calls (or on average approximately 1.6 vessels per day) in 2004. Of particular note is the more recent steady decline in bunker traffic from 762 vessels in 2001. to 704 in 2002, further to 639 on 2003 and to 601 in 2004. This represents an overall decrease of some 40 percent in numbers of

[4] Based on data supplied by the NPA in August 2005.

vessel callers over the eight-year period shown. This decline in bunker callers alone is shown graphically in Figure 2, below.

Table 1 Vessel arrivals in the port of Durban, by vessel type, 1996-2004

Year	Container Unitised Ro-Ro	Bulk carriers	Tankers	General cargo vessels	Bunker callers	Other vessel callers[1]	TOTAL
1996	1293	546	518	824	991	221	4393
1997	1240	505	418	802	984	363	4312
1998	1400	456	441	925	679	261	4162
1999	1417	411	386	772	757	320	4063
2000	1377	394	424	813	711	268	3987
2001	1390	371	446	820	762	299	4088
2002	1513	458	416	789	704	281	4161
2003	1288	384	454	748	639	569[1]	4016
2004	1254	281	390	837	601	574[1]	3937

Source: National Ports Authority, Port of Durban, August 2005

Note

1 The categories of vessel callers identified by the NPA for data purposes change somewhat before and after 2003. In 2003 and 2004, separate sub-categories of passenger vessels, reefers and (growing numbers of) pure car carriers are enumerated. In this table, these vessel types have been subsumed within the broad residual category of "other vessel callers". This further product differentiation after 2003 almost certainly is responsible for the virtual doubling of numbers in this category, as reefers were likely to have been enumerated previously as general cargo ships, while car carriers probably were classified in the container/unitised/ro-ro category. Reported decreases in numbers of the latter from 2003 should therefore be treated with caution.

Figure 1: Vessel Arrivals in the Port of Durban, by vessel type, 1996-2004

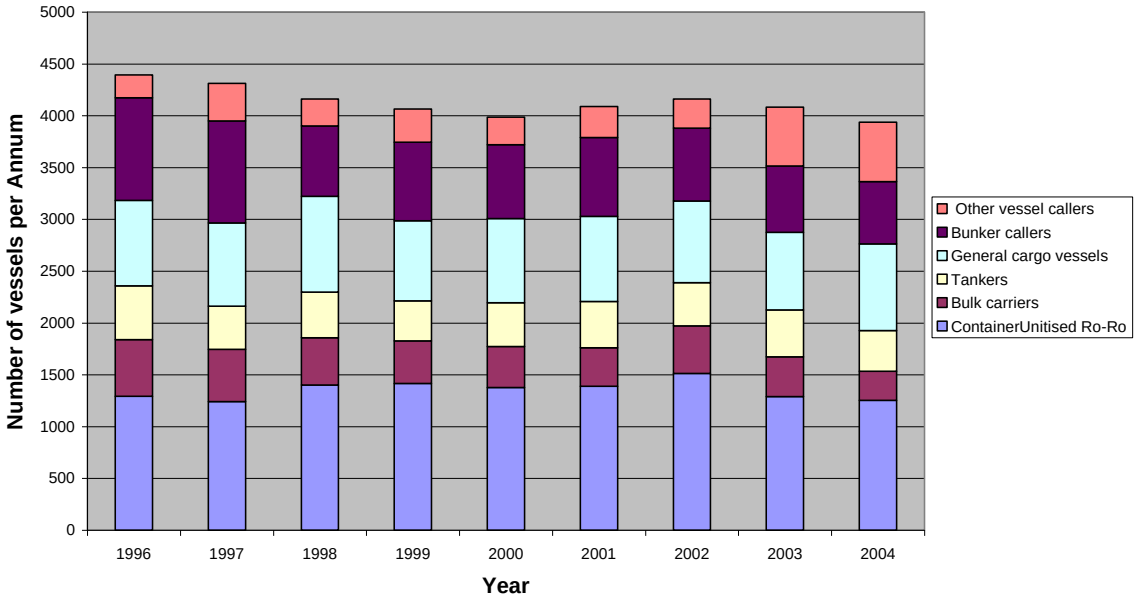
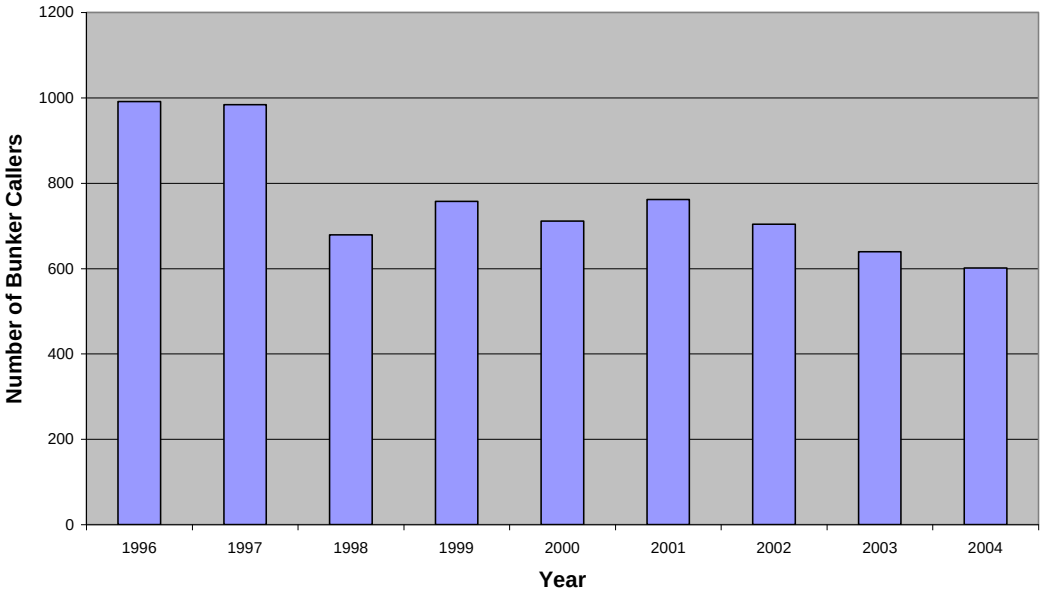


Figure 2: Bunker Callers in the Port of Durban, 1996-2004



Source: National Ports Authority, August 2005

Aggregate volumes of bunkers supplied by the Durban-based petroleum industry to all port callers over the rather shorter-term 2001-2005 period exhibit greater overall stability that is more in line with the behaviour of overall vessel arrivals, and indeed with volumes of cargo handled, although the latter lie outside the scope of this study. Overall volumes of ships' bunkers delivered by the joint bunkering service (JBS) mounted by the oil majors through the local SAPREF and ENGEN oil refineries have fluctuated in a narrow band from 2.03 million tonnes of all grades in 2001, rising marginally to 2.11 million tonnes in 2002, and then dropping slightly to 1.98 million tonnes in 2003 and further to 1.91 million tonnes in 2004. During the first seven months of 2005, a total of 1.17 million tonnes was delivered by the JBS to all categories of port callers. If this delivery rate is maintained for the remainder of the current year, annual deliveries will again rise marginally to fractionally over 2 million tonnes.

Three principal grades of bunker fuel are supplied: some 92 percent of aggregate volume comprises heavy marine fuel oil (MFO) used for the main propulsion machinery of most modern vessels, while the small residual is shared between marine diesel fuel (MDF), utilised principally for vessels' auxiliary machinery, and bunker gas oil (BGO), a lighter or more refined distillate that is used for the main engines of certain vessels. Bunker supply is effected by quayside pipeline in the container terminal (MFO only), at Pier One (MFO and MDF but not gas oil), and at the Island View berths (all grades, but gas oil delivery is limited to certain berths). In addition, bunkers are supplied to vessels by bunker barges in port segments not equipped with quayside pipeline systems (this includes all of the Point/City Terminal berths, Maydon Wharf, the Bayhead repair berths, and the four berths at the Bluff coal terminal), and to vessels requiring particular grades of fuel that cannot be supplied by pipeline, in line with the pipeline delivery limitations outlined above. The proportion of overall delivery effected by barge has been rising over recent years[5], and this trend is likely to continue. A greater reliance on bunker barges is in line with international port practices, notably in the major European ports,

[5] The percentage of overall product delivered by barge rose from 22.4 percent in 2001 to some 28 percent by 2003 and 2004, and then rose more abruptly to reach 41.7 percent of aggregate volumes of all grades delivered over the January-July 2005 period.

particularly in container terminals where shoreside pipeline connections to vessels with high freeboard is undesirable fore reasons of both safety and for unencumbered cargo handling. Any future berth provision in the port of Durban is unlikely to include a pipeline infrastructure for bunker supply, and in certain berths the existing infrastructure is no longer used.

It must be stressed that the above discussion relates to the supply of bunkers to all categories of vessel callers to the port of Durban, and not only to vessels that are calling specifically for the purpose of taking on bunkers and stores. It is the latter category that is the focus of this report, hence data relating to genuine transit callers must be extracted from the bunker supply aggregates presented by the JBS. This process of extraction is not an easy one, as the supplying companies draw no distinction between working ships and transit callers: both are simply customers purchasing standard products. This study has attempted to disaggregate the consolidated bunker data by seeking to identify the purpose of vessels' calls, using a mix of marine activity reports, schedules supplied by the berth planning division of the port, forward schedules of cargo-working vessels (the so-called "bar charts" supplied regularly by the NPA) and various liner schedules[6]. This labour-intensive exercise was applied to the full set of vessels taking all forms of ships' bunkers in 2004 and over the January-July 2005 period, and resulted in the identification of 593 "genuine" bunker callers in 2004 (out of the 601 indicated in a consolidated fashion by the NPA) and a further 382 transit callers[7] during the first seven months of 2005.

The pattern of bunker supply to these vessels differs markedly from the aggregated delivery pattern of port-wide bunkers. A detailed breakdown of patterns of delivery was attempted for the January-July 2005 period, the results of which are summarised in Table 2, below.

Table 2 Patterns of bunker fuel delivery to all bunker customers and to "genuine" bunker callers in the port of Durban, 1 January to 2 August 2005 (all magnitudes in tonnes[1])

Supply points/ Port sector	All bunker-using vessels						"Genuine" bunker callers					
	MFO	%	MDF + BGO	%	Total	%	MFO	%	MDF BGO	%	Total	%
Barges	420436	39.0	70579	70.5	491015	41.7	15072	6.5	6741	26.5	21813	8.5
Island View	275583	25.6	23666	23.6	299249	25.4	164226	71.2	15196	56.7	179422	70.0
Container Terminal	299635	27.9	-	-	299635	25.4	-	-		-	-	-
New Pier	82697	7.6	5867	5.9	88564	7.5	51385	22.3	3520	12.8	54905	21.5
TOTAL	1078351	100	100112	100	1178463	100	230683	100	25457	100	256140	100

[6] The website www.ports.co.za, maintained locally by an independent transport journalist, proved to be an excellent additional source of data on working vessels, and was used extensively to complement NPA sources.

[7] The boundaries of this category of "genuine" bunker or transit callers are difficult to pin down precisely. Such vessels are understood here to be vessels calling purely for fuel or stores, not for cargo-working purposes, for passenger transfers or to effect long-term repairs. Local and foreign fishing vessels and freezer trawlers have been excluded, but salvage tugs have been included in the bunker vessel set.

Source: SAPREF, Engen and JBS, August 2005

Note

1 Tonnes enumerated exclude local deliveries of product from Island View to NPA harbour craft and the bunker barges, in the latter case to avoid double counting of product subsequently delivered to vessels.

As indicated in Table 2 "genuine" bunker callers took a total of 256 140 tonnes of ships' bunkers across all three grades, or some 24 percent of port-wide delivery, but this category of callers was heavily reliant on the Island View port sector (where 70 percent of the supply to transit callers was delivered, as opposed to 25 percent to all bunker-using vessels); these callers made somewhat more intensive use of the few berths at New Pier that are utilised for bunker ships; and they made relatively minimal demands on the bunker barges, other than for deliveries of marine diesel and gas oil (only 8.5 percent of barge deliveries, as opposed to 41.7 percent to the full gamut of bunker-using vessels). This pattern of berth use by bunker callers makes these vessels vulnerable to the demands of working vessels in the port, as berths in the Island View port sector (other than IV 1 and IV 9) are in heavy if variable demand by product and chemical tankers, while the priority users of New Pier are geared container vessels and multi-purpose vessels. This latter port sector is earmarked for reconfiguration into a full container terminal in the near future, hence spare capacity for non-cargo-working vessels is unlikely increase.

The information summarised in Table 2, as well as the similar identification of the 2004 set of bunker callers, can also be used to establish the bunkering needs of an average or standard transit caller to the port of Durban. In the first seven months of 2005 (sample size 382 vessels), the average bunker stem was 603.8 tonnes of MFO, 35 tonnes of MDF and 31.7 tonnes of gasoil. This compares closely with supply activity over the full calendar year of 2004 (based on capture of details of 593 bunker vessels), when average bunker delivery amounted to 608.1 tonnes of MFO, 31 tonnes of MDF and 23 tonnes of gasoil. Similar magnitudes will be used as a basis for the expenditure on bunker fuels by typical transit callers in Section 4, below.

3 Port-related economic activity and research methodology

When vessels call at a port, economic activity in the host economy is energised at a number of levels in a myriad of industries. Some of these economic activities, which are referred to here as port-ancillary activities, owe their existence directly to the presence of the port, and in its absence would simply not exist. These would include the complex set of functions performed by a port authority itself, ships' agency business, ship repair activity, the services of ship suppliers and chandlers, terminal operators and port warehousemen, stevedores, road hauliers and rail service providers distributing seaborne freight flows, (most of) the activities of the clearing & forwarding industry, bunker suppliers and the services of professional specialists such as ships' surveyors, marine pilots (if supplied outside the port authority) and the like. Other activities, which are referred to here as port-dependent activities, are intimately, but less directly related to a port. Principal among these would be the activities of cargo owners (users of imports and generators of exports) who locate in the host economy wholly or partly because of the proximity of a working port, cargo logistics companies, providers of inputs and services to the direct port-ancillary industries, medical practitioners, transporters of seafarers, banks and financial service providers, travel agents and cruise operators, laundrymen, clubs and other entertainment providers, taxi drivers and call girls.

Not all vessels generate the same economic activities. Cargo-working vessels shipping or landing general cargo drawn from or destined for locally-based cargo owners almost certainly create the richest economic linkages; transhipment cargo as opposed to national cargo is considerably less linkage-rich; homogeneous bulk cargoes generate less related activities than general or breakbulk cargoes, and vessels calling for reasons of *force majeure* may impact little on cargo-related downstream activities, but could provide major injections for the ship-repair fraternity.

Once again, the principal focus of this exercise is to understand and quantify the port-ancillary and port-dependent economic activities generated in a host port community as a result of bunker callers. Although this category of port callers has no impact on cargo-related services, these vessels inject expenditure into a daisy chain of port-related service providers and industries. Such callers:

- Require safe navigation off-shore and in port approaches
- Utilise the marine infrastructure of the port, such as water depth in port fairways and channels, turning basins and quaywalls
- Use the services of marine pilots
- Require the assistance harbour tugs when arriving and sailing
- Use mooring gangs and berthing services when coming alongside or leaving the quay
- May require supplies of fresh water
- May require security services, including fire protection services
- Require port agents and use the professional services of the ships agency industry
- Take ships bunkers of various grades
- Take stores, victuals and supplies from ship chandlers
- May require laundry and other cleaning services
- May require local transport, longer-haul travel arrangements and accommodation for seafarers
- May require medical services
- Require money, with associated bank, finance and security services
- May need repairs
- May require professional services from ships surveyors
- May require maritime legal services
- May make use of various local entertainment services, in the both the formal and informal services

In all these activities employment opportunities in the local economy are created and cycles of expenditure are initiated. A 1994/95 study of the impact of the activities of the port of Durban on metropolitan economy estimated the number of full-time annual jobs associated with the direct port-ancillary sector to be between 25,000 and 28,000, with another 7-8,000 jobs generated in less directly port-related areas[8]. Re-estimating port-related employment in 2005 would be a major research undertaking, and then extracting the employment impacts of just one category of callers – in this case bunker vessels – would present intractable difficulties. Consequently, this study has not attempted any estimation of bunker-related employment levels.

Estimates of expenditure flows associated bunker callers are, however, more readily made, and are also more useful in the context of dynamic changes in port activity. With sufficient information relating to the spending patterns of typical bunker callers, it is possible to address a question such as: what are the spending gains in the Durban-

[8] Jones T, *op cit*, pp 30-54.

based economy that arise if the port attracts additional callers? Conversely, the expenditure losses resulting from a drop in transit traffic could also be estimated.

That is in essence what this research initiative attempts to do. A substantial sample of disbursement accounts provided by a number of ships' agents was scrutinised to provide a database of spending on various port functions and marine services provided by the NPA, as well expenditure captured by ships' agents themselves, crew transport costs, medical costs, various communications costs not subsumed within other categories, bank and finance charges and the like. In addition, very detailed data on all bunkers deliveries to all bunker-using vessels over a three-year period was provided by the oil majors and, as noted was unpacked to separate out the discrete category of pure bunker callers. Several important categories of vessel expenditure are not captured from these sources. Paramount among these is the category of spending on victuals, deck, engine and other stores supplied by the local ship chandlers. In a very few cases, some chandling activities were reflected in the ships' agents disbursement accounts, but for the most part ship owners or professional ship managers negotiate directly with the chandlers, hence a separate approach was made to the chandlers to attempt to determine the typical spending patterns of bunker callers. A final local industry grouping that deals directly with ship owners or managers, and not through ships' agents, is the ship-repair industry. Here the category of pure bunker callers is not a major source of business, particularly as hot work cannot be conducted while vessels are taking bunkers, but occasional transit callers require significant repair work. The ship repairers draw no distinction between transit and terminal-port callers and this, together with the infrequency of significant transit-related repair work, made any precise estimates of repair expenditure by a "standard" vessel elusive. These strictures accepted, what this study attempts to do is to construct a profile of local expenditure on the part of just such a typical or "standard" bunker caller.

These detailed spending profiles are set out in Section 4, below, but before these are discussed, a further important conceptual dimension of local spending and its consequences must be understood. That is that spending that is injected into a local economy, in this case in a direct and obvious fashion via bursts of spending from vessels that enter the local community from abroad, does not impact on the local community in a one-off fashion. Instead, the direct spending by the vessel itself represents immediate, first-round spending only, while this first-round spending sets off cycles of re-spending that reverberate in the area in question. This phenomenon is referred to as the multiplier effect of a new spending injection. The basic sense of the multiplier process is easily understood through a simple example, such as payment that a bunker vessel makes to a ship chandler for various items of ships' stores. Some of this expenditure is absorbed by the wages and salaries of the employees in the ship chandling enterprise, some represents profit, and some (in this case a significant portion) would be absorbed by purchases of consumer goods from local butchers, grocers, wholesalers, specialist suppliers and the like. Some of the purchases would be effected from other South African enterprises outside the Durban area and some would be imports held in bond and subsequently supplied to the vessels concerned. First-round expenditures of this nature therefore represent streams of income to various recipients, who in turn spend a portion of that income or save a portion, while some expenditure flows haemorrhage away from the local Durban economy in the form of transfers to other national centres or in the form of imports. In this way, any new injection into the circular flow of economic activity has a multiplied impact on final income and output. The size of the local-community multiplier is determined by the consumption propensity of wage earners, the tax leakage factor, and the extent to which expenditure leaks out of the Durban area. Algebraically, the local spending multiplier can be expressed as:

$$\text{Local-economy multiplier} = \frac{1}{1 - c(1 - t)r}$$

where c = marginal to consume (MPC) on the part of wage and salary recipients,
r = proportion of re-spending contained within the Durban area; and
t = average taxation rate faced by port-related salary earners[9].

Some analysis of plausible values for c, r and t was conducted in the 1994/95 study of the port of Durban and the Durban metropolitan economy, to yield an overall local spending multiplier of between 1.9 and 2.4. Similar values (though tending towards the lower end of the Durban range) emerged from a study of the local-economy impacts of the activities of the port of Brisbane[10], using a rather different methodology based on input-output analysis of successive layers of port-related activity, while results emanating from an expenditure-based study of the port of Oakland in California[11] yielded comparable values. Based on all these previous studies, a local-economy multiplier of approximately 1.9 appears to be reasonable if somewhat conservative. This suggests that an initial spending injection of, say, R10 million stemming from various payments from vessels calling at the port, would raise final income or output in the Durban area by R19 million.

4 The spending patterns of bunker callers to the port of Durban – survey results

Using the approach outlined in Section 3, the results obtained from the capture of data from the ships' agents disbursement accounts of 110 vessels calling at the port in late-2004 and during the first seven months of 2005; the detailed bunker records of 593 bunker ships using the port in 2004 and 382 calling during the first seven months of 2005; and more generic estimates of typical spending on chandling services, were used to construct a spending profile for a typical bunker caller in the port of Durban. The results are presented in Tables 3 and 4 and Figures 3 and 4, below.

Total spending on all categories of goods and services is shown in Table 3 and Figure 3, which indicate that total expenditure per standard bunker call amounted to some R1.28 million at 2005 prices, tariff levels and exchange rates. It is immediately clear that the lion's share (approximately 88 percent) of this outlay is on bunker fuels supplied by the local oil refineries. This is based on a robust estimate (based on over 950 observations) of patterns of bunker demand by transit callers in 2004 and 2005, of 600 tonnes of marine fuel oil at $240 per tonne, plus 33 tonnes of marine diesel at $420 per tonne, plus 30 tonnes of bunker gas oil at $439 per tonne, all at an assumed exchange rate of $1 = R6-40. It is consequently the local oil industry that emerges, by some considerable margin, as the greatest revenue-earning beneficiary of the port's pure bunker traffic. Indeed, so overwhelming is the expenditure dominance of the single category of ships' bunkers, that all other discrete categories of spending are relegated to quite small *relative* proportions in any consolidated expenditure profile. Some of these other items are, however, in themselves substantial *absolute* magnitudes, and to highlight these more clearly, Table 4 and Figure 4, below, present a spending profile for the same typical caller, but excluding payments for ships' bunkers.

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[9] Port-related wage recipients are generally in low to medium income brackets, hence a reasonably high MPC of approximately 0.85 and an average tax rate of 17 per cent is assumed. It is further estimated, in line with the findings 1994/95 Durban port study, that 60-70 per cent of re-spending is retained within the Durban area. These yield multiplier values of 1.7-2.3.

[10] Morison J B & Jensen R C, *The Economic Impact of the Port of Brisbane*, University of Queensland, 1987.

[11] Martin Associates, *The Local and Regional Economic Impacts of Maritime Activity at the port of Oakland*, 1995.

Table 3 Major categories of expenditure, including bunkers & fuel purchases, by typical bunker callers to the port of Durban: January-July 2005

Item/service	Expenditure R	% total
Port dues	7 569	0.6
Light dues	7 600	0.6
SAMSA levy	3 699	0.3
Vessel Tracking (VTS) charges	4 509	0.4
Pilotage	13 977	1.1
Tugs & towage	30 378	2.4
Other NPA marine services[1]	5 766	0.4
(Total NPA/DoT)	***(73 498)***	***(5.8)***
Ships agency fees	10 040	0.8
Crew transfers	2 148	0.2
Medical	536	-
Communications expenses[2]	2 110	0.2
Miscellaneous vessel husbandry[3]	934	0.1
Banking & finance[4]	415	-
Ship chandlers	56 250	4.4
Ship repairs[5]	Not quantifiable	
Bunkers & fuel[6]	1 133 382	88.5
(Total Private Port Ancillary)	***(1 205 815)***	***(94.2)***
Total Expenditure	**1 279 313**	**100.0**

Notes

1 Other marine services provided by the NPA include berth service charges, running of ships' lines when coming alongside, refuse removal, fire protection services in the case of tankers and vessels transporting flammable cargoes and the supply of fresh water.

2 Communications expenses cover fax, e-mail, telex, telephone, photocopy and particularly documentation courier services that are not included in ships agency fees.

3 Miscellaneous vessel and port services encompass a myriad of activities that include various security and search activities (notably when the presence of stowaways is suspected), laundry services (seldom provided to short-term transit callers), diving services when not included in ship-repair activities, the work of surveyors and the provision of nautical charts.

4 Bank charges are generally associated with the provision of cash to shipmasters. The charges reflected here are purely bank service charges associated with these transfers, not the transfers themselves, even though certain of the latter do find their back into the circular flow of local expenditure through spending by seafarers.

5 See discussion on the ship repair industry.

6 Payments for bunker fuels are based on 2004/5 average deliveries of 600 tonnes of MFO, 33 tonnes of MDF and 30 tonnes of BGO per vessel, at weighted average 2005 fuel prices of $240/tonne of MFO, $420/tonne of MDF and $430/tonne of BGO.

Figure 3: Major Categories of Expenditure, including bunkers & fuel purchases, by bunker callers to the Port of Durban, January-July 2005

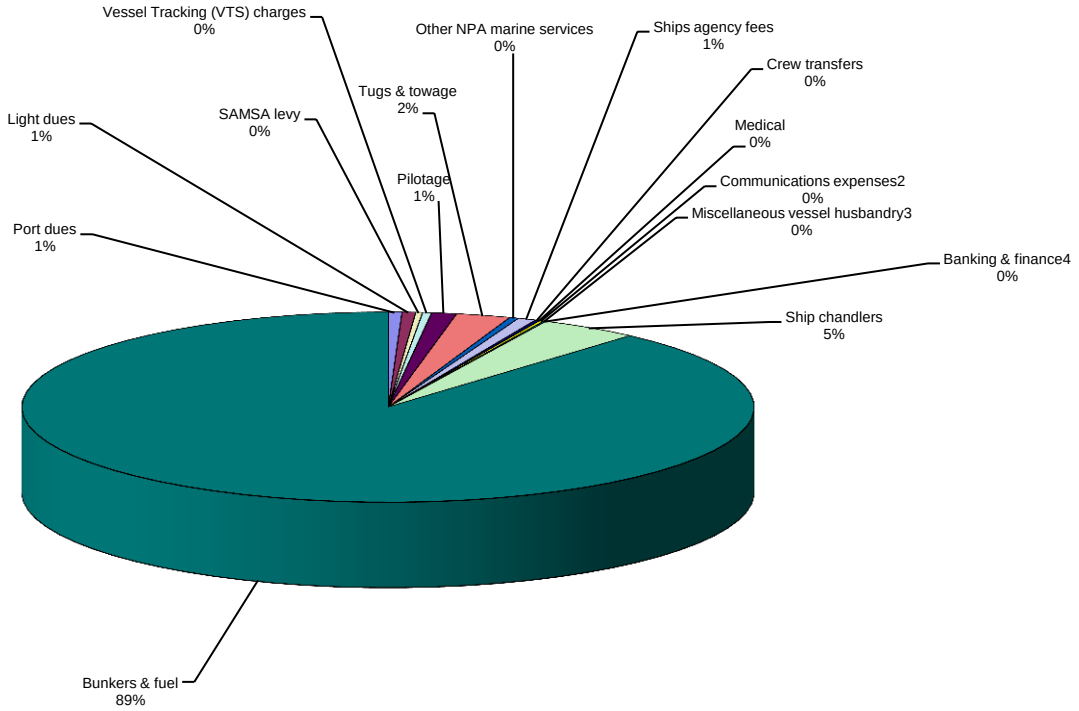


Table 4 Major categories of expenditure, excluding bunkers & fuel purchases, by typical bunker callers to the port of Durban: January-July 2005

Item/service	Expenditure R	% total
Port dues	7 569	5.2
Light dues	7 600	5.2
SAMSA levy	3 699	2.5
Vessel Tracking (VTS) charges	4 509	3.1
Pilotage	13 977	9.6
Tugs & towage	30 378	20.8
Other NPA marine services[1]	5 766	4.0
(Total NPA/DoT)	***(73 498)***	***(50.4)***
Ships agency fees	10 040	6.9
Crew transfers	2 148	1.5
Medical	536	0.4
Communications expenses[2]	2 110	1.4
Miscellaneous vessel husbandry[3]	934	0.6
Banking & finance[4]	415	0.3
Ship chandlers	56 250	38.5
Ship repairs[5]	Not quantifiable	
(Total Private Port Ancillary)	***(72 433)***	***(49.6)***
Total Expenditure	**145 931**	**100.0**

Notes

1 Other marine services provided by the NPA include berth service charges, running of ships' lines when coming alongside, refuse removal, fire protection services in the case of tankers and vessels transporting flammable cargoes and the supply of fresh water.

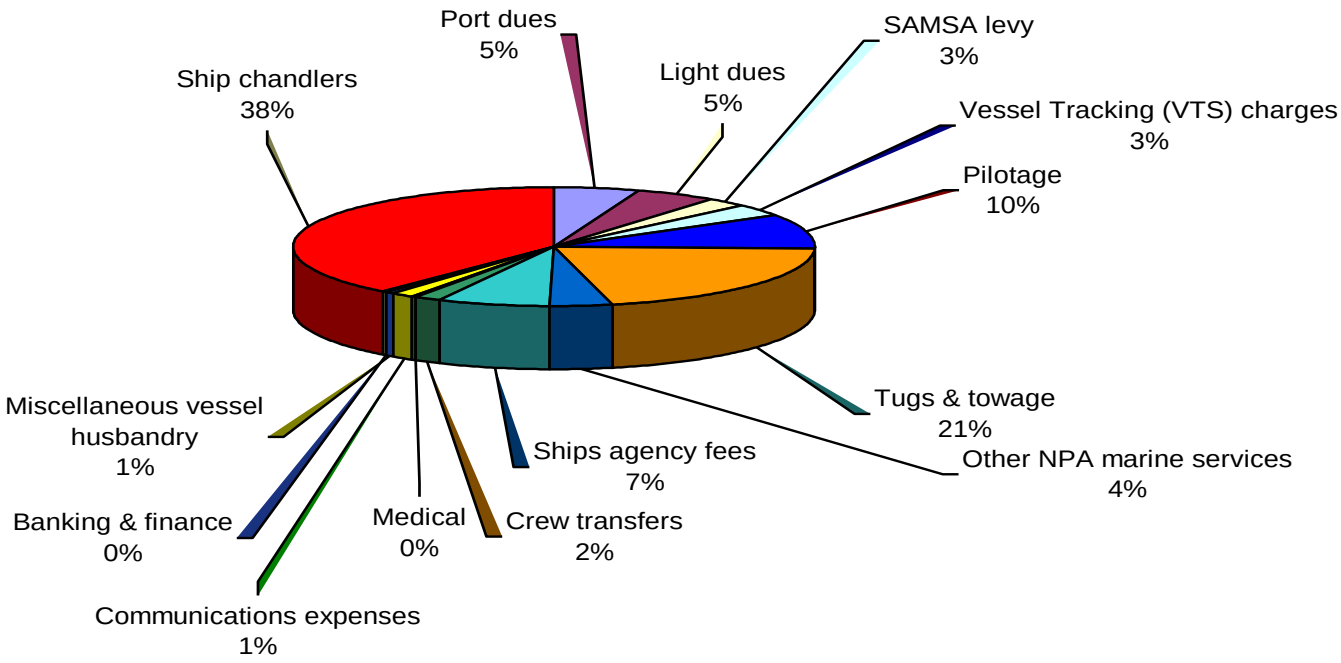
2 Communications expenses cover fax, e-mail, telex, telephone, photocopy and particularly documentation courier services that are not included in ships agency fees.

3 Miscellaneous vessel and port services encompass a myriad of activities that include various security and search activities (notably when the presence of stowaways is suspected), laundry services (seldom provided to short-term transit callers), diving services when not included in ship-repair activities, the work of surveyors and the provision of nautical charts.

4 Bank charges are generally associated with the provision of cash to shipmasters. The charges reflected here are purely bank service charges associated with these transfers, not the transfers themselves, even though certain of the latter do find their back into the circular flow of local expenditure through spending by seafarers.

5 See discussion on the ship repair industry.

Figure 4: Major Categories of Expenditure, including bunkers & fuel purchases, by typical bunker callers, January-July 2005



In this exercise, the other principal spending beneficiaries can be seen more clearly. The second major revenue recipient is the National Ports Authority, in respect of which payments for various infrastructural attributes (such as port dues as charges for the marine infrastructure) and for more discrete services (such as pilotage, tug services and berthing gangs) amount to very roughly R70,000 per vessel call, with another R3,700 finding its way into the coffers of the Department of Transport, by way of the compulsory levy imposed by the South African Maritime Safety Authority (SAMSA). Within the gamut of NPA charges, two items – payments for pilotage and for tugs and towage services – dominate. Tugs charges emerge as the single largest NPA-related expenditure item, at approximately R30,000 per call, with pilot charges standing at some R14,000, such that these two service items account for over 60 percent of all NPA-related expenditure.

In the private port-ancillary sector, two revenue recipients of note are the ship chandlers supplying transit callers with various categories of ships' stores, and the ships' agents, who conduct the requisite port husbandry on behalf of ship owners. Bunker callers are a particularly important source of business for the chandlers, whose own estimates indicate that expenditure per typical call amounts to some R56,000, or approximately 40 percent of total non-fuel expenditure. This industry is also significant in terms of local spending linkages, despite an increasing proportion of imports (estimated to be approaching 50 percent in value terms) in the range of products delivered. The international ship supply industry is also a highly competitive one, with ship owners or managers able to source supplies on a cost-minimising basis across a vessel's consolidated voyage. In this regard, an appreciating South African Rand has affected the competitiveness of local suppliers in a negative way, particularly in comparison with ship suppliers in Singapore and the Middle East, but industry representatives indicated that South Africa remains attractive as a ship supply base in comparison with South American ports, other African ports and Australasia. Since the South American and West African routes are a particular source of transit callers, the bunker vessels plying these trades remain a potentially lucrative source of business.

Ships' agents play a pivotal role in articulating the port husbandry associated with vessel calls by all categories of ships to the port of Durban. Their activities are also of a personnel-, service- and paper-intensive nature, and can therefore also readily be associated with strong local multiplier/linkage influences. Given the pivotal nature of their activities, agency fees for bunker callers are fairly modest, averaging some R10,000 per call, or approximately 7 percent on non-fuel expenditure.

Of all the industries within the direct port-ancillary family, the single one with the strongest potential linkage effects is the ship-repair business. Backward linkages to steel fabrication, electrical & mechanical engineering, paint, outfitting and equipment supply are particularly strong, and generate major local multiplier effects. As noted above, no specific typical repair expenditure has been attached to the spending profiles set out. This is simply because of the difficulty of separating transit callers as a discrete set of customers for the ship-repairers. In the normal course of a typical bunker call, few if any repair services are delivered, but occasional vessels that develop problems provide major sources of work. Occasional tug-and-tow bunker callers are also an important source of business, although these are not simple transit callers in the way that a vessel calling for bunkers during the course of a normal commercial from, say Brazil to Vietnam quite clearly would be. This illustrates the somewhat fuzzy boundaries around the category of transit callers as salvage tugs, passing oil rigs, scrap-bound vessels and others with potentially rich pickings for the repair industry do patronise the port because of the consolidated quality of the services provided, including the efficiency of bunker supply. The exclusion of quantified estimates of repair activities consequently serves to under-estimate the spending sums set out in Tables 3 and 4.

Other categories of expenditure are less substantial per single vessel-call, but they loom considerably larger when the totality of bunker-related economic activity is considered. *If the full set of 382 bunker vessels calling at Durban between January and end-July 2005 is considered, these vessels in the aggregate would have been responsible for direct, first round expenditure of R488.7million in the local Durban economy, or approximately R838 million on an annualised basis.*

During the first seven months of 2005, "genuine" bunker vessels would therefore have spent:

- R433 million on bunker fuel purchases from the local oil industry
- R26.7 million for various services and functions provided by the NPA
- R21.5 million on various types of victuals and stores provided by local ship chandlers
- R3.8 million on ships' agency fees to Durban-based port agents
- R820,000 on local transport companies and hotels providing crew transport services
- R205,000 on local doctors, hospitals and dentists
- R806,000 in the form of courier services, faxes, and telecommunication services not subsumed within agency charges
- An unquantified but at times substantial sum on ship-repair services…..
- Plus a myriad of expenditure flows on more minor items not enumerated specifically.

On this basis, it is clear that both the private and public sectors within the Durban metropolitan economy benefit very substantially from the ability of the port to attract and deliver services to bunker or transit callers, and that it would benefit further from an increase in the level of "genuine" bunker traffic. Indeed, the loss of bunker activity from 1996 to 2004, over which time numbers of vessels fell by 390 from 991 to 601 vessels could, *ceteris paribus*[12], be associated with a loss in first-round domestic expenditure of some R485 million at 2005 prices and tariff levels, or very close to the total expenditure recorded by all transit callers during the first seven months of this year.

These spending magnitudes are, of course, measures of direct, first-round spending only, and take no account of multiplier effects. If multiplied spending effects are taken into account, then each typical bunker vessel visiting Durban can be associated with a final increase in local income or output of some R2.43 million; the bunker activity recorded during the January-July 2005 period would have raised local income by R928.5 million; and if sustained at this level for the remainder of the current year, pure bunker calls would raise local income/output by some R1.6 billion on an annualised basis.

5 Concluding remarks

The provision of services to bunker and transit callers has been a permanent feature of the activities of the port of Durban since modern port facilities were established. This report has shown that this category of port callers represents an important source of revenue for the port itself, and also for the wider economic port cluster of industries.

The category of bunker/transit callers is also distinct from other categories of port callers, insofar as this port activity is unrelated to general economic activity in the South

[12] That is, assuming that typical vessels at the two points in time had broadly similar technical characteristics, purchased similar quantities of bunkers, and had otherwise similar patterns of local spending.

African economy (other than aspects that affect currency fluctuations or the efficiency of services provided); rather, this activity should be as a self-standing business opportunity for the port and the Durban economic community, and consequently as a genuine injection into the circular flow of local economy activity.

The extent to which the Durban economy benefits from the continued patronage of bunker traffic has also been shown to be substantial: each typical caller is responsible for a direct, first-round expenditure injection of R1.28 million, and for a final increase in income of R2.4 million once local multiplier effects are taken into account. Conversely, the loss of each transit caller robs the local economic community of a similar level of spending. At present activity levels, the aggregate annual level of services to bunker callers in the port generates first-round expenditure of some R489 million, or multiplied spending of R838 million.

The retention and indeed the strengthening of this set of port services is strongly desirable; in its absence both the port of Durban and the Durban economy would be the poorer.