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Purchase or Lease of All-Purpose Vehicle for Government Offices

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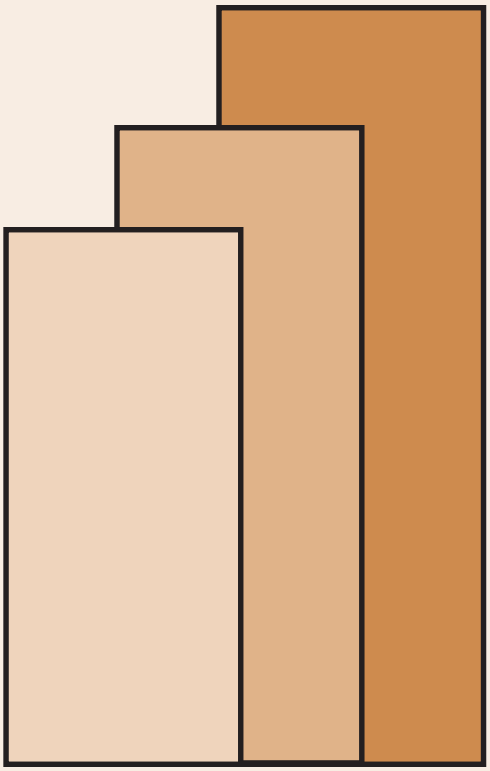

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DEPARTMENT OF BUDGET AND MANAGEMENT

Purchase or Lease of All-Purpose Vehicle for Government Offices

This article compares the costs and benefits for the government of leasing vis-a-vis outright purchase of motor vehicles. It presents two methods through which public managers can estimate and assess the value of procuring motor vehicles either under lease payment or direct purchase. Using data from selected government agencies, the net present values (NPV) generated suggest that outright purchase of low-end vehicles is preferable to leasing. For high-end end models, leasing offers a more practical option. The findings, however, are far from conclusive because assumptions regarding the variables and input data are subject to change. Results can be significantly improved with better and more accurate statistics. To gain sufficient understanding of the issue, factors other than those covered by the study, i.e. economies of scale and entry of commercial banks, must also be explored.

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1. Introduction

Every year, the Philippine government spends billions of pesos of taxpayers' money to purchase goods and services needed to perform its duties and deliver public services to its citizens. Included in this wide array of goods are motor vehicles that are used to provide public services directly or indirectly. Police patrol cars and ambulances, for instance, are used directly to maintain peace and order and to provide health services. Motor vehicles are likewise necessary in the general administration of government functions, which is an indirect form of public service. To expedite public service and support its general work requirements, government needs motor vehicles.

The provision of government motor vehicles however, competes with other inputs and impinges upon government's scarce resources. Notwithstanding the salaries and benefits of the required manpower and support staff, the government must also contend with various expenses directly associated with maintaining a government fleet. On top of the initial or full up-front costs, there are continuing maintenance costs as well as disposal costs that must be considered in motor vehicle acquisition.

Given the current economic condition, government managers who are entrusted with public funds are under increasing pressure to deliver faster and better services while managing costs, particularly with regard to government offices' capital outlay requirements. To contain expenditure growth in this area, the DBM has partnered with PIDS to look for a more economical and cost-effective approach to fleet acquisition and management, and leasing is one alternative being seriously considered. Unfortunately however, the Philippine government at present has no prescribed methodology to evaluate leasing and buying options for financing big-ticket items procured from private entities. Neither is there any relevant research that can be found regarding leasing versus buying vehicles by/in Philippine government offices.

2. Objectives and methodology

This study is being conducted to address this gap. It will determine if the long-term lease for government as one entity is the most cost-efficient as against direct purchase considering the huge costs to government, aside from the possibility that procurement may not have been well-managed. Using data from select government agencies, the paper will employ simple, straightforward cost-benefit analysis models (CBA) lifted from previous studies. The paper will examine the benefits for the government to either lease or purchase motor vehicles as demonstrated by the agency cases selected for the study. Moreover, given the changes in salvage value (depreciation) and the incremental costs, the paper will also describe and identify the corresponding costs between leasing and purchasing. In sum, the paper will have the following specific objectives:

1. To describe the existing systems, procedures in the procurement of all-purpose land motor vehicles of the government[1]
2. To determine the advantages and disadvantages of purchase vs lease of all-purpose land motor motor vehicles by analyzing the costs and benefits for each mode

[1] It was agreed during the initial project meetings that the study will not assess the procurement process since PIDS has no technical expertise to undertake a procedural analysis of the government procurement system

3. To review other country experiences of purchase or lease of all-purpose land motor vehicles by government
4. To generate policy recommendations as basis for decisionmaking by DBM

3. Scope and limitation

The study focuses only on all-purpose vehicles or those motor vehicles used indirectly in the provision of government services and/or used in the performance of general administration functions. Specialized vehicles like patrol cars, ambulances, fire trucks and military service trucks are not included. Aside from the difficulty of estimating their depreciation and future values, all too often, government motor vehicles with 'specialized' functions are obtained through the Philippine Charity Sweepstakes Office (PCSO), the Priority Development Assistance Fund (or pork barrel), or grants and donations from private individuals and international donors, and therefore beyond the purview of the current undertaking. Moreover, the unavailability of data on leasing or rental fees for these types of vehicles, which is required in performing CBA, makes it impossible to estimate the net present value (NPV) of specialized vehicles under lease agreement. The paper also refrains from using noneconomic input data in the generation of NPV and tries to abstain from using input variable costs dealing with personnel costs and/or benefits and related matters that are highly sensitive and difficult to quantify.

4. Government motor vehicles: Some basic statistics

As mentioned, the Philippine government uses motor vehicles in delivering services to the general populace. The total government fleet, including LGUs and government-owned corporations, is composed of 72,204 vehicles as of 2012. This is equivalent to about 1.0 percent of the total number of registered motor vehicles in the country. Table 1 presents data on motor vehicles from 2000 to 2012. Data show that government vehicles accounted for less than 2 percent of the total number of motor vehicles in the country from 2000 to 2012. While it may seem that the ratio of government vehicles to total registered vehicles is declining, a closer look at the absolute figures, however, reveals that government purchase of motor vehicles has remained relatively unchanged. From 6,623 new units in 2000, the purchase of new vehicles in 2012 totaled 6,456, supporting an earlier observation of a somewhat stable purchasing trend.

Table 1. Number of registered government-owned vehicles: 2000 to 2012

Year	Total Motor Vehicles	Government-Owned Vehicles	Newly-Owned Government Vehicle	Ratio of Government-owned Vehicles to Total (In %)	Ratio of Newly-Owned to Total Government Vehicles (In %)
2000	3,701,173	66,468	6,623	**1.8**	**10.0**
2001	3,865,862	56,695	4,426	**1.5**	**7.8**
2002	4,187,673	58,142	3,749	**1.4**	**6.4**
2003	4,292,272	68,437	7,325	**1.6**	**10.7**
2004	4,760,593	74,356	6,820	**1.6**	**9.2**
2005	5,059,753	77,953	8,368	**1.5**	**10.7**
2006	5,331,574	75,803	6,200	**1.4**	**8.2**
2007	5,530,052	70,528	4,657	**1.3**	**6.6**
2008	5,891,272	73,307	6,553	**1.2**	**8.9**
2009	6,220,433	68,230	7,109	**1.1**	**10.4**
2010	6,634,855	65,060	5,956	**1.0**	**9.2**
2011	7,138,942	67,324	5,681	**0.9**	**8.4**
2012	7,463,393	72,204	6,456	**1.0**	**8.9**

Sources: NSCB; LTO

Table 2. Motor vehicle by mode of registration

	Mode of Registration	2009	2010	2011	2012	2010-11 GR	2011-12 GR	Ave GR
Private	NEW	900,245	1,082,992	1,229,197	1,241,436	13.5	1.0	7.25
	RENEWAL	4,316,401	4,548,385	4,867,226	5,176,373	7.01	6.35	6.68
	Sub-Total	5,216,646	5,631,377	6,096,423	6,417,809	8.26	5.27	6.76
Government	NEW	7,109	5,956	5,681	6,456	-4.62	13.64	4.51
	RENEWAL	61,121	59,104	61,643	65,748	4.3	6.66	5.48
	Sub-Total	68,230	65,060	67,324	72,204	3.48	7.25	5.36
Diplomatic	NEW	328	406	450	326	10.84	-27.56	-8.36
	RENEWAL	3,574	3,185	3,147	2,734	-1.19	-13.12	-7.16
	Sub-Total	3,902	3,591	3,597	3,060	0.17	-14.93	-7.38
For Hire	NEW	33,538	38,955	42,531	41,270	9.18	-2.96	3.11
	RENEWAL	897,510	895,221	928,415	928,514	3.71	0.01	1.86
	Sub-Total	931,048	934,176	970,946	969,784	3.94	-0.12	1.91
Tax Exempt	NEW	56	60	36	80	-40	122.22	41.11
	RENEWAL	551	591	616	456	4.23	-25.97	-10.87
	Sub-Total	607	651	652	536	0.15	-17.79	-8.82
TOTAL	NEW	941,276	1,128,369	1,277,895	1,289,568	13.25	0.91	7.08
	RENEWAL	5,279,157	5,506,486	5,861,047	6,173,825	6.44	5.34	5.89
	GRAND TOTAL	6,220,433	6,634,855	7,138,942	7,463,393	7.6	4.54	6.07

Source: LTO

Table 2 shows motor vehicle statistics by mode of registration. The data under 'renewal' should give some indication of the total number of 'serviceable' government fleets, which has increased slightly in recent years. From only 66, 468 units in 2000, the government was able to accumulate some 72, 200 units of motor vehicles in 2012. The government acquired an average of 6,148 units a year between 2000 and 2012.

As a percentage share of the national procurement budget and total capital outlays, government purchase of transportation equipment for the years 2007 to 2011 ranges from 0.6 to 1.3 percent, and 1 to 2.1 percent, respectively. In the last two years however, this has gone up, accounting for 2.3 to 4.4 percent of the total capital outlays (Table 4). Add to that is the cost of operating and maintaining the fleet. Available general data on MOOE from DBM, however, do not specifically reflect or indicate the costs of repairing and maintaining transportation equipment (Table 3), which are likely to jack up over the years as the vehicles age and the warranties lapse.

Table 3. Philippine government procurement budget 2007-2011 (PhP '000)

	2007	2008	2009	2010	2011
Maintenance & Operating Expenses					
Repair and Maintenance	23,465,563	24,988,621	21,771,084	25,021,782	27,763,401
Supplies and Materials	39,637,080	41,277,811	48,635,923	44,274,234	43,433,069
Utility Expenses	6,442,858	6,705,812	6,834,835	8,253,051	8,533,803
Training and Scholarship Expense	6,209,303	7,160,583	11,843,028	9,192,594	13,372,926
Professional Services	15,964,613	22,805,652	31,559,649	23,184,888	19,071,665
Printing and Binding Expenses	1,871,709	1,131,623	1,303,719	1,232,892	1,263,446
Advertising Expenses	609,565	891,073	960,280	827,372	1,062,623
Subscription Expenses	171,309	132,796	6,949,257	238,528	247,884
Subtotal (A)	**94,372,000**	**105,093,971**	**129,857,775**	**112,225,341**	**114,748,817**
Capital Outlay					
Land and Land Improvement	12,127,661	5,525,203	11,723,151	5,440,485	6,161,027
Buildings and Structures	8,472,219	10,837,703	10,997,394	22,694,122	38,662,260
Office Equipment	4,944,178	5,583,390	9,309,847	7,357,548	6,833,778
Transportation Equipment	1,380,911	2,524,880	4,524,978	2,104,774	1,580,823
As a % share of Govt Procurement budget	0.602	0.902	1.316	0.676	0.513
As a % share of Total Capital Outlay	1.023	1.443	2.115	1.056	0.818
Machineries and Equipment	8,084,841	11,996,851	9,361,146	10,679,190	10,170,871
Public Infrastructure	99,936,131	138,463,865	168,035,648	151,048,823	129,923,265
Subtotal (B)	**134,945,941**	**174,931,892**	**213,952,164**	**199,324,942**	**193,332,024**
Total	**229,317,941**	**280,025,863**	**343,809,939**	**311,550,283**	**308,080,841**
Percent of National Government Budget	19.84%	21.30%	23.90%	20.00%	18.70%
Percent of Gross Domestic Product	3.45%	3.77%	4.47%	3.74%	3.40%

Source: Bombay (2011)

Table 4. Capital outlays, 2011-2013

	2011 (Actual)	2012 (Adjusted)	2013 (Proposed)
Capital Outlays			
Investment Outlay	12,202,592	3,223,917	8,448,995
Loans Outlay	379,796	21,385	2,010,000
Livestock and Crops Outlay	313,275	361,628	45,340
Land and Land Improvement Outl	1,398,176	3,193,701	2,364,257
Building and Structures Outlay	16,872,915	30,706,449	23,153,543
Office Eqpt, Furniture and Fixture	6,138,709	7,688,387	8,690,750
Work Animals Outlay	19,998	29	1,088
Transportation Eqpt	861,635	11,152,177	6,778,973
Machineries and Eqpt	6,440,338	13,332,600	13,825,865
Public Infrastructures	136,475,259	183,291,924	230,259,410
Reforestration Projects	1,144,535	1,522,291	3,123,612
Total Capital Outlays	**182,247,228**	**254,494,488**	**298,701,833**

Source: DBM Website

5. Government procurement policy

5.1 General guidelines

All procurement activities by government agencies, local government units, state universities and colleges, and state-owned enterprises are guided and governed by Republic Act 9184, otherwise known as the Philippine Government Procurement Reform Act (GPRA) of 2003. Widely considered a landmark legislation, the GPRA, which is anchored on the principles of transparency, accountability and competitiveness, consolidates and standardizes procurement rules and procedures for all government entities. It applies to procurement of goods and services, including infrastructure projects and consulting services, regardless of funding source.

The GPRA covers activities from procurement planning, to the contract implementation stage, to termination of contract and warranty. Its distinguishing and perhaps most important feature is the establishment of the "Philippine Government Electronic Procurement System or PhilGEPS", an electronic single portal for government procurement activities. Backed by state-of-the-art software, PhilGEPS serves as a primary source of information on government procurement, which is made available through its electronic bulletin board; registry of manufacturers, suppliers, distributors and consultants; and an electronic catalog of all current purchases and sales.

Although the GPRA and PhilGEPS make procurement simpler and faster, it cannot account for the variations in the nature and procurement practices of government agencies. There is at the moment no single government entity responsible for all procurement functions. Procurement is decentralized, with each agency maintaining responsibility for and controlling its own procurement activities (Bombay 2011).

Section 6.2 of the revised IRR of the GPRA states that government agencies are given prerogatives to customize their procurement procedures to suit the agencies' needs, peculiarity, nature, or complexity of procurement. These procedures however, must be harmonized and consistent with the GPRA rules, including those specific to motor vehicle acquisition.

For motor vehicle acquisition and repair which fall under the "goods" category, the GPRA reiterates the general guidelines prescribed in the National Budget Circular No. 446 and 446-A issued in 1995 and 1998, respectively. Both circulars maintain that "acquisition of brand new units by outright purchase (paid for on a single, lump-sum basis) shall be adopted as a mode of motor vehicle acquisition." NBC 466, in particular, restricts the continuous renting of motor transport equipment to not more than fifteen (15) days, except as may be authorized by the DBM Secretary. The types of motor vehicles that may be acquired are likewise limited to the classifications set and described by both circulars. Still in accordance with the above memoranda, Administrative Order (AO) 233 issued in 2008 which applies to all NGAs, SUCs and GOCCs, requires the consent and approval of agency heads, Secretary of DBM, and the Office of the President for the purchase of motor vehicles regardless of funding source. It also prohibits the use and acquisition of what the state considers as "luxury vehicles" and stipulates compliance with the Clean Air Act. AO233 provides a long list of what the government considers acceptable for official use and what it deems as "luxury vehicles" (Table _).

For LGUs, Budget Circular 2010-2 allows local chief executives to approve and authorize the purchase of brand-new motor vehicles chargeable against local funds, provided these vehicles do not exceed the technical specifications prescribed by AO 233. Table 5 below lists down some of the government policies and circulars relevant to motor vehicle rental and acquisition.

5.2 Replacement/disposal

Also pursuant to NBC 446, government motor vehicles may be replaced under the following conditions: (1) for high official function vehicle, if the car is at least seven years old and has traveled at least 175,000 kms and (2) if the utility vehicle is at least five years old and has traveled at least 150,000 kms. Other conditions may also apply: if the vehicle is declared and certified unserviceable and/or if the average annual cost of recurring repair during the past two years is at least 30 percent of the current price of the same unit.

Under the current setup, the disposal of motor vehicles must be appraised, approved and must have complied with Commission on Audit (COA) rules. The most common mode of disposal is through donation or transfer without cost to junk.

Table 5. Summary of selected government directives on motor vehicle procurement and disposal

National Budget Circular No. 446 (1995)	Guidelines on the Acquisition and Rental of Motor Vehicles	Sets the general guidelines for purchasing and renting motor vehicles
		Prescribes the types and classifications of motor vehicles allowed to government agencies; as well as the mode of acquisition
National Budget Circular No. 446-A (1998)	Amendment to NBC No. 446	Refines existing policies relative to the acquisition of motor vehicles for government use
		Prescribes policy guidelines on the purchase of "second-hand/reconditioned" transport equipment as an alternative mode of motor vehicle acquisition
Administrative Order 233 (2008)		Reiterates the prohibition of use and purchase of "luxury vehicles" and stipulates compliance of the Clean Air Act
Budget Circular 2010-2		Reiterates implementing guidelines for AO 233;
		Updates the typology of government motor vehicles and motor vehicle classifications

5.3 Agency-specific guidelines

As mentioned, government agencies are given discretion to organize and establish their respective procurement systems and processes provided these do not violate the GPRA principles and provisions. To validate and determine the extent of compliance, some national government agencies were asked to describe their respective rules and procedures as regards motor vehicle acquisition and disposal. The summaries are presented in this section.

5.3.1 Department of Interior and Local Government : Bureau of Jail Management and Penology (BJMP)

BJMP strictly adheres to the provisions set by RA 9184 and its implementing rules and regulations in procuring motor vehicles. Since the creation of BJMP in 1991, motor vehicles have been acquired mainly through direct purchase. The acquisition of the Prisoners' Van, the vehicle used in transporting inmates, is a special-purpose vehicle that is strategically customized to secure inmates while in travel to and from courts during hearings. Its design and features are much different from those commonly used vehicles; hence, purchasing is the appropriate mode of acquiring this type of vehicle.

5.3.2 Department of Interior and Local Government : National Police Commission (NPC)

NPC also adheres to RA 8194 and describes its procurement procedures as follows: (1) All reports and requests for motor vehicles of central and regional offices are consolidated by the General Services Division of the Personnel and Administrative Service (GSD-PAS) for inclusion in the NPC's Capital Outlay program, which in turn is submitted to DBM for approval. Once approved, the Financial Service informs the head of agency and the BAC. The BAC convenes and discusses the technical aspects of the vehicles. A pre-bid conference is conducted, after which the BAC Secretariat prepares the required bid documents, including PhilGEPS postings. Then, bidding and subsequent activities proceed as set, with the whole process ending with the issuance of notice to proceed to the winning bidder from BAC, as prescribed by the law.

5.3.3 Philippine Institute for Development Studies (PIDS)

PIDS also follows the GPRA guidelines on procurement. The current motor pool, which consists of nine utility vehicles, were all obtained through direct purchase. The Institute also rents vehicles but always on a short-term basis, and only during special occasions, i.e. out-of-town team building activity, foreign visitors, etc. Old cars are disposed of either through donation or scrapped as junk as per COA guidelines.

5.3.4 Department of Health (DOH)

The Department of Health (DOH) has published two volumes of a procurement manual documenting the the procurement activities of different DOH offices and affiliates, and how these should be coordinated and modified to observe and follow the GPRA guidelines. The manual formally identified the procuring entity/ies for the whole organization, and also that of the central office. The agency's current fleet, including the ambulances, were acquired mostly through direct purchase.

5.3.5 Department of Foreign Affairs (DFA)

DFA developed a refleeting program which was introduced in 2008. Following the basic guidelines set by GPRA, the refleeting program is directed more towards the department's posts in foreign countries whose transport needs must incorporate the peculiarity that comes with working abroad. This was DFA's deliberate attempt to respond and cater to the needs of DFA officials and diplomats. Under the program, motor vehicle units were standardized and for this time, the "Mercedez Benz E200 series" or its equivalent were issued to requesting units. These vehicles are acquired either through direct purchase or under lease arrangement depending on the assessment of the requesting consular office. Aside from economic considerations (i.e. economically advantageous to government), several other factors were considered in the acquisition of these transport equipment: usefulness in the posts' performance of its mandate (i.e. use of diplomatic plate), security, ease of maintaining the vehicle, and possible resale value (if purchased). Plus, it must be presentable, a model befitting an Ambassador, a Diplomat or visiting foreign dignitaries. It is important to point out however, that these units are within the 'High official function cars' category of DBM Budget Circular 2010-2—the same circular that exempts the DFA from the government moratorium on the use and purchase of luxury vehicles. Meanwhile, for nonexecutive functions, the department maintains a a more conservative fleet.

To assist in the conduct of this study, DFA did a quick survey of its foreign posts and made requests for them to send data that may be relevant to the study. Out of 84 posts abroad, 59 responded with data on budget allocation and the purchase price of the acquired vehicle. A summary of the rapid appraisal conducted between car leasing and direct purchase using the above-mentioned factors as basis was likewise provided. In 34 foreign posts, purchasing motor vehicles were found to be more economical, while the other 18 posts show inclination towards leasing motor vehicles.

It was also noted that in countries like Mexico, Brussels, Dubai and in some cities in the US, Philippine consular offices prefer and favor car rental over direct purchase presumably because it is cheaper and offers hassle-free registration for diplomatic plates. Meanwhile for those who hold office in Middle East and Asia Pacific countries (i.e. Bangkok, Tokyo, Abu Dhabi, etc), direct purchase is preferable than leasing.

For the 18 foreign posts where the circumstances support the rental of vehicles, there is a pending request for DBM to approve the extension of the rental period to one year from 15 days. To date, in addition to its vehicles abroad, the DFA also maintains 28 service vehicles in its Manila headquarters, eight (8) of which are rented cars from CATS Philippines.

Box 1. Car rental industry: A brief overview

Although the leading car leasing company has been in the country since the early 1970s, data from the National Statistics Office (NSO) seem to suggest that car leasing is virtually non-existent in the Philippines. Industry statistics on car leasing in the country are almost negligible, with only a handful of reported players. As shown in the table below, the number of establishments engaged in renting and leasing motor vehicles in the country and other relevant data were 'suppressed'. The NSO does this only in cases wherein there are very few establishments, to avoid disclosure of individual establishment data.

A quick interview with NSO officials reveals that there are fewer than five car rental companies under 20 ATE and over, most of which are operating in urban areas, in particular the National Capital Region (NCR). Online data sources, however suggest several car rental companies operating in Metro Manila. But since these are likely to have an average total employment of less than 20 employees, they were not counted in the official statistics. Also excluded in the list are manufacturers engaged in car leasing as a secondary business activity, which remains undisclosed as of this writing. Interestingly, even car dealers are not too keen to join the government's roster of suppliers. Even with a streamlined accreditation process, car dealers remain wary and elusive. As per the PSO Chief, dealers do not wish to be registered for fear of being monitored by the BIR.

TABLE 1 Summary Statistics for Administrative and Support Service Activities Establishments for All Employment Sizes by Industry Group: Philippines, 2010

(Value in thousand pesos. Details may not add up to total due to rounding and/or statistical disclosure control)

2009 PSIC Code	Industry Description	Number of Establishments	Employment as of November 15		Total Compensation	Total Revenue
			Total	Paid Employees		
		(1)	(2)	(3)	(4)	(5)
N	**ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES**	**6,272**	**523,709**	**521,711**	**103,213,593**	**211,988,543**
N771	Renting and leasing of motor vehicles	s	s	s	s	s
N772	Renting and leasing of personal and household goods	442	1,854	1,734	156,291	838,132
N773	Renting and leasing of other machinery, equipment and tangible goods, n.e.c.	406	4,602	4,392	727,489	7,440,565
N781	Activities of employment placement agencies	2,442	110,332	109,611	16,188,732	36,497,470
N782	Temporary employment agency activities	s	s	s	s	s
N783	Other human resources provision	s	s	s	s	s
N791	Travel agency and tour operator activities	876	7,342	7,200	1,383,837	5,079,005
N799	Other reservation service and related activities	118	1,430	1,341	477,322	1,222,857
N801	Private security activities	726	115,069	114,893	10,841,450	14,880,780
N802	Security systems service activities	20	1,683	1,680	82,077	594,519
N803	Investigation activities	14	279	275	13,093	46,229
N811	Combined facilities support activities	4	587	587	131,937	101,156
N812	Cleaning activities	234	42,410	42,370	3,276,252	6,380,089
N813	Landscape care and maintenance service activities	s	s	s	s	s
N821	Office administrative and support activities	97	641	623	61,780	179,244
N822	Call centers and other related activities	408	221,292	220,840	67,899,754	129,836,454
N823	Organization of conventions and trade shows	35	275	275	96,735	326,290
N829	Business support service activities, n.e.c.	444	6,699	6,676	1,060,577	6,620,521

6. Leasing vs direct purchase : A conceptual review

Except for the Department of Foreign Affairs, it would appear that government agencies in general have only one primary method of procuring motor vehicles, which is purchasing. This case is not unique to the Philippines. A notable exception perhaps is Michigan State in the US, which started leasing vehicles in 1995. Governments in many parts of the world simply do not lease vehicles, they purchase them (Christiansen 2010). This practice was predicated on the notion that government vehicles have longer life cycles and the "run it into the ground" approach was seen as the most cost-effective method for operating a fleet of vehicles. The government's directive to purchase outright and pay lump-sum, as well as the minimum number of years required to replace a government fleet are a throwback to this long-held tradition.

But over the years, given the dynamic business environment and rapidly changing demands, outright purchase of capital equipment such as motor vehicles may not always be the best option for the government. Considering the cost of repair and the hassle of disposing of old unserviceable cars, perhaps there is indeed a real value in seeking other alternatives. And leasing is one that offers a practical solution that will fund and operate a younger fleet. Table 6 below gives a general overview of the advantages and disadvantages of both leasing and purchasing options.

Table 6. Direct purchase vs lease: Advantages and disadvantages

	Advantages	Disadvantages
Purchasing	Rights of ownership	Higher initial expense
	More streamlined process*	Less available liquidity
	Tax benefits	Obsolete equipment/car model
Leasing	No upfront costs	payment obligation for entire term
	More available liquidity	higher overall costs
	Flexible payment options	maintenance requirements
	Easier to upgrade model	
	tax benefits	
	lower, fixed interest rate	

Generally defined as an agreement conveying the right to use a property, plant and equipment for a stated period of time in return for a series of stipulated cash payments, leasing has become quite popular in recent decades. Many companies in the US lease a significant portion of their assets and this is particularly true for equipment leasing. It was estimated that in the 1990s, about 80 percent of the corporations in the US lease assets, roughly equivalent to USD 100 billion in earnings a year. It would seem that increasingly, companies are signing up for the extra services that leasing companies provide. Car leasing has likewise become so pervasive, that one in every three cars in the US road is rented (Mollaghasemi 1995).

Leasing, on one hand, as opposed to purchasing, generally does not require a huge initial investment, has lower interest costs, and has more flexible payment terms. Under a highly competitive market, banks are likely to offer lower lease payments and interest rates. Leasing arrangements also have provisions for asset upgrading and disposal (Department of Treasury and Finance Western Australia, 2005). In some cases like in an open-end lease contract, the lessee is responsible for the market value of the vehicles

when it is sold at the end of the lease. Hence, the lessee has to maintain the equipment to pre-defined specifications which may entail some cost on the part of the lessee.

Direct purchase, on the other hand, gives government offices the right of ownership and with that, the discretion to maintain the equipment according to their guidelines. However, they have to contend with repair and maintenance costs, not to mention the manpower support which are likely to increase over the years.

The basic aspects described above can also be organized into broad categories to summarize the major issues that must be considered in the buying-versus-leasing decision. These factors may be classified into technical, managerial, and financial aspects. The technical aspects refer to the technical requirements, whereas managerial aspects relate to managerial and administrative issues. The financial aspects relate to the funding and cost factors associated with lease negotiations. The succeeding section explains these aspects in detail: [2]

6.1 Technical aspects

Although these are more applicable to technical equipment like computers and sensitive communication devices, there are also technical requirements in motor vehicle acquisition that government agencies must consider, such as design and performance specifications. DFA's posts abroad can clearly relate to this view. If the objective and requirement is to have transport equipment with the latest and most reliable security features and establish a certain status, then perhaps leasing is more appropriate. Leasing, in this case, gives the lessee flexibility to swap and replace vehicles to accommodate changing security and design requirements as time passes and technology changes.

6.2 Managerial aspects

Leasing requires less administrative and managerial effort on the part of the government, hence the managerial aspect of leasing is definitely an important factor to consider. The overhead management cost is lowered since the number of personnel assigned will be smaller.

6.3 Financial aspects

The timing of costs and benefits to the cash flow is an important factor in lease-versus-buy decisions. Purchasing requires one-time payment, whereas leasing involves a series of small periodic costs, whose aggregate amount may be bigger than the one-time cost of purchase decision. Here, how the government values the time difference and opportunity cost of money, i.e. discount rate, is critical in calculating the total present value costs of the lease stream and buy stream. Determining the appropriate discount rate is one of the most contentious issues in lease-versus-buy analyses.

[2]

7. Leasing vs direct purchase : Some country experiences

While the literature is replete with studies on the procurement practices of the private sector, procurement in the public sector receives significantly less focus. As a result, a significant knowledge gap exists and there is relatively little information on the purchasing function, as practiced by public entities (Wang and Bunn 2004; Schiele and McCue 2006; Bryntse 1996; Murray 1999, 2001, as cited in Scott 2011). Acknowledging the wide disparity in the nature and organizational goals of government and the private sector, Scott (2011) insists their respective procurement objectives and practices would differ just as much. Hence, although useful, many of the findings on lease-versus-buy decisions currently available may not relate well to government setup.

The few available studies on lease-versus-buy decisions are limited to developed economies, particularly the US, and these are mostly studies conducted for the US Military (Kim 1990; Kim 2002). For instance, the issue of leasing versus buying of the US Air Force's general purpose vehicles has been documented in several studies. The US Department of Defense has been struggling with this issue as early as the 1940s after the World War II, when the department was faced with a huge demand for new vehicles which resulted in the establishment of the General Services Administration (GSA). GSA was created in 1949 to build up stocks and supplies for wartime, and manage and dispose of war surplus goods[3].

Kim (2002) asserts the GSA has played a very important role in the procurement and management of the US government fleet, and provided motivation for the US Air Force to conduct studies on leasing versus buying in the US military. Most of these graduate papers according to Kim (2002) identified vehicle procurement as the most cost-effective option between commercial leasing and GSA leasing and ownership. The GSA leasing option exists only in the United States and there is currently no single statutory authority anywhere in the world which would allow the ownership of all general-purpose vehicles to be transferred to the commercial sector.

Despite a handful of studies on lease-versus-purchase analysis in the US Air Force, it has yet to come up with a definitive approach to acquiring general purpose vehicles. Kim (2002) further maintains that available literature is split, with leasing advocates insisting that the act will lead to rationalization of fleet size and induce significant reduction in the amount of resources required to maintain an ageing fleet. Other studies note that the flexibility and the sense of ownership that comes with directly purchasing motor vehicles help reduce performance uncertainty and boost employee morale. They associated the leasing of equipment and facilities with labor downsizing within the military.

A recent study by Lebo and Scott (2009) however, provides a "middle ground" as it argued for a "hybrid" approach to motor vehicle acquisition within the US Marine Corps (USMC). Using a simple cost-benefit analysis, the paper examined the overall benefits for the USMC to either purchase or lease alternative fuel-vehicles (AFV). Lebo and Scott (2009) estimated a net savings of USD 823,000 for the USMC if it decides to purchase vice lease these vehicles. More savings however will be realized if USMC adopts a "hybrid" approach, or a combination of lease and purchase for its fleet. From USD 823,000, overall savings will increase to roughly USD 1.7 million if the USMC purchases compact sedans and pickup trucks, and leases minivans. Based on these findings, the study concludes that a "one-size-fits-all" policy may not necessarily be the optimal solution for the USMC.

3

Kim (2002) came out with a different verdict. Looking at the procurement of sedans in the Korean Air Force, Kim (2002) found that ownership or outright purchase of general-purpose vehicles is the better alternative to leasing. It was shown that in the case of KAF, having direct ownership of these sedans is almost three times more cost-beneficial than leasing. It was also proven to be less costly.

8. Data and methodology

Most studies involving lease-vs-buy decisions utilized the Cost Benefit Analysis or Net Present Value method. It has also been used extensively in the lease-or-buy decisions studies in the US military. The concept of NPV has been widely accepted as basis for determining the most desirable investment alternatives in finance literature (Johnson and Lewellyn, 1972).

NPV allows for the systematic and quantitative evaluation and comparison of the life cycle costs and benefits of buying to other alternative ways of acquiring vehicles. Included in a typical CBA analysis are the economic and financial costs and benefits of both alternatives. From the time of acquisition to the disposal of the vehicles, many components of tangible and intangible benefits of leasing versus buying are weighed and quantified in money terms, which are then compared with a cost analysis through discounted cash flow. Each year's net cash are discounted to take into account the time value of money. This discounting gives the present value of each of the amounts. When comparing leasing and purchasing options, the peso value of future expenditures (or income in the case of salvage value) in a lease or purchase agreement, must be converted to their present value in pesos to compare the real costs of each option (Lebbo and Scott 2009).

Using the data from three government agencies—a government-owned and controlled corporation (GOCC) and two government deparments, two methodologies were considered. The first was developed by Johnson and Lewellen (1972) and the second was lifted from the graduate paper of Lebo and Scott (2009). These methodologies were chosen on the basis of their simplicity and their applicability to the Philippine case, taking into consideration the quality of available data.

8.1 Model 1:

The first methodology takes off from a study done by Johnson and Lewellen published in the *Journal of Finance* in 1972. Simple and straightforward, the model measures only quantifiable economic factors and disregards non-tangible items such as "pride of ownership" which is highly subjective and difficult to measure. The model also reckons that leasing is a "long-term acquisition-of-services arrangement which differs in time profile but not in financing impact from purchase", hence borrowing issues and other forms of financing should not even be remotely considered in the estimation.

Interestingly, based on the illustrative example given, the model allows for the computation of net present value (NPV) for one single asset, which suits data-constrained cases like the Philippines. Under this method, a positive figure for Δ NPV would imply that outright purchase is economically superior to leasing.

The model is mathematically described as follows[4]:

[4] Some of these common terms will cancel out and assumptions were made for the input variables that are left to form part of the final equation

$$\mathrm{NPV(P)} = \sum_{i=1}^{n} \frac{(R_i - C_i) - t(R_i - C_i - D_i)}{(1+k)^i} + \frac{S - t_g(S-B)}{(1+k)^n} - A \quad (1)$$

$$\mathrm{NPV(L)} = \sum_{i=1}^{n} \frac{[R_i - (C_i - O_i)](1-t)}{(1+k)^i} - \sum_{i=1}^{n} \frac{L_i(1-t)}{(1+r)^i} \quad (2)$$

Where:

A = Cash purchase price of the asset in question;

n = Useful economic life of the asset (years);
Assumption : Under existing government rules, motor vehicles subject for replacement must be at least seven years old. Taking note of this directive, the economic life span of motor vehicles for this purpose is assumed to be 10 years.

B = Anticipated book value of the asset at the end of its useful life; book value represents the value of an asset as reflected in the balance sheet, less its accumulated depreciation

S = Expected cash salvage value of the asset at the end of its life; the salvage or residual value is the estimated value of asset at the end of its useful life.
Assumption: For this case, the government mandated salvage value, which is equivalent to 10 percent of the purchase price, is assumed.

D_i = Depreciation charge for the year *i* if the asset is owned;

L_i = Lease payment (before taxes) required in year *i* if the asset is leased ;
Assumption: There are two (2) sources of lease data used in this study: (1) for motor vehicles acquired and used abroad, the GSA rental rates for 2014 were used as basis[5]; and (2) for those obtained and utilized domestically, average rental rates from websites of domestic car rental companies and other online sources were employed. Car leasing rates are likely to vary per country, but for purposes of consistency and uniformity, the GSA rates were used as benchmark. In cases where lease data for identified units are not available, rental rates for comparable models are used.

t = Corporate ordinary income tax rate;
Assumption: In this case, the government imposed corporate income tax rate of 50 percent is observed.

t_g = Tax rate applicable to gains and losses on the disposal of fixed assets (may be equal to t);
Assumption: Proceeds from sale of an asset are taxed as ordinary income of a corporation. Irrespective of purpose, the disposal of fixed assets in the Philippines is subject to a corporate gains tax of 7.5%, which is also applied in this study.

R_i = Total cash revenues expected from the use of the asset in year *i* ;

C_i = Total pre-tax cash costs for labor, materials, etc., expected to be required to operate the asset in year *i* if it is *purchased* by the firm;

O_i = Pre-tax cash operating costs that are expected to be borne in year *i* by the firm if it purchases the asset, but not if the asset is leased; these might include certain

[5] It would have been preferable to use GSA Rental rates corresponding to the acquisition years of motor vehicles as reported in the available government data, but these are not accessible from the GSA website.

items of maintenance, insurance, property taxes, etc., depending upon the terms of the lease contract, or might be zero if the case of a "pure" financial lease. In either event O_i denotes the year- *i* additional operating cost, if any, of owning, and therefore the difference C_i - O_i represents the year- *i* total cash operating cost of leasing;
Assumption: Under a government setup, the standard operating costs for maintaining a motor pool includes salaries of support staff, i.e. drivers and administrative clerks. The assumed operating cost of PhP356,000 already incorporates the estimated annual maintenance cost (PhP 100,000) and the highest annual personnel service cost earmarked for a driver position in the government.

k = after-tax cost of capital for the firm; *Assumption:* 12 percent

r = after-tax interest rate on the firm's borrowings; *Assumption:* 4 percent

Here, the NPV of an anticipated asset is the sum of the present value of its net after-tax cash operating profits, plus the discounted after-tax cash proceeds from salvage, minus the asset cost. Similarly, the NPV under lease arrangement is represented by the NPV of the after-tax cash operating profits, less the after-tax present value of the lease payments.

Since there are several terms common to both flows, algebraically, the equations can be transformed into a reduced form, where:

$$\Delta NPV = NPV(P) - NPV(L)$$
$$= \sum_{i=1}^{n} \frac{tD_i - O_i(1-t)}{(1+k)^i} + \frac{S - t_g(S-B)}{(1+k)^n} - A + \sum_{i=1}^{n} \frac{L_i(1-t)}{(1+r)^i} \quad (3)$$

8.2 Model 2:

For the second methodology, the following equations from Lebbo and Scott (2009) were adopted with slight modification to suit available data. The proposed method is applicable only to data with longer, continuous time trend and for only one type of vehicle, i.e. government purchase of sedans from 2004-2011. Here, NPV is calculated as follows:

Net Present Value (NPV) of Total Annual Cost of Inventory (Purchase) = Annual Cost of Inventory (lease) x Discount Rate Factor

NPV of Total Annual Cost of Inventory (Purchase) = Annual Cost of Inventory (purchase) x Discount Rate Factor – Total Average Salvage Value*

Total Average Salvage Value Per Year = Number of Vehicles Acquired x (Purchase Price per Vehicle + Incremental or Operating cost per vehicle) x (0.10*Purchase price)

The preferred alternative is the one with highest NPV. It is important to mention however, that the model did not undergo peer review, hence this should cause analysts to view the whole procedure with caution.

9. Data description

This section describes the data used in the calculation of NPV. As mentioned, the data generated came from three government offices: one government-owned and controlled corporation (GOCC) and two line agencies.

9.1 Case 1: Government-owned and controlled corporation (GOCC)

Case 1 refers to a government-owned and controlled corporation (GOCC), the Philippine Institute for Development Studies (PIDS), which has a total of nine vehicles in its current pool. The oldest, both Toyota Corolla GLi models, were purchased in 1996, while the two most recent purchases, Isuzu Wagon-Crosswind units, were acquired in 2012. The Institute's administration department estimated that the total maintenance costs for all nine vehicles averaged PhP100,000 yearly. Table 7 below is an inventory with unit and acquisition details of all the motor vehicles acquired by PIDS from 1996 to 2012.

Table 7. Transport equipment procurement of GOCC (Case 1)

INVENTORY REPORT AS OF DECEMBER 27, 2012			
Government Owned and Controlled Corporation			
MOTOR VEHICLES			
PROPERTY NUMBER	DESCRIPTION	ACQUISITION DATE	ACQUISITION COST
A522A	Toyota Corolla GLi with Plate No. SEG 587	6/11/1996	500,500.00
A522B	Toyota Corolla GLI with Plate No. SEG 577	6/11/1996	500,500.00
A621	Honda Civic Lxi M/T with Plate No. SEW 925	3/12/1998	447,000.00
A622	Nissan Vanette Grand Coach with Plate No.SEV 500	9/28/1998	609,500.00
A694	New Toyota Revo SRJ Series 1.8 L M/T, Gas SGH-667	6/21/2002	750,000.00
A1056	Toyota Innova E Diesel MT Plate No. SJA 382	3/12/2008	828,500.00
A1094	Nissan Escapade Plate No. SHV 117	7/1/2008	927,678.58
A1179a	2013 Isuzu Wagon, Crosswind Series, Model XT 2.5L Diesel (Rich Red) Plate No. SKV 791	12/17/2012	945,000.00
A1179b	2013 Isuzu Wagon, Crosswind Series, Model XT 2.5L Diesel (Midnight Blue) Plate No. SKV 781	12/17/2012	945,000.00
	Grand Total		**6,453,678.58**

9.2 Case 2: Government department 1

The second case refers to a government institution involved in the delivery of primary government services. Although some of its functions have already been devolved, the department still carries out critical tasks and has retained its supervisory role in many of the devolved offices. The agency's transport equipment purchases include motor vehicles with highly specialized features. However, for this purpose, only general-purpose motor vehicles were covered. From 2000-2013, the agency's central office in Manila was able to accumulate a total of 73 units of transport equipment. Most are SUVs and AUVs, and only three are ambulances. Car leasing is very rare and only on a short-term basis.

9.3 Case 3: Government department 2

For Case 3, the data used came from a government agency with satellite offices abroad. It is one of the very few government agencies that regularly rents motor vehicles and currently, has set up a refleeting program for its posts overseas. Table 8 below shows the motor vehicle procurement expenses of the agency from 2000 to 2011 by type of vehicle.

The agency's refleeting program, which commenced in 2008, could perhaps explain the zero-car purchase in 2007. Aside from replacing old and unserviceable motor vehicles, the refleeting program provides for the acquisition and/or rental of a certain brand of motor vehicles, i.e. the Mercedes Benz E Class. This is reflected in Table 9 below which tabulates some of the motor vehicle purchases of the department for its offices abroad. Data under Table 9 were used to determine the NPVs under three different scenarios.

Table 8. Motor vehicle expenses, by type of vehicle: 2000-2011

					Total	
	Sedan	Van	SUV	Motorcycles	in USD	in PhP
2000	31,389.00	19,423.09			50,812.09	2,540,604.64
2001	89,162.50				89,162.50	3,645,854.63
2002	124,508.23	132,518.62	18,000.00		275,026.85	14,629,088.06
2003	33,236.66	27,348.68			60,585.34	2,677,266.17
2004	45,000.00				45,000.00	1,988,550.00
2005	363,005.57	19,531.25	60,000.00		442,536.82	22,564,952.58
2006	56,387.00	117,515.85			173,902.85	8,903,826.02
2007					-	
2008	279,217.21	57,096.00			336,313.21	17,908,678.43
2009	873,522.99	24,729.33	179,464.91		1,077,717.23	49,801,313.20
2010	1,098,938.00	71,687.43	62,263.33	2,716.03	1,235,604.79	54,218,337.93
2011	957,910.09	100,749.14	67,650.28		1,126,309.51	49,118,357.58

Table 9. Motor vehicle procurement of Government Agency 2

				Mode of	Acquisition				
Post	Qty	Description	Manufacturer/Model	Acquisition	Year		Amount	Condition	Remarks
A. Embassies									
Athens, Greece	1	Motorcycle	Honda 125CC	Purchase	2009			Good	Under Car Refleeting Program (FY 2008)
	1	Sedan	Mercedes Benz E280	Purchase	2008	$	58,158.64	Good	Under regular repair and maintenance
	1	Sedan	Mercedes Benz E240	Purchase	1998	$	38,645.89	Poor	Unservicable and for disposal
Bangkok, Thailand	1	Motorcycle	Honda 125CC	Purchase	2010	Bht	38,095.23	Good	Under regular repair and maintenance
	1	Sedan	Mercedes Benz 300S	Purchase	2009	$		Good	Under Car Refleeting Program (FY 2008)
	1	Van	Toyota Hi-Ace D3.0	Purchase	2002		23,090.24	Serviceable	Under regular repair and maintenance
	1	Sedan	Mercedes Benz E230	Purchase	1995	DM	58,368.00	Serviceable	Under regular repair and maintenance
	1	Sedan	Mitsubishi Galant	Purchase	1987		12,083.33	Poor	Unservicable and for disposal
Beijing, PRC	1	Sedan	Mercedes Benz E230	Purchase	2009	$	38,775.00	Good	Under Car Refleeting Program (FY 2008)
	1	Van	Toyota Hi-Ace	Donation	2006			Poor	Unservicable and for disposal
	1	Sedan	Toyota Camry	Donation	2002			Serviceable	Under regular repair and maintenance
	1	Sedan	Mercedes Benz 220E	Purchase	1993		46,463.00	Poor	Unservicable and for disposal
Budapest, Hungary	1	Van	Kia Carins 2.0	Purchase	2009	$	24,729.33	Good	Under Car Refleeting Program (FY 2008)
	1	Saloon	BMW 520i 2002	Purchase	2002		24,020.62	Serviceable	Under regular repair and maintenance
	1	Van	Mercedes Benz V230	Purchase	1999		34,914.24	Serviceable	Under regular repair and maintenance
Buenos Aires, Argentina	1	Sedan	Mercedes Benz E280	Purchase	2009	$	45,426.00	Good	Under Car Refleeting Program (FY 2008)
	1	Sedan	Mercedes Benz E220	Purchase	1998		31,630.00	Poor	Unservicable and for disposal
Doha, Qatar	1	Sedan	BMW 523i 2006	Donation	2009			Good	Under regular repair and maintenance
The Hague, Netherlands	1	Sedan	Mercedes Benz E240	Purchase	2004		41,215.00	Serviceable	Under regular repair and maintenance
Ottawa, Canada	1	Sedan	Mercedes Benz	Purchase	1999	$	50,325.00	Poor	Under regular repair and maintenance
Riyadh, Saudi Arabia	1	SUV	Toyota Prado	Purchase	2010	$	29,413.33	Excellent	Under Car Refleeting Program (FY 2008)
	1	Van	Toyota Previa	Lease Purchase	2007		30,572.80	Good	Under regular repair and maintenance
	1	Sedan	Mercedes Benz 350L	Lease Purchase	2005	$	85,171.20	Good	Under regular repair and maintenance
	1	Van	Toyota Previa	Trade-in	1996		1,333.00	Poor	Unservicable and for disposal
Tel Aviv, Israel	1	Sedan	Mercedes Benz S350 2005	Lease Purchase	2005	$	90,056.76	Fair	Under regular repair and maintenance
	1	Van	Toyota Hi-Ace	Lease Purchase	2008		57,096.00	Good	Under regular repair and maintenance
Vientienne, Laos	1	Sedan	Mercedes Benz E230	Purchase	2009	$	46,500.00	Good	Under Car Refleeting Program (FY 2008)
	1	Motorcycle	KOLAO 125CC	Lease Purchase	2006		744.00	Good	Under regular repair and maintenance
Amman, Jordan	1	Sedan	Mercedes Benz	Purchase	2009	$	39,375.00	Good	Under Car Refleeting Program (FY 2008)
	1	Van	Toyota Hi-Lux	Donation	2003			Serviceable	Under regular repair and maintenance
Oslo, Norway	1	Sedan	Mercedes Benz E220	Lease Purchase	2008	$	49,107.14	Good	Under regular repair and maintenance
Lisbon, Portugal	1	Sedan	Mercedes Benz E250 CDI	Purchase	2010	$	54,881.44	Excellent	Under regular repair and maintenance
Warsaw, Poland	1	Sedan	Mercedes Benz E250	Purchase	2010	$	64,443.54	Excellent	Under regular repair and maintenance

B. Consulates									
Honolulu, Hawaii USA	1	Sedan	Lincoln Town Car	Lease Purchase	2002	$	39,395.00	Serviceable	Under regular repair and maintenance
Jeddah, Saudi Arabia	1	Sedan	Mercedes Benz E300	Purchase	2010	€	40,480.00	Excellent	Under Car Refleeting Program (FY 2008)
	1	SUV	Toyota Prado GX Diesel	Lease Purchase	2009		32,653.75	Serviceable	Under regular repair and maintenance
	1	Van	GMC Savana - 2006	Donation	2006		61,333.33	Good	Under regular repair and maintenance
	1	Sedan	Mercedes Benz S350L	Lease Purchase	2005		82,929.60	Serviceable	Under regular repair and maintenance
	1	Sedan	Lincoln Town Car	Purchase	1996		40,691.49	Poor	Unservicable and for disposal
	1	SUV	Mitsubishi Pajero	Purchase	1995		30,851.06	Poor	Unservicable and for disposal
	1	SUV	GMC Suburban	Donation	1995		38,829.79	Poor	Unservicable and for disposal
Osaka, Japan	1	Sedan	Mercedes Benz E350	Purchase	2010	$	68,328.65	Excellent	Under Car Refleeting Program (FY 2008)
	1	Sedan	Toyota Crown Royal Saloon	Donation				Good	Under regular repair and maintenance
	1	Van	Toyota Hi-Ace	Donation				Good	Under regular repair and maintenance
Milan, Italy	1	Sedan	Mercedes Benz E260	Purchase	2009	$	43,500.00	Good	Under Car Refleeting Program (FY 2008)
	1	Van	Volkswagen Caravelle	Purchase	2001		21,851.00	Serviceable	Under regular repair and maintenance
	1	Sedan	Mercedes Benz E220	Purchase	1997		35,309.00	Poor	Unservicable and for disposal
New York City, USA	1	Sedan	Mercedes Benz E350	Purchase	2011	$	67,348.38	Excellent	Under Car Refleeting Program (FY 2008)
	1	Sedan	Cadillac DTS 2007	Lease Purchase	2010		33,122.50	Good	Under regular repair and maintenance
Xiamen, PRC	1	Van	Golden Dragon	Donation	2007			Good	Under regular repair and maintenance
	1	Sedan	Toyota Camry 2003	Donation	2003			Serviceable	Under regular repair and maintenance
	1	Sedan	Toyota Camry 2005	Purchase	1995	$	20,077.72	Poor	Unservicable and for disposal
C. Missions									
New York, USA	1	Sedan	Mercedes Benz E350	Purchase	2010	$	58,644.00	Excellent	Under Car Refleeting Program (FY 2008)
	1	Sedan	Lincoln Town Car	Lease Purchase	2005		48,185.00	Serviceable	Under regular repair and maintenance

10. Estimation of Net Present Values

Using the available data from these government offices, and the assumptions described above, the net present values under lease and direct purchase were estimated applying the prescribed methodologies. Whenever possible, the estimates were done for three different types of motor vehicles per agency: low-end, mid-range and high-end. The classifications were based on the purchase price of motor vehicles acquired by the agencies from 2008-2012. Vehicle data from each agency were sorted according to acquisition cost, from lowest to highest, with the least expensive and most expensive units as proxies for low-end and high-end vehicles respectively. Likewise, as earlier stated, data for Agency 2 referred to motor vehicles purchased or rented abroad, and the reported acquisition costs were converted to Philippine currency using the applicable average US Dollar-Philippine Peso exchange rate (average annual exchange rate for the year of purchase).

The succeeding tables below summarize the relevant flows and calculations called for by Johnson and Lewellen's model. Note that the assumptions used were all based on prevailing government and market rates. Car rental rates for domestic cars or those used within the country were taken from the published rates posted on the websites of various car rental companies. For motor vehicles purchased and used abroad, the GSA rates for 2014 (Annex 1) were used as basis in lieu of real-time, country-specific data.

Meanwhile, since most of the data obtained were patchy and inconsistent, the NPV estimate using Methodology 2 was applied only to the case of Government Agency 2 and only for its purchase of Mercedes Benz E-Class units (sedan) between 2008-2011. An average inflation of 3.0 percent was discounted from the GSA monthly rate of USD 356 to estimate monthly car rental rates for 2010 and

earlier years. Additionally, whenever appropriate, the assumptions made under Methodology 1 were applied.

11. Results

Case 1: GOCC

Data obtained from the selected GOCC permitted the calculation of NPV for only two types of motor vehicles: low-end and mid/high-end. Tables 10 and 11 below show positive NPV for both types of vehicles.

Case 2: Government Department 1

For Government Department 1, the reported net present values favor direct purchase over leasing. This is true for all types of cars, from low-end AUVs to luxury cars which include SUVs like Toyota Fortuner (Tables 12-14). One plausible explanation for the positive NPV is the high cost of renting motor vehicles in the country. Another reason could be the anticipated economic life of a government motor vehicle, which is at least seven to 10 years.

Case 3: Government Department 2

The estimates generated using available data from Government Department 2 under Methodology 1 reveal negative NPVs, which suggest that leasing motor vehicles is more economically advantageous than purchasing. The results may be attributed to the low rental rates abroad and also the high purchase costs of the transport equipment acquired, which fall under the "high-end" category (Tables 15-17).

Similarly, NPV estimate under Methodology 2 (Annex 3) generated a negative result, which also suggests that abroad, leasing of cars is favorable over direct purchase. Evaluating all the variables applied in this model, salvage value appears to be a very strong determinant in support of leasing. This is consistent with the result obtained by Lebo and Scott (2009), where it was argued that without sufficient values, leasing would always turn out to be the most desirable option (Lebo and Scott 2009).

12. Summary and findings

Based on the calculations presented, it appears that for domestic vehicles, outright purchase would be more beneficial than leasing, regardless of technical specifications. The positive net present values obtained will ensue if (1) the net salvage value of the assets exceeds the extra operating costs of owning, or (2) the purchase price, less depreciation tax savings, is less than the burden of the lease payments (Johnson and Lewellyn, 1972). The latter appears to be truer in this case as accumulated cost of renting in the country has been shown to be much higher than cost of owning a vehicle.

Meanwhile, for superior and more expensive models, like the Mercedez Benz E350, leasing offers a more favorable option. The operating costs associated with such units far outweigh the cost of periodic leases. It is probable that in areas where there are significant players and car-renting is highly competitive, leasing is an attractive and perhaps the best alternative especially for offices with overseas operations. If the GSA rates are of any indication, it seems that international car rates are much lower than the reported domestic car rental rates. Likewise, salvage values, especially in relation to superior car models, can

significantly impact the decision to lease. Perhaps this is because these models can easily meet market demand for resale.

It is also important to mention that several important factors not covered by the study can significantly affect the estimation and sign of NPVs. For instance, bulk purchases and economies of scale and the entry of commercial banks in car leasing and/or car-ownership trade can have substantial impact in the lease-versus-buy decisions of firms. Any of these circumstances can either lower car costs and make motor vehicles more affordable or create low-cost lease opportunities (Johnson and Lewellyn, 1972).

This paper introduced two types of models, through which an attempt to establish the cost and benefits of leasing and purchasing motor vehicles was made. The findings however are far from conclusive because the assumptions regarding the variables and choice of input data are subject to change and interpretation. Hence, the results presented here can be significantly improved with the availability of longer and more accurate statistics, especially with respect to car rental rates and operating costs. Moreover, examining factors other than those considered by the study can provide sufficient understanding of the issues and present good topics for further research.

Table 10. GOCC : Low-end motor vehicle

Toyota Innova E Diesel MT Plate No. SJA 382

Assumptions:	
Economic Life (N) =	10
eqpt cost (date purchased: 2008)=	828,500
lease pymnt (annual)=	480,000
salvage cost (10% of purchase price)	82,850
Annual Operating cost	356,000
Corp inc tax	0.5
Capital gains rate	0.075
Overall cost of capital	0.12
Discount rate/borrowing cost (int rate)	0.08
aftr tax rate	0.04

	1400	42,000.00
	17,510.0	70,040.0

ILLUSTRATIVE CALCULATION USING GOCC DATA

Year, i	Tax Savings on Depreciation tDi (1)	After-tax Added Operatings Costs Oi (1-t) (2)	Salvage Value Net of Taxes S-tg (S-B) (3)	After-Tax Lease Payment Li (1-t) (4)	Present Value of (1) minus (2) plus (3), at 12 %	Present Value of (4) at 4%
1	75,318.18	178,000		240,000.0	(91,680)	230,769
2	67,786.36	178,000		240,000.0	(87,862)	221,893
3	60,254.55	178,000		240,000.0	(83,809)	213,359
4	52,722.73	178,000		240,000.0	(79,616)	205,153
5	45,190.91	178,000		240,000.0	(75,359)	197,263
6	37,659.09	178,000		240,000.0	(71,101)	189,675
7	30,127.27	178,000		240,000.0	(66,890)	182,380
8	22,595.45	178,000		240,000.0	(62,765)	175,366
9	15,063.64	178,000		240,000.0	(58,756)	168,621
10	7,531.82	178,000	76,636.3	240,000.0	(30,211)	162,135
					(708,050)	1,946,615

ΔNPV = NPV (P) - NPV (L)	
ΔNPV =	410,065
Conclusion: Purchasing is better than leasing	

Table 11. GOCC : Mid-range/High-end motor vehicle

2013 Isuzu Wagon, Crosswind Series, Model XT 2.5L Diesel (Midnight Blue)

Assumptions:	
Economic Life (N) =	10
eqpt cost (date purchased: 2013)=	945,000
lease pymnt (annual)=	725,760
salvage cost (10% of purchase price)	94,500
Annual Operating cost	356,000
Corp inc tax	0.5
Capital gains rate	0.075
Overall cost of capital	0.12
borrowing cost (int rate)	0.08
aftr tax rate	0.04

60480 Toyota Previa

ILLUSTRATIVE CALCULATION USING GOCC DATA

Year, i	Tax Savings on Depreciation tDi (1)	After-tax Added Operatings Costs Oi (1-t) (2)	Salvage Value Net of Taxes S-tg (S-B) (3)	After-Tax Lease Payment Li (1-t) (4)	Present Value of (1) minus (2) plus (3), at 12 %	Present Value of (4) at 4%
1	85,909.09	178,000		362,880.0	(82,224)	348,923
2	77,318.18	178,000		362,880.0	(80,263)	335,503
3	68,727.27	178,000		362,880.0	(77,778)	322,599
4	60,136.36	178,000		362,880.0	(74,904)	310,191
5	51,545.45	178,000		362,880.0	(71,754)	298,261
6	42,954.55	178,000		362,880.0	(68,418)	286,789
7	34,363.64	178,000		362,880.0	(64,974)	275,759
8	25,772.73	178,000		362,880.0	(61,482)	265,153
9	17,181.82	178,000		362,880.0	(57,993)	254,955
10	8,590.91	178,000	87,412.5	362,880.0	(26,401)	245,149
					(666,191)	2,943,282

ΔNPV = NPV (P) - NPV (L)
ΔNPV = 1,332,091
Conclusion: Purchasing is better than leasing

Table 12. Government Agency 1 – Low end motor vehicle

Mitsubishi Adventure GLX DSL

Assumptions:	
Economic Life (N) =	10
eqpt cost (date purchased: 2009?)=	879,600
lease pymnt (annual)=	600,000
salvage cost (10% of purchase price)	87,960
Annual Operating cost	356,000
Corp inc tax	0.5
Capital gains rate	0.075
Overall cost of capital	0.12
borrowing cost (int rate)	0.08
aftr tax rate	0.04

50000 Hyundai Trajet 7 seater
1400 42,000.00
17,510.0 70,040.0

ILLUSTRATIVE CALCULATION

Year, i	Tax Savings on Depreciation tDi (1)	After-tax Added Operatings Costs Oi (1-t) (2)	Salvage Value Net of Taxes S-tg (S-B) (3)	After-Tax Lease Payment Li (1-t) (4)	Present Value of (1) minus (2) plus (3), at 12 %	Present Value of (4) at 4%
1	79,963.64	178,000		300,000.0	(87,532)	288,462
2	71,967.27	178,000		300,000.0	(84,529)	277,367
3	63,970.91	178,000		300,000.0	(81,164)	266,699
4	55,974.55	178,000		300,000.0	(77,549)	256,441
5	47,978.18	178,000		300,000.0	(73,778)	246,578
6	39,981.82	178,000		300,000.0	(69,924)	237,094
7	31,985.45	178,000		300,000.0	(66,050)	227,975
8	23,989.09	178,000		300,000.0	(62,202)	219,207
9	15,992.73	178,000		300,000.0	(58,421)	210,776
10	7,996.36	178,000	81,363.0	300,000.0	(28,540)	202,669
					(689,690)	2,433,269

ΔNPV = NPV (P) - NPV (L)
ΔNPV = 863,979
Conclusion: Purchasing is better than leasing

Table 13. Government Agency 1— Mid-range motor vehicle

Isuzu Crosswind XT (AUV)	
Assumptions:	
Economic Life (N) =	10
eqpt cost (date purchased: 2009)=	925,000
lease pymnt (annual)=	725,760
salvage cost (10% of purchase price)	92,500
Annual Operating cost	356,000
Corp inc tax	0.5
Capital gains rate	0.075
Overall cost of capital	0.12
borrowing cost (int rate)	0.08
aftr tax rate	0.04

ILLUSTRATIVE CALCULATION

Year, i	Tax Savings on Depreciation tDi (1)	After-tax Added Operatings Costs Oi (1-t) (2)	Salvage Value Net of Taxes S-tg (S-B) (3)	After-Tax Lease Payment Li (1-t) (4)	Present Value of (1) minus (2) plus (3), at 12 %	Present Value of (4) at 4%
1	84,090.91	178,000		362,880.0	(83,847)	348,923
2	75,681.82	178,000		362,880.0	(81,567)	335,503
3	67,272.73	178,000		362,880.0	(78,813)	322,599
4	58,863.64	178,000		362,880.0	(75,713)	310,191
5	50,454.55	178,000		362,880.0	(72,373)	298,261
6	42,045.45	178,000		362,880.0	(68,879)	286,789
7	33,636.36	178,000		362,880.0	(65,303)	275,759
8	25,227.27	178,000		362,880.0	(61,702)	265,153
9	16,818.18	178,000		362,880.0	(58,124)	254,955
10	8,409.09	178,000	85,562.5	362,880.0	(27,055)	245,149
					(673,377)	2,943,282

ΔNPV = NPV (P) - NPV (L)
ΔNPV = 1,344,905
Conclusion: Purchasing is better than leasing

Table 14. Government Agency 1 – High-end motor vehicle

Isuzu 090 Altera 4x2 Wagon (SUV)	
Assumptions:	
Economic Life (N) =	10
eqpt cost (date purchased: 2009)=	1,567,000
lease pymnt (annual)=	1,048,320
salvage cost (10% of purchase price)	156,700
Annual Operating cost	356,000
Corp inc tax	0.5
Capital gains rate	0.075
Overall cost of capital	0.12
borrowing cost (int rate)	0.08
aftr tax rate	0.04

ILLUSTRATIVE CALCULATION

Year, i	Tax Savings on Depreciation tDi (1)	After-tax Added Operatings Costs Oi (1-t) (2)	Salvage Value Net of Taxes S-tg (S-B) (3)	After-Tax Lease Payment Li (1-t) (4)	Present Value of (1) minus (2) plus (3), at 12 %	Present Value of (4) at 4%
1	142,454.55	178,000		524,160.0	(31,737)	504,000
2	128,209.09	178,000		524,160.0	(39,693)	484,615
3	113,963.64	178,000		524,160.0	(45,580)	465,976
4	99,718.18	178,000		524,160.0	(49,750)	448,054
5	85,472.73	178,000		524,160.0	(52,502)	430,821
6	71,227.27	178,000		524,160.0	(54,094)	414,251
7	56,981.82	178,000		524,160.0	(54,742)	398,319
8	42,736.36	178,000		524,160.0	(54,631)	382,999
9	28,490.91	178,000		524,160.0	(53,914)	368,268
10	14,245.45	178,000	144,947.5	524,160.0	(6,055)	354,104
					(442,699)	4,251,407

ΔNPV = NPV (P) - NPV (L)
ΔNPV = 2,241,708
Conclusion: Purchasing is better than leasing

Table 15. Government Agency 2 – Low-end motor vehicle

Kia Carins 2.0 - Van (purchased: 2009)	$24,729.33
Assumptions:	
Economic Life (N) =	10
eqpt cost (date purchased: 2009)=	1,162,279
annual lease pymnt = (GSA:$260)	146,640.00
salvage cost (10% of purchase price)	116,228
Annual Operating cost	356,000
Corp inc tax	0.5
Capital gains rate	0.075
Overall cost of capital	0.12
borrowing cost (int rate)	0.08
aftr tax rate	0.04

68,328.7 USD
48000 yen/12 hrs
222 USD

ILLUSTRATIVE CALCULATION

Year, i		Tax Savings on Depreciation tDi (1)	After-tax Added Operatings Costs Oi (1-t) (2)	Salvage Value Net of Taxes S-tg (S-B) (3)	After-Tax Lease Payment Li (1-t) (4)	Present Value of (1) minus (2) plus (3), at 12 %	Present Value of (4) at 4%
	1	105,661.68	178,000		73,320.00	(64,588)	70,500
	2	95,095.51	178,000		73,320.00	(66,091)	67,788
	3	84,529.35	178,000		73,320.00	(66,531)	65,181
	4	73,963.18	178,000		73,320.00	(66,117)	62,674
	5	63,397.01	178,000		73,320.00	(65,029)	60,264
	6	52,830.84	178,000		73,320.00	(63,415)	57,946
	7	42,264.67	178,000		73,320.00	(61,400)	55,717
	8	31,698.50	178,000		73,320.00	(59,089)	53,574
	9	21,132.34	178,000		73,320.00	(56,568)	51,514
	10	10,566.17	178,000	107,510.76	73,320.00	(19,294)	49,532
						(588,120)	594,691

ΔNPV = NPV (P) - NPV (L)
ΔNPV = (356,328-945,000-89036) = (1,155,708)
Conclusion: Leasing is better than purchasing

Table 16. Government Agency 2 – Mid-range motor vehicle

Toyota Prado GX Diesel (2009)	$32,653.75
Assumptions:	
Economic Life (N) =	10
eqpt cost (date purchased: 2009)=	1,534,726
annual lease pymnt = $276* x 12 (GSA	155,664
salvage cost (10% of purchase price)	153,473
Annual Operating cost	356,000
Corp inc tax	0.5
Capital gains rate	0.075
Overall cost of capital	0.12
borrowing cost (int rate)	0.08
aftr tax rate	0.04

68,328.7 USD
48000 yen/12 hrs

ILLUSTRATIVE CALCULATION

Year, i		Tax Savings on Depreciation tDi (1)	After-tax Added Operatings Costs Oi (1-t) (2)	Salvage Value Net of Taxes S-tg (S-B) (3)	After-Tax Lease Payment Li (1-t) (4)	Present Value of (1) minus (2) plus (3), at 12 %	Present Value of (4) at 4%
	1	139,520.57	178,000		77,832.00	(34,357)	74,838
	2	125,568.51	178,000		77,832.00	(41,798)	71,960
	3	111,616.45	178,000		77,832.00	(47,250)	69,192
	4	97,664.40	178,000		77,832.00	(51,055)	66,531
	5	83,712.34	178,000		77,832.00	(53,501)	63,972
	6	69,760.28	178,000		77,832.00	(54,838)	61,512
	7	55,808.23	178,000		77,832.00	(55,273)	59,146
	8	41,856.17	178,000		77,832.00	(54,986)	56,871
	9	27,904.11	178,000		77,832.00	(54,126)	54,684
	10	13,952.06	178,000	141,962.18	77,832.00	(7,111)	52,581
						(454,296)	631,287

ΔNPV = NPV (P) - NPV (L)
ΔNPV = (356,328-945,000-89036) = (1,357,735)
Conclusion: Leasing is better than purchasing

Table 17. Government Agency 2 – High-end motor vehicle

Mercedes Benz E350 (Purchased in 2010)	**$68,328.65**
Assumptions:	
Economic Life (N) =	10
eqpt cost (date purchased: 2010)=	3,082,305
annual lease pymnt = $376* x 12 (GSA rate)	203,536
salvage cost (10% of purchase price)	308,231
Annual Operating cost	356,000
Corp inc tax	0.5
Capital gains rate	0.075
Overall cost of capital	0.12
borrowing cost (int rate)	0.08
aftr tax rate	0.04

68,328.7 USD
48000 yen/12 hrs

ILLUSTRATIVE CALCULATION

Year, i		Tax Savings on Depreciation tDi (1)	After-tax Added Operatings Costs Oi (1-t) (2)	Salvage Value Net of Taxes S-tg (S-B) (3)	After-Tax Lease Payment Li (1-t) (4)	Present Value of (1) minus (2) plus (3), at 12 %	Present Value of (4) at 4%
	1	280,209.58	178,000		101,768.16	91,259	97,854
	2	252,188.62	178,000		101,768.16	59,143	94,090
	3	224,167.67	178,000		101,768.16	32,861	90,472
	4	196,146.71	178,000		101,768.16	11,533	86,992
	5	168,125.75	178,000		101,768.16	(5,603)	83,646
	6	140,104.79	178,000		101,768.16	(19,199)	80,429
	7	112,083.83	178,000		101,768.16	(29,817)	77,335
	8	84,062.87	178,000		101,768.16	(37,940)	74,361
	9	56,041.92	178,000		101,768.16	(43,979)	71,501
	10	28,020.96	178,000	285,113.25	101,768.16	43,510	68,751
						101,767	825,431

ΔNPV = NPV (P) - NPV (L)
ΔNPV = (356,328-945,000-89036) = (2,155,108)
Conclusion: Leasing is better than purchasing

Annex 1. GSA Rental Rates

Vehicle Description	Equip. Code	Federal Std. Item	2014 Monthly Rate	2014 Mileage Rate
PASSENGER VEHICLES				
Sedan, Midsize	1100	10B	$ 260.00	$ 0.180
Sedan, Midsize, Special Services	1125	17Z	$ 308.00	$ 0.200
Sedan, Midsize, Special Services	1126	17, 17F	$ 350.00	$ 0.200
Sedan, Midsize, Special Services, Charger	1127	17R	$ 373.00	$ 0.200
Sedan, Compact	1200	9C, 9Z	$ 171.00	$ 0.150
Sedan, Compact (Hybrid)	1203	9H	$ 171.00	$ 0.110
Sedan, Compact (Hybrid - Full Replacement)	1204	9H	$ 341.00	$ 0.110
Sedan, Compact	1263	9D	$ 231.00	$ 0.160
Sedan, Subcompact	1300	8C, 8Z, 6	$ 160.00	$ 0.135
Sedan, Subcompact (Hybrid)	1301	8H	$ 160.00	$ 0.105
Sedan/Station Wagon Subcompact (Electric)	1305	8E	$ 171.00	$ 0.059
Sedan/Station Wagon Subcompact (Electric)	1307	8P	$ 171.00	$ 0.075
Sedan, Subcompact (CNG)	1330	8N	$ 160.00	$ 0.135
Sedan, Microcompact	1358	7, 7Z	$ 204.00	$ 0.136
Sedan, Large, Special Services	1426	17R	$ 376.00	$ 0.240
Motorcycle (Electric)	1700	2E	$ 187.00	$ -
Motorcycle (Electric)	1701	2E	$ 256.00	$ -
Station Wagon, Subcompact	2000	12Z	$ 189.00	$ 0.145
Station Wagon, Subcompact	2100	13Z	$ 242.00	$ 0.160

LIGHT TRUCKS, LESS THAN 12,500 GVWR, 2-WHEEL DRIVE (4X2)				
	Equip.	Federal	2014 Monthly	2014 Mileage
Vehicle Description	**Code**	**Std. Item**	**Rate**	**Rate**
Minivan 4x2, Cargo (Electric)	4109	30E	$ 204.00	$ 0.077
Van, Cargo	4110	30	$ 204.00	$ 0.195
Van, Passenger	4115	20, 20C	$ 214.00	$ 0.195
Compact Pickup, Regular Cab	4120	60	$ 192.00	$ 0.185
Compact Pickup, Extended Cab	4121	61C	$ 197.00	$ 0.185
Compact Pickup, Crew Cab	4122	61E	$ 200.00	$ 0.185
Standard Pickup, Regular Cab	4150	41, 41Z	$ 197.00	$ 0.185
4X2 SUV, Compact	4174	98A	$ 231.00	$ 0.165
Sport Utility, 4-Door (Hybrid)	4175	98H, 100	$ 188.00	$ 0.150
Sport Utility	4181	91	$ 277.00	$ 0.210
SUV, Crossover, 4-door	4182	91B	$ 277.00	$ 0.210
Sports Utility, 4-door	4194	98	$ 188.00	$ 0.185
Van, Cargo	4210	31, 31Z	$ 222.00	$ 0.230
Van, Passenger	4215	21	$ 230.00	$ 0.230
Sport Utility, Special Services	4221	100L	$ 310.00	$ 0.255
Standard Pickup, Regular Cab	4250	41, 42Z	$ 200.00	$ 0.240
Standard Pickup, Extended Cab	4251	41C	$ 206.00	$ 0.240
Standard Pickup, Crew Cab	4252	50, 50Z	$ 225.00	$ 0.240
Standard Pickup, Crew Cab (Hybrid)	4254	50H	$ 225.00	$ 0.200
Standard Pickup, Crew Cab, Special Services	4255	50C	$ 259.00	$ 0.250
Standard Pickup, Full Size, Crew Cab	4259	51	$ 230.00	$ 0.240
4x2 SUV, 4-door, Special Services*	4272	101C	$ 296.00	$ 0.250
Sport Utility, 4-Door	4275	100B, 100C	$ 287.00	$ 0.240
Sport Utility, 4-Door	4276	101	$ 301.00	$ 0.240
Sport Utility, 4-Door	4279	100A	$ 267.00	$ 0.240
Van, Cargo	4310	32, 32Z, 34, 34N, 75E	$ 252.00	$ 0.230
Van, Maint. Conversion	4313	162	$ 252.00	$ 0.230
Van, Passenger	4315	22, 24	$ 260.00	$ 0.230
Pickup, Regular Cab	4350	44, 44A, 44B	$ 238.00	$ 0.250
Pickup, Extended Cab	4351	44C, 44D, 44E	$ 244.00	$ 0.250
Pickup, Crew Cab	4352	51C, 52, 54	$ 258.00	$ 0.250
Service Utility	4355	82, 83, 84	$ 258.00	$ 0.260
Service Utility, Crew Cab	4356	141, 142, 144	$ 301.00	$ 0.260
Service Utility, Extended Cab	4357	82C, 83C, 84C	$ 276.00	$ 0.260
4X2 Pickup, Crew Cab	4360	52A	$ 265.00	$ 0.260
Van, Cargo	4364	95, 95E, 95Z	$ 276.00	$ 0.220
Delivery Van, Cut-off Cab	4365	92, 94	$ 297.00	$ 0.285
Multistop Van (FC) Truck	4366	131, 134	$ 297.00	$ 0.285
Cargo Van, Cutaway, CNG	4368	94N	$ 492.00	$ 0.285
Chassis & Regular Cab	4370	73, 74, 74A	$ 258.00	$ 0.260
Chassis & Crew Cab	4371	73E, 73F, 74E	$ 274.00	$ 0.260
Chassis & Extended Cab	4372	73C, 73D, 74C	$ 269.00	$ 0.260
4x2 Flightline Van (Ford E350)	4374	92F	$ 276.00	$ 0.230
Sport Utility, 4-Door	4375	102, 102C	$ 301.00	$ 0.250
Chassis & Cutaway Cab	4376	75, 75A, 75D, 75F	$ 196.00	$ 0.260
Stake, Regular Cab	4380	122, 123, 124	$ 258.00	$ 0.260
Stake, Crew Cab	4381	122E, 123E, 124E	$ 287.00	$ 0.260
Stake, Extended Cab	4382	122C, 123C, 124C	$ 274.00	$ 0.260
Dump Truck	4390	154, 154Q	$ 258.00	$ 0.260

Annex 2

METHODOLOGY 1	Case 1: GOCC		Case 2: Government Agency 1				Case 3: Government Agency 2		
	Low end	High end	Low end	Mid-range	High end	High end	Low end	Mid-range	High end
Car type/model	**Toyota Innova E Diesel MT Plate No. SJA 382**	**2013 Isuzu Wagon, Crosswind Series, Model XT 2.5L Diesel (Midnight Blue)**	**Mitsubishi Adventure GLX DSL**	**Isuzu Crosswind XT (AUV)**	**Isuzu 090 Altera 4x2 Wagon (SUV)**	**Toyota Fortuner 4x4 DSL A/T (SUV)**	**Kia Carins 2.0 - Van**	**Toyota Prado GX Diesel**	**Mercedes Benz E350**
Date purchased	2008	2013	2009?	2009	2009	2012	2009	2009	2010
Purchase price in USD							$24,729.33	$32,653.75	$68,328.65
Assumptions:									
Economic Life (N) =	10	10	10	10	10	10	10	10	10
Eqpt cost or purchase price (in PhP)=	828,500	945,000	879,600	925,000	1,567,000	1,895,000	1,162,279	1,534,726	3,082,305
Lease payment (annual)*=	480,000	725,760	600,000	725,760	1,048,320	1,128,960	146,640	155,664	203,536
Salvage cost (10% of purchase price)	82,850	94,500	87,960	92,500	156,700	189,500	116,228	153,473	308,231
Annual Operating cost	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Corp inc tax	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Capital gains rate	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
Overall cost of capital	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
borrowing cost (int rate)	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
aftr tax rate	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
*from online sources		*rental for Toyota Previa (60,480/month)*	*rental for Hyundai Trajet 7 seater (50k/month)*	*rental for Toyota Previa (60,480/month)*	*rental for Nissan Patrol (87,360/month)*	*rental for Toyota Fortuner (92,123/month)*	*GSA rate: $260/mo 1 USD: 47 PhP*	*GSA: $276/mo 1 USD: 47 PhP*	*GSA: $376/mo 1 USD: 45.11 PhP*
	1,381,017.61	2,302,125.23	1,834,529	2,315,097	3,206,835	3,321,133	(186,639.20)	(391,364.14)	(1,199,948.53)
ΔNPV =	410,064.52	1,332,091.13	863,979	1,344,905	2,241,708	2,358,593	(1,155,707.78)	(1,357,734.56)	(2,155,107.67)
CONCLUSION	Purchase	Purchase	Purchase	Purchase	Purchase	Purchase	Lease	Lease	Lease

Annex 3

METHODOLOGY 2: COMPACT SEDAN BASELINE CALCULATIONS									
FY	Vehicles Acquired	Total Inventory	Monthly Lease Rate per Vehicle*	Inflation Adjusted Yearly Lease Rate per Vehicle	4 yr Capitalization Rate	Discount Rate Factor		Annual Cost of Inventory	NPV of Total Annual Cost of Inventory
UNDER LEASE									
2008	2	2	$343.17	$4,118	0.120	1.00000		$8,236	$8,236
2009	5	7	$353.78	$4,245	0.120	0.89286		$29,717	$26,533
2010	5	12	$364.72	$4,377	0.120	0.79719		$52,519.68	$41,868
2011	1	13	$376.00	$4,512	0.120	0.71178		$58,656.00	$41,750
							TOTAL	$149,129	$118,388
FY	Vehicles Acquired	Total Inventory	Avg Purchase Price Per Vehicle	Annual Maintenance cost per Vehicle	Avg Salvage value per year	Discount Rate Factor	Average Salvage Value	Annual Cost of Inventory	NPV of Total Cost of Inventory
UNDER PURCHASE				Assumption:					
				PHP 356,000.00					
2008	2	2	53,632.89	$8,005	30,818.7	1.00000	661,159,010.61	123,274.92	($661,035,736)
2009	5	7	42,715.20	$7,473	62,735.4	0.89286	1,071,902,730.33	250,941.76	($1,071,678,675)
2010	5	12	55,424.15	$7,892	79,145.0	0.79719	1,754,618,332.05	316,580.11	($1,754,365,956)
2011	1	13	67,348.38	$8,219	18,891.9	0.71178	508,935,559.94	75,567.60	($508,881,772)
							TOTAL	766,364.39	($3,995,962,140)

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