

Francisco, Kris A.; Abrigo, Michael Ralph M.

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## CONTACT US:

RESEARCH INFORMATION DEPARTMENT  
Philippine Institute for Development Studies

18th Floor, Three Cyberpod Centris - North Tower  
EDSA corner Quezon Avenue, Quezon City, Philippines

publications@pids.gov.ph  
(+632) 8877-4000

<https://www.pids.gov.ph>

# Market Power in the Philippine Domestic Shipping Industry

Kris A. Francisco  
Michael R.M. Abrigo

PHILIPPINE INSTITUTE FOR DEVELOPMENT STUDIES

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## **Abstract**

High market concentration in the Philippine domestic shipping industry has always been a subject of concern among policymakers and researchers. While many reforms aimed at improving the level of competition in the industry have been implemented since the 1990s, studies show that domestic shipping operations remain in the hands of a few players, especially at the route-level. This study aims to enrich the discussion by providing an alternative measure of market power in domestic shipping, through the estimation of markups –a useful indicator of how firms can price their goods or services above marginal cost. Estimates confirm the exercise of market power in the domestic shipping industry, as evidenced by high markups. It was also found that markup on freight is relatively larger than the markups on passenger services. Additional analysis confirms that having a high market share significantly influences high markups.

**Keywords:** Market power; Markups; Domestic shipping

**JEL:** D2, D4, L1

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# Market Power in the Philippine Domestic Shipping Industry

*Kris A. Francisco and Michael R.M. Abrigo<sup>1</sup>*

## I. Introduction

The Philippine domestic shipping industry has experienced significant policy reforms aimed at improving the level of competition in inter-island shipping, since the 1990s. Despite government efforts, however, studies show that domestic shipping, especially at the route-level, remains concentrated among a few players. For instance, Austria (2003) found that in the year 2000, the top 10 shipping companies in the Philippines controlled 74 percent of the domestic cargo market, while the top 5 container shipping lines accounted for 82 percent of the total container throughput. Llanto et al. (2005) hinged the strong market concentration on the lack of transparency and weak enforcement of policies and regulations that were meant to promote competition. Consistent with these findings, a World Bank document (2014) revealed that more than 40 percent of the 54 routes included in their analysis were served by a lone operator, and less a quarter were served by 3 or more operators. In addition, a recent study (Francisco 2023) observed that while at the aggregate, the level of competition appears to have improved over the years, route-level data shows that some routes even worsened in terms of competition when compared with the previous estimates of Austria (2003).

A World Bank publication (2014)<sup>2</sup> remarks that the state of market concentration in domestic shipping unsurprising given the characteristics of the industry that tends to favor an oligopolistic market structure. For one, economies of scale serve as a huge factor in ship operations, wherein there exist an incentive for companies to expand their operations to compensate for the maintenance and operating cost of ships. Relatedly, frequency of service is more attractive to customers than having a large vessel offering only a single schedule per day; hence, the tendency of one or a few companies to target more turnarounds and dominate a specific shipping route. While this is the case, the government nevertheless, desires some form of competition at the route level to deter companies from gaining too much market power, which could have welfare implications to consumers and the whole industry.

There are some important points to consider when dealing with market power. On the one hand, great market power, especially in the absence of a strong market-disciplining force, could lead to several economic consequences. Firms, without much competition, can command higher prices to the detriment of the consumers. High market power could eventually result to lower demand for labor, lower capital investment, and distort the distribution of economic rents, constraining business growth and innovation (De Loecker et al. 2020). On the other hand, high market concentration may not necessarily be bad if the market is contestable and there exist a market force that disciplines the players. Given this range of possibilities, studies are crucial to better understand

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<sup>1</sup> The authors are grateful for the research assistance of Valerie Lim and Jan Bianca Abellera, Research Analysts in the Philippine Institute for Development Studies.

<sup>2</sup> See World Bank (2014). Enhancing Competition Conditions and Competitiveness of Philippine Domestic Shipping. Report No. 105363-PH, accessed from <https://elibrary.worldbank.org/doi/abs/10.1596/24800>

the dynamics of market power in certain industries, to inform policy decisions and craft better regulations.

This study aims to deepen the discussion about market power in the Philippine domestic shipping industry by estimating the markups of shipping companies and detecting observable trends. Markup is an informative indicator about how companies can price their goods or services above marginal cost, implying some level of market power (De Loecker et al. 2020). Our analysis seeks to provide a solid demonstration of the exercise of market power in a seemingly concentrated industry. We further utilize our markup estimates in a regression framework to establish correlations with shipping company characteristics, to learn more about the heterogeneity involved in the practice of market power within the industry. Results of this study could provide new insights about the domestic shipping industry, which could be useful in policymaking. The rest of the paper is organized as follows: In Section II, we discuss our estimation strategy and sources of data. In Section III, we present our estimates and discuss our results, and in Section IV, we convey our conclusion.

## II. Methodology

Studies on market power generally equates having market power with the firm's ability to set the price of their services/commodities above marginal cost<sup>3</sup>. Based on literature, there are two main directions for estimation. One is through concentration measures such as the Herfindahl-Hirshman index, which are sensitive to the definition of markets and rest on the assumption of Cournot type of competition<sup>4</sup>. The second is through the estimation markups –measured as the gap between the price and the marginal cost of producing a specific good/service.

Markup estimation was initially considered extremely challenging due to the data requirements and assumptions needed for estimation. Earlier studies of Bresnahan (1989) and Berry et al. (1995) employed a demand approach, which necessitates data on prices, quantities, and consumer characteristics that are typically difficult to obtain. The demand approach also requires some assumptions on consumer behavior as well as on profit maximization and competition of firms, limiting its application to aggregate markets facing different kinds of conditions. Alternatively, the production approach was initiated by Hall in 1988. In contrast, this approach only made use of firms' input and output data in estimating the markup. Each firm's markup at any point in time is given by the difference between a variable input's revenue share –which is directly observable in the firm's accounting data, and the input's elasticity with respect to output –obtained by estimating the production function. The practical advantage of the production approach is its relatively simpler data requirements, which can be sourced from firms' financial statements. It also does not require a specific model for the demand or market conduct, making it easier to implement on a broader scope of heterogenous markets and over long periods of time<sup>5</sup>. The initial work of Hall was further enhanced by the likes of De Loecker and Warzynski in 2012, and this has led to the

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<sup>3</sup> See Syverson 2019 for an extensive discussion on market power.

<sup>4</sup> See discussion of De Loecker et al. 2020 and Syverson 2019.

<sup>5</sup> Read De Loecker et al. 2020 for more discussion.

widespread adoption of the markup estimation technique in industrial organization and development economics.

### *Estimation*

Our analysis adopts the advancements made to the production approach by De Loecker and Warzynski (2012), which builds upon the work of Hall (1988). We come up with more efficient markup estimates by controlling for unobserved productivity and allowing for flexible production technologies<sup>6</sup> in our estimation. De Loecker and Warzynski's refinements also enable us to produce firm-specific and time-specific markup estimates, which we later utilize in a regression framework to establish correlations with firm characteristics.

The empirical strategy we follow is highly dependent on the cost-minimization conditions for variable inputs, facing zero adjustment costs<sup>7</sup>. We estimate the firm-level markups in the Philippine domestic shipping industry, by generating output elasticities from a production function and combine these with firm-level information on variable input expenditure and total sales. The technique requires only the estimation of output elasticity of at least one variable input of production, and the expenditure share of that input. The expression for the markup is given by:

$$u_{it} = \theta_{it}^x (\alpha_{it}^x)^{-1}$$

where  $u_{it}$  is the markup or price-marginal cost ratio;  $\theta_{it}^x$  is output elasticity of  $x$  (set as labor); and  $\alpha_{it}^x$  is share of total cost of input  $x$  in total sales.

Meanwhile, the estimation of a production function based on the proxy methods, developed by Olley and Pakes (1996), Levinsohn and Petrin (2003) and Akerberg, Caves and Frazer (2015), is an important step in obtaining the estimate for the output elasticity  $\theta_{it}^x$ . The proxy methods generally, take advantage of the differential timing of production decisions (investments, labor, and variable input) to consistently estimate elasticities and total factor productivity<sup>8</sup>.

The second part of our analysis involves utilizing our markup estimates in a regression form to establish correlations with firm characteristics. Results from our regressions will uncover possible heterogeneity related to the exercise of market power within the country's domestic shipping industry. Our regression model can be generalized as:

$$\ln u_{it} = \delta_0 + \mathbf{b}'_{it} \sigma + \gamma_t + \varphi_i + \varepsilon_{it}$$

where  $\ln u_{it}$  is the log markup estimate;  $\mathbf{b}'_{it}$  represents firm characteristics and the corresponding coefficients,  $\sigma$ ;  $\gamma_t$  and  $\varphi_i$  controls for year- and region- fixed effects, respectively; and finally,  $\varepsilon_{it}$  represents the idiosyncratic error term.

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<sup>6</sup> Read De Loecker and Warzynski (2012) for a discussion on the refinements to the model.

<sup>7</sup> See Basu and Fernald (2002) and Petrin and Sivadasan (2010) for similar works.

<sup>8</sup> See full discussion in De Loecker and Warzynski (2012).

## *Data*

Our analysis relies on the detailed income and expenditure information of domestic shipping companies in the Annual Survey of Philippine Business and Industry (ASPBI) and Census of Philippine Business and Industry (CPBI), sourced from the Philippine Statistics Authority. We utilized data during the period 2012 to 2019, where we observed information on capital participation, employment, types, values and breakdown of income and expenditure items. More particularly, we exploit the following firm-level information in our estimation: count of workers, assets value, compensation of employees and materials cost.

Table 1 exhibits the distribution of firms in our sample based on some characteristics. Generally, we classify the firms based on whether they are involved in passenger or freight services. Our summary shows that most of our samples for both classifications are smaller firms (less than 200 workers), with a small market share (below 5 percent), and less than 40 years in the business. We note that market share here is the share for the whole industry and not at the route-level. Many of the firms in our sample are also involved in sea and coastal water transport and are mainly operating in the National Capital Region (NCR).

### **III. Results and findings**

Following De Loecker and Warzynski (2012), we estimate the markups for domestic shipping companies during the period of 2012 to 2019. As shown in Table 2, we summarized our markup estimates based on some firm characteristics to discern observable patterns. Similar with Table 1, we categorized firms based on the nature of their services –either passenger or freight. We also used median markups for comparison.

#### *Passenger vs freight services*

Table 2 generally implies that firms with the following profile impose higher level of markup: high market share; high fixed assets; higher employment; and longer in the business. This is intuitive since firms in a dominant position have the tendency to exert market power through raising markups. Characteristics such as high market share, high fixed assets, high employment, and being longer in the business are also interrelated. We also notice that firms that are operating outside of the NCR levy higher markups.

Meanwhile, in addition to initial observations, we discern a difference between how markups are imposed on passenger and freight services. When we compare our computed median markups, we notice that firms impose relatively higher markups on freight. We consistently observe this under all firm characteristics considered in the table.

**Table 1. Firm distribution by selected characteristics (in %)**

	Passenger	Freight	All types
All firms	100.0	100.0	100.0
Market share			
Below 5%	88.7	86.5	87.8
5% and over	11.3	13.5	12.2
Net income			
Below 10% of current expense	55.1	56.5	55.7
At least 10% of current expense	44.9	43.5	44.3
Number of workers			
Less than 200 workers	87.4	86.1	86.9
At least 200 workers	12.6	13.9	13.1
Fixed assets			
Less than PhP100 million	81.9	57.1	71.7
At least PhP100 million	18.1	42.9	28.3
Age			
Below 40 years	85.0	80.1	83.0
At least 40 years	15.1	19.9	17.0
Ownership			
Partly foreign-owned	4.3	14.6	8.5
Wholly Filipino-owned	95.7	85.4	91.5
Transport industry class			
Sea and coastal water	75.7	94.0	83.2
Inland water	24.3	6.0	16.8
Legal organization			
Single proprietorship	38.1	2.6	23.5
Corporation and others	61.9	97.4	76.5
Economic organization			
Single establishment	72.2	78.9	74.9
Establishment with branches	27.8	21.1	25.1
Region			
National Capital Region	89.1	60.3	77.3
Other regions	10.9	39.8	22.7

Source of basic data: Annual Survey of Philippine Business and Industry (ASPBI) and Census of Philippine Business and Industry (CPBI)

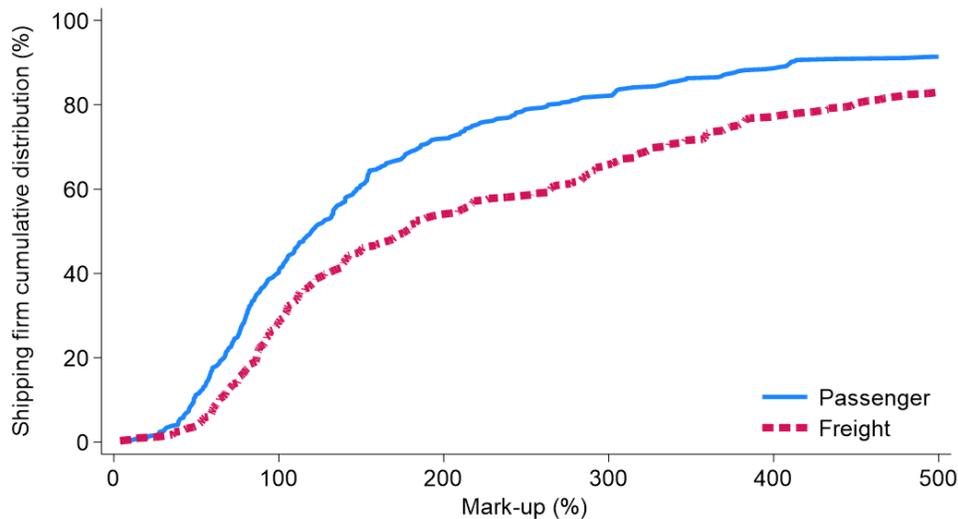
To support our findings in Table 2, we further examine our results by plotting a separate cumulative distribution of estimated markups for passenger and freight services, seen in Figure 1. As exhibited in the figure, the distribution plot for passenger services is shifted farther to the left, indicating lower computed markups relative to freight services. Take for instance, the markups at the 60<sup>th</sup> percentile where the value for passenger services registers at 150 percent while the value for freight services is at 300 percent. Moreover, we observe that the markups in passenger services appear to have lower variability, or they are closer in range of values, than the markups in freight. We note that most markups in passenger services occur between 80 to a little less than 200 percent. In comparison, the markup for freight is relatively more spread out between 100 to 500 percent.

**Table 2. Median markup by firms, by selected characteristics (in %)**

	Passenger	Freight	All types
All firms	103.3	162.2	118.3
Market share			
Below 5%	90.8	144.9	108.4
5% and over	215.4	447.1	336.6
Net income			
Below 10% of current expense	102.3	150.1	118.7
At least 10% of current expense	105.2	176.3	116.6
Number of workers			
Less than 200 workers	88.6	150.1	108.4
At least 200 workers	165.0	316.8	205.6
Fixed assets			
Less than PhP100 million	83.8	104.9	92.7
At least PhP100 million	229.6	316.8	285.8
Age			
Below 40 years	96.7	168.9	112.1
At least 40 years	111.6	150.1	144.9
Ownership			
Partly foreign-owned	92.9	121.2	105.5
Wholly Filipino-owned	104.0	167.1	119.5
Transport industry class			
Sea and coastal water	112.1	164.3	133.0
Inland water	80.9	103.6	83.7
Legal organization			
Single proprietorship	71.0	86.0	73.0
Corporation and others	138.2	169.4	150.1
Economic organization			
Single establishment	88.6	150.1	111.1
Establishment with branches	140.3	209.0	148.2
Region			
National Capital Region	97.1	144.9	108.4
Other regions	149.3	173.0	167.3

Source: Authors' calculations.

**Figure 1. Distribution of firm markups in domestic shipping industry: Philippines, 2012-2019**



Source: Authors' calculations.

Our findings from Table 2 and Figure 1 seem to suggest a difference between the behavior of firms providing passenger and freight services. We relate our results to a previous study that discussed the forces of competition faced in the passenger and freight market. Austria (2003) noted that the passenger market is constrained by additional competition from the air transport industry. Budget airlines act as a close competitor for third class passengers, thereby serving as a constant threat to domestic shipping companies. Stated differently, there exist a strong disciplining force in the passenger market that is not present in the freight market. We take this as one of the possible reasons for the observed difference in the level of markups for passenger and freight services.

### *Market power and markup*

To strengthen the link between market share and the exercise of market power –proxied by the computed markups, we utilize our estimates in a regression framework and try to establish correlations with select firm characteristics. Our regression results are shown in Table 3. We present six models with increasing number of included characteristics to analyze how markups are being influenced by factors inherent to the firms. We also control for year and region fixed-effects to reduce noise in our estimates.

As shown in the table, Models 1, 2 and 3 strongly implies the importance of market share and net income in the firm's exercise of market power. An increase in the firm's market share results to an increase in the level of markup imposed. Similarly, higher net income leads to higher markup. These findings are further strengthened in Models 4, 5 and 6, which shows better estimates (larger beta coefficients) while accounting for more firm characteristics. Additionally, Models 4, 5 and 6 suggests that firms with high fixed assets typically impose higher markup. Another interesting finding from our regressions is the inverse relationship between the count of workers and markups.

Based on our results, employing additional workers in domestic shipping results to lower markups or alternatively, reducing the number of workers lead to higher markups. This firm behavior related to the practice of market power leading to lower labor share has an entire strand of literature (see for instance Chari et al. 2007, Autor et al. 2017, Bils et al. 2018), and is beyond the scope of our study. Meanwhile, we also found that markups for inland water transport are priced significantly lower.

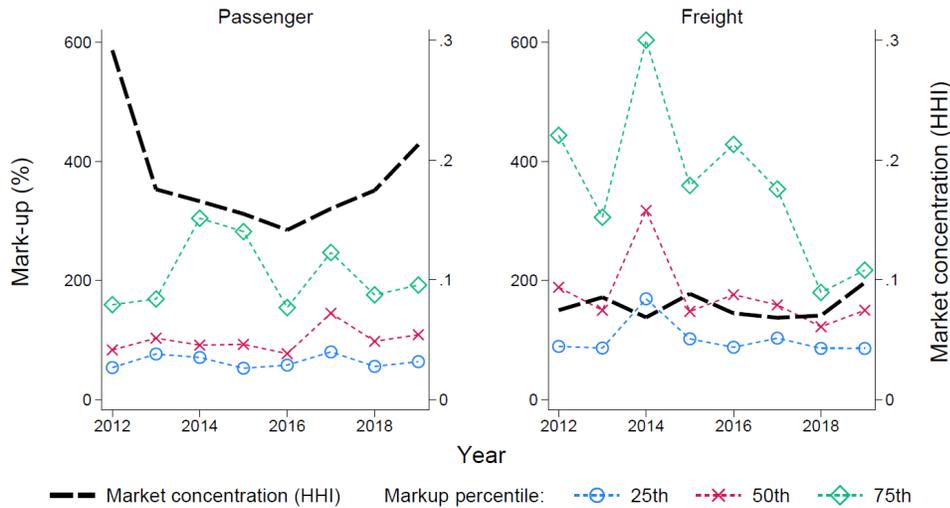
**Table 3. Shipping firm markup linear model**

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Market share (%)	0.095 *** (0.036)		0.092 *** (0.035)	0.134 *** (0.038)		0.129 *** (0.037)
Net income (% of current expense)		0.030 *** (0.007)	0.029 *** (0.007)		0.028 *** (0.006)	0.027 *** (0.005)
Age (years)	-0.105 (0.075)	-0.036 (0.066)	-0.038 (0.065)	-0.117 * (0.064)	-0.055 (0.059)	-0.059 (0.056)
Age-squared	0.002 * (0.001)	0.001 (0.001)	0.001 (0.001)	0.002 ** (0.001)	0.001 (0.001)	0.001 * (0.001)
Workers (count), log				-1.645 *** (0.501)	-1.427 *** (0.493)	-1.594 *** (0.486)
Fixed assets (PhP), log				0.603 ** (0.236)	0.696 *** (0.243)	0.628 *** (0.237)
Wholly Filipino-owned (=1)				0.084 (1.248)	0.360 (1.247)	0.359 (1.220)
Single proprietorship (=1)				-2.609 ** (1.136)	-2.720 ** (1.110)	-2.533 ** (1.089)
Establishment with branches (=1)				0.104 (0.417)	0.219 (0.398)	0.233 (0.375)
Inland water transport (=1)				-2.220 *** (0.708)	-0.131 (0.846)	-2.147 *** (0.647)
Freight transport (=1)				0.747 (0.595)	0.641 (0.589)	0.558 (0.561)
Constant	4.823 *** (1.463)	3.374 ** (1.434)	3.397 ** (1.431)	-0.826 (2.241)	-4.680 ** (2.232)	-2.674 (2.200)
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	745	745	745	744	744	744
Clusters (Firms)	234	234	234	234	234	234
BIC	4,888	4,871	4,859	4,826	4,821	4,798
Adjusted R-squared	0.096	0.117	0.137	0.205	0.211	0.240

As a final step, we plot our computed markups over our sample period, and include the Herfindahl-Hirschman indices (HHI) computed for the domestic shipping industry from a previous study (Francisco 2023). These HHIs were used to gauge market concentration to determine the level of competition in the industry.

We generally notice a similarity between the trend of the markups and the HHI in Figure 2. We observe that markups seem to closely follow the movement of the HHI. We notice that when market concentration is high, the level of markups also rises. The reverse is likewise true. While our comparison is crude, it nevertheless, suggests some feedback dynamics between market concentration and markups.

**Figure 2. Trends in markups and HHI**



#### IV. Summary and Conclusion

At large, what we have seen in our results is the existence and practice of market power in the domestic shipping industry. In the past, discussions about market power have been limited to the results of concentration indices, possibly due to the lack of data and more sophisticated methodologies. Using the recent developments in markup estimation techniques, we were able to add a new dimension into the discussions. To highlight the value of our results, we recall important findings from two related studies.

In 2003, Austria computed HHI for the whole industry as well as for primary and secondary routes using 1998 data; wherein she revealed that domestic shipping is highly concentrated. She found that only 5 companies dominated in both passenger and cargo services, effectively controlling majority of the primary and secondary routes. A study released twenty years later (Francisco 2023), provided continuity to Austria’s work, by assessing the state of competition in domestic shipping given the policy reforms implemented to improve market competition. Following Austria’s work, concentration indices were computed for years 2010 to 2017 and was compared to 1998 values. Results from the study confirmed that at the aggregate level, market competition has improved. It also appears that government intervention aimed at encouraging more players into domestic shipping has worked as the number of shipping companies increased over time. Additionally, the study noted that the market for cargo services has become relatively more competitive (i.e. more players) than the market for passenger services. This observation was attributed to possible differences in incentives or constraints related to providing those services.

With our estimates, we found that the level of markups on freight is set higher than the level of markups on passenger services. We take this as a possible indication of lucrateness in freight business that could have attracted more players to join the market. We highlight that in contrast to freight, the passenger market is facing more complex competition because apart from competition within the industry, it also faces competition from budget airlines. This could have major

implications on how markups are set for passenger services; hence the difference we observed in our results.

Two useful policy insights can be obtained from this study. First, as we've tackled in our discussions, there are differences in the way competition has evolved for the market on freight and passengers. Having said this, policies and regulations should be formulated and designed specific to each market to ensure appropriateness and effectivity. Second, there are many dimensions to the topic of market power that still needs to be explored. This study, in no way, intends to advocate a specific policy at this point, but would like to underscore the importance of research to further understand the underlying causes of firm behavior in the domestic shipping industry, in the aim of crafting better policy responses.

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