Concentration and Diversification in a Small Island Economy: Mauritius

Stephen Davies
Centre for Competition Policy and School of Economics, University of East Anglia
Prishnee Armoogum
Competition Commission, Mauritius

CCP Working Paper 21-13
This version: 22 December 2021

Abstract: The objectives of this paper are partly to add to the worldwide literature on contemporary levels of concentration – but in our case for a small island economy, and partly to provide a reference study which yields a concise and accessible source for anyone interested in gaining a quick picture of the state of concentration and diversification of the leading firms in Mauritius. In the main, we have confined ourselves to fact-finding at this stage, and the novelty of the work lies in the descriptive statistical framework within which it is presented. Nevertheless, it is inevitably policy relevant. In our opinion it suggests the need for continuing vigilance of concentration in individual markets, but also more research in the potential competition implications of the fact that the very largest firms have leading, possibly dominant, market shares in more than one industry – is such diversification a cause for competition concern?

Contact Details:

Stephen Davies	S.W.Davies@uea.ac.uk
Prishnee Armoogum	Khemla@yahoo.com

ISSN 1745-9648

Concentration and **Diversification in a Small Island Economy: Mauritius 22.12.2021**

Prishnee Armoogum[1] and Stephen Davies

Executive Summary

1 There is an ongoing worldwide debate on whether the forces of competition are on the decline. A major metric of competition is concentration – measuring the extent to which markets are dominated by their leading firms. Nearly all of the literature so far has been concerned with the USA and Europe, with much less attention to the developing world.

2 In this paper, we conduct an analysis of concentration in Mauritius, a small island economy which has been developing rapidly in recent decades. Of particular concern in such a country is whether the inevitably small size of its markets has constrained how many firms can effectively compete: i.e. is concentration inevitably high?

3 If so, high levels of aggregate and market concentration may significantly constrain the competition dynamics in markets and harm consumer welfare by raising entry barriers. This can be exacerbated when a handful of conglomerates controls large shares across many different markets.

4. The purpose of this paper is to open up such questions by presenting a simple statistical framework which can provide answers to key questions about concentration in Mauritius: How far is the economy as a whole dominated by a few large firms (**aggregate concentration**)? Are they large because they dominate individual markets, and/or because they operate in many different markets (**diversification**)? Which markets in Mauritius are most concentrated (**market concentration)**?

5. We want to answer such questions in an integrated, but concise, form: in a way which is not too time- or data-intensive; and we want our results to be easy to interpret.

6. To achieve these objectives, we return to a framework first formulated by one of the authors many years ago: the "Market Share Matrix" and the decomposition of aggregate concentration into market concentration and firm-level diversification.

[1] Competition Commission, Mauritius. The views herein are those of the author and not necessarily those of Competition Commission of Mauritius.

7 We assemble a sample of 454 firms which accounts for virtually all of the economic activity in Mauritius (excluding the financial sector). The firms are classified into 25 industries and we show that these are representative of the structural breakdown of GDP reported in national accounts.

8. In aggregate, the 20 largest firms generate 50% of the total turnover; none of the 434 others has a share exceeding 1%.

9 Most firms are specialised, with only 21 being diversified across more than one industry. 87 of the firms are top 5 leaders in at least one industry. Of these, IBL is one of the leaders in 7 of the 25 industries. The other most diversified firms (CIEL, Eclosia, ENL and Leal) are amongst the leaders in 3 industries on average. Only a few of the very largest firms are specialised in one industry.

10 Unsurprisingly, market concentration is generally high in Mauritius. 11 of the 25 industries (air transport, telecommunication, security, public transport, cleaning, fuel wholesaling, agriculture, media, real estate, automobiles are “highly concentrated” by conventional international definitions; 9 of the others qualify as “concentrated” and only 5 are “unconcentrated”.

11 These results can be conveniently summarised and linked using a statistical decomposition. This converts the statistics on concentration and diversification into hypothetical equal-sized “numbers-equivalents”. In these terms, the Mauritian economy has the equivalent of roughly 13 industries, each with typically just 7 firms. The typical firm operates in the equivalent of roughly 2 industries, so there are only roughly 50 equivalent sized firms in the economy as a whole.

12 Are these numbers “high”? International comparisons are pointless since comparable estimates are only currently available for much larger, developed western countries; Mauritian markets are inevitably much smaller, and concentration inevitably higher. One way to interpret our estimates is to employ a thought experiment. In a country the size of Mauritius, with 13 equivalent sized industries, how many firms would there be if all markets were “highly concentrated”? Using conventional yardsticks (HHI>2000, and number equivalent firms<5.) The answer is 65, *if there was no diversification*. This might suggest cause for concern since the island has fewer than 65 equal sized firms. However, in the absence of diversification, there would be twice as many firms, and the numbers equivalent would comfortably rise to above 50.

13. At this preliminary stage, the prudent policy implications are twofold: we advocate (i) continuing vigilance of concentration in individual markets and (ii) new research into the competition implications (if any) of the high levels of diversification of Mauritius’s largest firms.

14. We also hope that future research will replicate this matrix for other years, and for other countries of comparable size

1 Introduction

This paper has been written at a time of considerable interest, and some controversy, about the state of competition across the world. Some of the significant contributions include Furman (2015), *The Economist* (2016), De Loecker and Eeckhout (2017, 2018), Autor et al (2017), Phillipon (2019), and Covarrubias et al (2019) but there are many others; the most widely documented evidence is for the US, but closely followed by Europe. Increasingly, national and international agencies (e.g. OECD (2018) and CMA (2020)) have taken an interest and have started to publish reports. The majority of researchers have concluded that, typically, the forces of competition have been on the wane, but this is hotly contested by others who deny such waning[2].

One of the main metrics used for competition is the concentration of firms both in individual industries and for the economy as a whole. Concentration (and, by implication. the degree of oligopoly) is defined to be high when an industry is dominated by just a few large players. The widespread general assumption is that high concentration means weak competition. Davies (2021) and others have advised caution by arguing that high concentration need not necessarily signal a lack of competition, and acknowledging that high concentration may sometimes be the result of intense competition in which only the fittest have survived. For the purposes of this paper we do not enter the discussion of whether or not concentration is necessarily good or bad, but we do argue that it remains an important indicator of considerable interest.

So one of the two main purposes of the current paper is to turn the spotlight on a country which thus far has not featured in this debate. Mauritius is tiny, of course, compared to the largest Western economies, but this is not deny that it has considerable potential intrinsic interest value. It may be illustrative of smaller island economies, on which very little appears to have been written in competition debates worldwide. But also it is a country which has grown rapidly in recent years and now has the highest per capita GDP in Africa.

However, we also have a second objective for writing this paper, and on this our underlying motivation is more immediate and practical. We believe that on policy-relevant subjects such as the state of competition and industrial and business strategy, it is important that data be publicly available in a form which, while comprehensive in coverage, is concise and easy to access and comprehend. So our objective is to produce such a source of data which covers the market shares of all of the leading firms in Mauritius and disaggregates their operations into all of the industrial sectors in which they are active: we refer to this as the Mauritian "market share matrix". We have

[2] Davies (2021) provides a summary, but see also Berry et al (2019) and Shapiro (2019).

assembled this from entirely public sources in a relatively short period of research time. As will be seen, conceptually it shows how the degree of aggregate concentration (measuring the share of the largest firms in the overall economy) is linked and can be definitionally decomposed into two key components: the typical level of concentration in individual markets and corporate diversification across industries by leading firms. All three concepts – aggregate concentration, typical market concentration and diversification are key topics of potential policy interest.

2 The Structure of the Mauritian economy

Mauritius is an independent island state situated around 2,000 kilometres (1,200 mi) off the southeast coast of the African continent, east of Madagascar in the Indian ocean. Its area spans over 2,040 square kilometres (790 sq mi) and an exclusive economic zone covering 2.3 million square kilometres with a population of 1.3 million. Previously, a low income agriculturally based economy, Mauritius is today classified as a high-income country (since 2020) with a GDP per capita of USD 11,098 in 2019.

Since, it gained independence in 1968, the country has progressively moved from the sugar industry as main pillar of the economy to the textile and tourism industry. Today, Mauritius is striving to diversify its revenue stream by promoting other areas such as information technology and financial and businesses services. Table 1 provides an overview of the structure of economy based on the value added of the different sectors. This gives us a rough idea how the Mauritian economy operates.

The manufacturing, the wholesale and retail trade and the financial and insurance activities are found to be among the top sectors generating revenue. They each contributed over 10% of the GDP in 2018.

Table 1: Structure of the economy, value added at current prices, 2018

Sectors	Rs M	%
Agriculture, forestry and fishing	13,401	3%
Sugarcane	*1,897*	*0%*
Other	*11,504*	*2%*
Mining and quarrying	1,047	0%
Manufacturing	54,550	11%
Sugar	*393*	*0%*
Food (excluding sugar)	*19,540*	*4%*
Textile	*15,320*	*3%*
Other	*19,297*	*4%*
Electricity, gas, steam and air conditioning supply	7,052	1%
Water supply; sewerage, waste management and remediation activities	1,701	0%
Construction	19,656	4%
Wholesale & retail trade; repair of motor vehicles and motorcycles	52,284	11%
Transportation and storage	27,116	6%
Accommodation and food service activities	30,650	6%
Information and communication	17,844	4%
Financial and insurance activities	49,514	10%
Monetary intermediation	*30,152*	*6%*
Financial leasing and other credit granting	*2,799*	*1%*
Insurance, reinsurance and pension	*11,089*	*2%*
Other	*5,474*	*1%*
Real estate activities	24,902	5%
of which: Owner occupied dwellings	*20,026*	*4%*
Professional, scientific and technical activities	21,244	4%
Administrative and support service activities	13,300	3%
Public administration and defence; compulsory social security	26,295	5%
Education	20,524	4%
Human health and social work activities	18,949	4%
Arts, entertainment and recreation	15,424	3%
Other service activities	6,867	1%
Gross Value Added (GVA) at current prices	**422,319**	**88%**
Taxes on products (net of subsidies) [3]	**58,936**	**12%**
Gross Domestic Product (GDP) at current market prices	**481,256**	**100%**

Source: Digest of National accounts 2020, Table 4[3]

See Annex A1 for definitionak botes to this Table.

[3] Available at:
https://statsmauritius.govmu.org/Pages/Statistics/By_Subject/National_Accounts/SB_National_Accounts.aspx

3 Analytical Framework

3.1 Mauritian Market Share Matrix (MMSM)

At the heart of our analysis is a concept known as the "Market Share Matrix". This was first introduced and applied to the UK by Davies (et al 1991a, 1991b) and subsequently to the EU (for the manufacturing sector (Davies et al, 1996) and the Groceries sector Clarke et al (2002)). It is based on the following two principles:

- Define a firm as 'leading' if it is one of the five[4] largest producers in at least one industry
- For all such firms, the matrix should include estimates of its production in all industries in which it operates – not only those in which it is a 'leader'.

Thus, the rows of the matrix identify the production of each leading firm in all industries; and the columns identify the leading producers in each industry (figure 1).

Figure 1: Skeleton of the matrix

	Industry						**All industries**
Firm	I1	I2	I3	.	.	.	
F1							
F2							
F3							
.							
.							
All firms							**= Total economy**

In constructing the matrix for Mauritius, the first task was to identify the industries/sectors into which the economy was to be disaggregated. In this case, we chose 25, although in future work we will aim for greater disaggregation with more industries than this. The second task was to identify for each industry the largest firms and their market shares. As above, we chose to define the leaders as the top 5, which is sufficient to include all the main players in the market for a small country. If each firm was only present in one industry, the matrix would include 125 leaders. However, because

[4] The choice of five is largely arbitrary, but in most industries the top five typically includes all the main players.

some firms are leaders in more than one industry, the number of such leaders will be fewer than 125 (In fact, in this case 87.) Thirdly, we chose to supplement by including all other firms who appear in a listing of Mauritius's largest 500 firms. Although this means that the matrix will include approximately 400 firms who are much smaller than the leaders, it means that it covers almost all firms operating in the Mauritius economy (see section 4). We return to the make-up of the matrix later.

3.2 The Information Content of the Matrix

A matrix constructed on these lines can provide information on:

(i) **aggregate concentration** in the country as a whole, as revealed by reading down the final column, which shows firms' aggregate turnovers in the economy as a whole
(ii) **market concentration** in the individual industries, as revealed by reading down each of the industry columns
(iii) **diversification** of individual firms across industries, as revealed by reading along each of the firms' rows.

We employ the two most commonly used indexes to measure both aggregate and market concentration: (i) the concentration ratio (CR) and (ii) the Herfindahl-Hirschman index (HHI).

The *concentration ratio* is the sum of the market shares of the largest players in the market. Denoting the market share of the i^{th} firm by symbol S_i and ranking firms in descending order of size, the concentration rate is defined as:

$$CR_k = \sum_{i=1}^{k} S_1$$

where k denotes the number of firms chosen as largest. The choice of value for 'k' is to some extent arbitrary, here we report various values up to five. The industry is deemed to be more concentrated, the closer is CR to 100%.

The *Hirschman-Herfindhal index*, *HHI,* is the sum of the squares of the market shares of all *n* firms in the market. Therefore, it attaches greatest weight to enterprises with a larger market shares:

$$HHI = \sum_{i=1}^{n} S_i^2$$

The HHI is the most commonly used index of market concentration by competition authorities. Its value varies between 0 (perfect competition) and 10,000 (monopoly). We will follow the widespread conventions[5] of defining markets to be "highly concentrated" if HHI>2000 and "concentrated" if 2000>HHI>1000.

To measure the diversification of an individual firm across *j = 1…k* industries, we employ Berry's D index (1975):

$$Di = 1 - \sum_{j=1}^{k} S_{ij}^{2} / S_{i}^{2}$$

Where the firm is specialised in just 1 industry, D=0, but as diversification increases across the industries it rises to (k-1)/k.

4 Populating the matrix: data: sources and industry definitions

Our primary source for firms' turnover is *The Top 100 Companies Report 2018*.[6] This provides data on the 574 firms with turnover of more than R100s million (approx. £2.5 million) turnover. To avoid double counting, we excluded all subsidiaries whose turnover was already included in the figures for their parents, and this reduced the sample to 454 firms. Information on the nature of the business activities carried out by each of the firms were each collected either from the firm's website, annual report or registrar of firms. Since we believe that this sample includes all firms, except the very smallest, we treat it henceforward as approximately the population of economically active firms in Mauritius.

The firms were first categorised into 14 sectors and subsequently into 25 industries based on the nature of business activity as defined by the International Standard Industrial Classification of All Economic Activities (ISIC)[7] of the United Nations. We disaggregated the turnovers of those firms with diversified portfolios of activities using the segmental information provided in their respective annual reports[8].

---

[5] For example in DGCOMP's merger guidelines.

[6] Published by La Sentinelle Ltd in collaboration with DCDM Research, this annual report provides rankings of the top firms by both sector based on publicly available information from the Registrar of Firms, Mauritius. La Sentinelle Ltd is a leading media group in Mauritius and DCDM Research is a Mauritius-based market and social research firm.

[7] See International Standard Industrial Classification of All economic Activities, Revision 4 of the United Nations.

[8] Some of these firms (IBL Ltd, Ciel Group, Innodis Ltd, Harel Mallac Group, Gamma Group and Alteo Group) and reported an 'adjustment' figure when reporting their segmental revenue. For these firms, this figure was spread across the different sectors based on their segmental revenue ratio.

The dimensions of the 'firm matrix' are shown in Table 2

Table 2: The firm market share matrix

Details	Number
Firms	454
Industries	25
Observations	521

The industries together with their ISIC references are shown in Table 3. (The definitional notes to the table are in Annex A1.) The table also shows the number of firms in each industry as well as their shares in terms of turnover and their share of GDP that they represent. As can be seen, the sectoral breakdown of the matrix is remarkably similar to that in GDP: to all intents and purposes, the matrix firms capture nearly all economic activity in Mauritius[9].

[9] It should be noted that we exclude all non-market industries and financial intermediation – the latter because "turnover" in some financial sectors vastly overstates the scale of the sector measured in most other measures of real activity (e.g. value added or employment.)

Table 3: Coverage of the matrix by numbers and revenue shares

Sector	Industry	ISIC Reference	No of firms	% of matrix turnover by Industry	% of matrix turnover by Sector	% GDP[10]
Agriculture, forestry and fishing	Crop and animal production	A: 01; 011-017	12	2.8%	2.80%	4.00%
Manufacturing	Textile	C: 13; 131-139	25	6.9%	16.70%	16.00%
	Food	C: 10; 101-108	19	7.2%		
	Others	C excl food and textile.	18	2.6%		
Construction	Construction	F: 41-43; 410, 421, 422, 429, 431, 432, 433, 439.	63	9.0%	9.00%	6.00%
Wholesale and retail trade; repair of motor vehicles and motorcycles	Supermarket	G: 47: 472	81	15.4%	34.60%	16.00%
	Automobile	G: 45: 451-454	11	2.5%		
	Wholesale and retail trade (Exc supermarkets and automobile)	G: 46,47: 461, 462, 463, 464, 465, 466, 469, 474, 475, 476, 477, 478.	54	7.8%		
	Wholesale of fuel	G: 46: 466	4	8.3%		
	Retail sale of automotive fuel	G: 47: 473	12	0.6%		
Transportation and storage	Public transport	H: 49: 493	3	0.4%	8.20%	8.00%
	Air transport	H: 51: 511,512	2	4.3%		
	Logistics/Freight	H: 52,53: 521, 522, 531, 532.	28	3.5%		

[10] All other columns in the table refer to the matrix firms but GDP shares are for the whole economy taken from the national accounts. The calculation of share of GDP excludes the following sectors: mining and quarrying, electricity, gas, steam and air, water supply; sewage, waste management and remediation, monetary intermediation, public administration and defence, compulsory social security and education.

Sector	Industry	ISIC Reference	No of firms	% of matrix turnover by Industry	% of matrix turnover by Sector	% GDP[10]
Accommodation and food service activities	Hotels	I: 55: 551, 552, 559, 561, 562, 563	45	9.8%	9.80%	9.00%
Information and communication	Computer programming	J: 62: 631, 639	10	0.6%	4.50%	5.00%
	Media	J: 59, 60: 591, 592, 601, 602	10	0.7%		
	Telecommunication	J: 61: 611 ,612, 613, 619	6	3.2%		
Financial and insurance activities	Insurance	K: 65,66: 651, 652, 653, 661, 662, 663	17	5.2%	5.20%	6.00%
Real estate	Real estates	L: 68: 681, 682	16	1.4%	1.40%	7.00%
Human health and social work	Health	O: 86: 861, 862, 869	23	1.9%	1.90%	4.20%
Arts, entertainment and recreation	Gambling and betting	R: 92: 920	9	0.8%	0.80%	5.00%
Professional, scientific and technical	Professionals	M: 69-75: 691, 692, 701, 702, 711,712, 721, 722, 731, 732, 750	35	2.0%	2.00%	6.00%
Administrative and support service	Security	N: 80: 801, 802, 803	3	0.3%	0.50%	4.00%
	Cleaning	N: 81: 811-813	3	0.2%		
Others			12	2.7%	2.70%	2.00%
Total			521	100.1%	100.1%	100%

Source: Authors'

5 Results

5.1 The Top firms and Aggregate Concentration

Roughly 70 firms record turnover in excess of Rs 1 billion. The largest 20 have a turnover of over Rs 5 billion, as shown in Table 4. All of the other firms have less than 1% of the matrix turnover.

Table 4: Top 20 firms by turnover in 2018 (Rs millions)

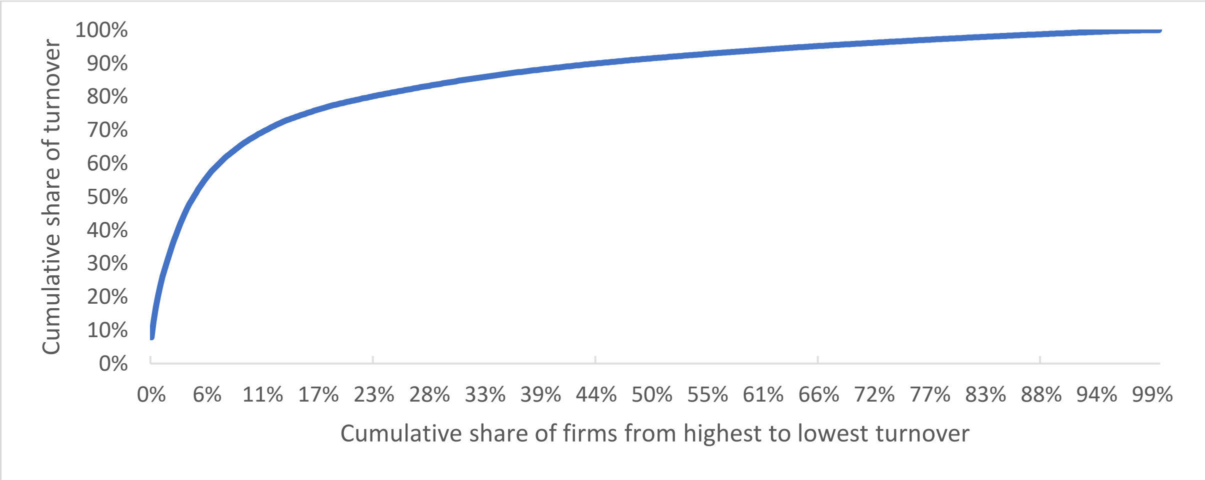
Rank	Firm name	Turnover (Rs M)	% Turnover matrix
1	IBL Ltd	37,074	8%
2	CIEL Group	22,608	5%
3	Air Mauritius Ltd	19,907	4%
4	Eclosia	16,279	3%
5	ENL Limited	14,602	3%
6	Vivo Energy Ltd	12,849	3%
7	Mauritius Telecom Group	10,605	2%
8	The Leal Group	10,214	2%
9	New Mauritius Hotels Ltd	10,106	2%
10	Princes Tuna (Mtius) Ltd	9,914	2%
11	Engen Petroleum (Mauritius Limited)	9,545	2%
13	Indian oil (Mauritius) Ltd	8,568	2%
12	Alteo	8,176	2%
14	Total Mauritius Ltd	8,068	2%
15	Swan	7,531	2%
16	APTIS Group	7,100	2%
17	ABC Group	6,721	1%
18	Companie Mauricienne de Textile Ltee	6,216	1%
19	Airports of Mauritius Co. Ltd	5,284	1%
20	Currimjee Group of Firms	5,244	1%

Source: Top 100 firms 2018, published by La Sentinelle Ltd and authors'calculation

Brief bios of the top 10 firms are provided in Annex A2**.**

Figure 2 illustrates the cumulative share of the total matrix turnover accounted for by ranking firms from the highest to lowest turnovers. It shows, for example, that the top 5% generated 50% of total matrix turnover, while the smallest 50% of firms accounted for less than 10& of aggregate turnover.

Figure 2: Cumulative share of turnover



Source: Authors' calculations

This marked inequality in the aggregate firm turnover distribution is also reflected in Table 5 which reports the concentration indices described earlier. Aggregate concentration is high with the top 4 firms accounting for one fifth of the entire matrix turnover; the aggregate HHI index is 192 – to give this an intuition, such a value would be recorded in an economy where there were 1000/192= 52 equal sized firms. We return later to the interpretation of these numbers.

Table 5: Aggregate concentration

Measure of market concentration	Ratio/index
3-firm concentration	17%
4-firm concentration	20%
Herfindhal Hirschman Index	192

Source: Authors' calculation

5.2 Market Concentration

Turning to the 25 individual industries, Table 6 shows them ranked in descending order of their HHI values (the concentration ratios reveal the relative market shares of the leading firms.) A close look at the HHI reveals that 11 of the 25 are "highly concentrated" (HHI>2000), and 9 are "moderately concentrated" (1000<HHI<2000) and the rest are weakly concentrated.

Table 6: Market concentration by sectors

Sector	HHI	CR1	CR2	CR3	CR4	CR5
Air transport	0.9565	98%	100%	100%	100%	100%
Telecommunication	0.5425	71%	91%	94%	97%	99%
Security	0.5167	71%	89%	100%	100%	100%
Public transport	0.4297	56%	88%	100%	100%	100%
Cleaning	0.3873	50%	83%	100%	100%	100%
Wholesale of fuel	0.2591	33%	57%	79%	100%	100%
Crop and animal production	0.2590	46%	60%	71%	77%	83%
Others	0.2303	42%	60%	73%	80%	85%
Media	0.2263	42%	56%	65%	73%	79%
Real estate	0.2028	41%	51%	61%	67%	73%
Automobile	0.2015	36%	52%	68%	80%	86%
Food	0.1711	29%	52%	66%	73%	79%
Textile	0.1687	33%	52%	61%	68%	74%
Gambling and betting	0.1670	25%	46%	65%	75%	82%
Insurance	0.1625	31%	49%	60%	70%	78%
Other manufacturing (excl textile and food)	0.1407	27%	46%	57%	67%	72%
Computer programming	0.1377	25%	41%	54%	64%	72%
Health	0.1179	25%	40%	52%	59%	65%
Retail sale of automotive fuel	0.1039	17%	31%	42%	52%	60%
Hotels	0.1017	22%	36%	48%	56%	63%
Logistic/Freight	0.0949	22%	36%	45%	52%	57%
Wholesale and retail sector (Exc supermarkets and automobile)	0.0667	18%	27%	35%	42%	49%
Construction	0.0616	19%	26%	32%	38%	43%
Supermarket	0.0521	16%	23%	30%	36%	41%
Professional	0.0353	6%	11%	17%	22%	28%

Source: Authors' calculations

It is clear that Mauritius is a concentrated/highly concentrated country – both at the aggregate level and in most individual industries.

5.3 Classification of firms: Diversification and Market Leadership

To further understand the links between aggregate and market concentration, the firms are next classified into two categories (i) diversified versus specialised and (ii) leading versus non-leading. Diversified firms are those firms which owns or operate in several unrelated business segments (with D >0). Specialised firms are those which tend to concentrate their business activity in a particular business segment (with D = 0). Leading firms as those which are in the Top 5 in individual industries and non-leading are those not in the top 5 in any industry.

Table 7: Typology of firms

	Number		
	Diversified	**Specialised**	**Total**
All Firms	21	433	454
Leading firms (top 5 in at least one industry)	19	68	87
Non-leading firms	2	365	367

Table 7 shows that the majority of firms are specialised with only 21 (4.6%) being diversified. Only 87 (19%) of the matrix firms hold any leading positions. Thus the large majority of firms, (365, i.e. 80%) do not appear to play significant roles, having small market shares in single industries.

Table 8: Top 5 diversified firms and ranking by industry

Firm	Ranking by industry
IBL (D=0.781)	1st - Construction, Supermarket 2nd- Food manufacturing 3rd- Logistics, hotels, real estate 5th- Insurance
CIEL Group (D=0.671)	1st- Textile, health 2nd- Hotel 4th- Insurance
Eclosia (D=0.798)	2nd- Crop and production 3rd- Food manufacturing 5th- Supermarket
ENL Limited (D=0.793)	1st- Logistics 5th- Crop and production, Hotel
The Leal Group (0.761)	1st- Automobile 2nd- Computer programming, 4th- Telecommunication

Table 8 establishes a key feature of the matrix: the very largest firms tend to be both highly diversified (with high D values) and with leading positions in a number of different industries. This is most obvious for IBL which is amongst the leaders in 7 different industries; but the other 4 firms also display significant diversification with leadership status in more than one industry.

Table 9 - Top 5 specialised firms and ranking by industry

Firms	Ranking by sector
Air Mauritius Ltd	1st - Air transport
Vivo Energy Ltd (Shell)	1st- Wholesale of fuel
Mauritius Telecom Group	1st- Telecommunication
New Mauritius Hotels Ltd	1st- Hotels
Princes Tuna (Mtius) Ltd	1st- Food manufacturing

However, this is not to say that all leading firms are conglomerate. This is not to say that only the big conglomerates have market leadership. As Table 9 reveals, the 5 largest specialised firms each have #1 ranking in their sole industries.

6 Interpretation of the results

What should we make of these results? We might expect that the characteristics of the Mauritian economy - its isolated location, structure and small markets - would lead to concentration; and this is largely borne out by these results. The 20 largest firms generating 35% of the total turnover suggests an economy which is concentrated in aggregate, and this is also true for market concentration in individual industries: 11 of the 25 industries are “highly concentrated” and 9 of the others “concentrated”. While most firms are specialised, 21 of the largest firms are highly diversified across a number of industries: IBL is one of the leaders in 7 of the 25 industries, and CIEL, Eclosia, ENL and Leal are amongst the leaders in 3 industries on average.

But are these numbers particularly “high”? This is a difficult question to answer because International comparisons are pointless. Comparable estimates are only currently available for much larger, developed western countries; Mauritian markets are inevitably much smaller, and concentration inevitably higher.

Nevertheless, we can offer some intuition by re-expressing the results in so-called *numbers equivalent* form. Davies et al (1996, Appendix 1, Section A1.4.1) provides a full technical discussion of the following techniques, but the basic idea can be simply explained. First note that, associated with any value for an HHI index, there is a *numbers equivalent,* defined as the reciprocal of that value:

$$N(HHI) = 10000/HHI$$

This has the effect of converting the HHI into the *equivalent number of equal sized firms* which would generate that given value. So an industry with HHI=2000 is equivalent to an hypothetical industry of 5 equal sized firms. A more complicated illustration is an industry with a dominant firm (50% share), three medium sized rivals (17%, 17%, 16% shares) and one very small firm (1%). Such a size distribution would generate an HHI=3300, and this would be equivalent to an hypothetical industry of 3 equal sized firms; effectively, it converts the number 5 downwards to 3 to reflect the smaller shares of the non-leading firms. This can be applied to both the aggregate HHI and the HHIs of individual industries. A similar conversion can be used for the firm diversification index, in which case it measures the equivalent number of equal sized industries over which the firm is diversified.

In numbers equivalent form then, the Mauritian economy has 10000/192 =52 firms in total; 11 of its 25 industries have fewer than 5 equivalent firms each, and 9 have between 5 and 10 equivalent firms. The leading firms are diversified into more than 2 equivalent sized industries, in each of which they have leading market shares.

To bring these results together Davies et al show that there is an exact decomposition:

N(AGGCON) = N(MKTCON)*N(IND)/N(D)

where N(AGGCON) Is the numbers equivalent of equal sized firms in the economy as a whole; N(MKTCON) is the weighted average numbers equivalent of equal sized firms in industries; N(IND) is the numbers equivalent number of industries in the economy, and N(D) is the weighted average number equivalent industries each firm is diversified in. In this case, N(AGGCON)=52; N(MKTCON) = 7.4; N(IND) = 13.3, and N(D) = 1.88. Thus, it is as if the Mauritian economy has roughly 13 industries, each with typically just 7 firms. The typical firm operates in the equivalent of roughly 2 industries, so there are roughly 50 equivalent sized firms in the economy as a whole.

This leads to the obvious final question:

> **Given the size and industrial structure of Mauritius, is aggregate concentration of 52 equivalent equal sized firms a high or low number?**

At first sight, 52 firms and 13 industries suggests a highly concentrated economy with a ratio of only 4 firms to each industry. However, this ignores the fact that the firms are diversified across industries and this magnifies the effect of market concentration, which is, as we have just seen, typically 7 equivalent firms per industry, not 4.

In other words, aggregate concentration in Mauritius is high, but this is partly the effects of high market concentration in individual industries but also partly the effect iof a number of largest firms who have market power across a number of industries.

7 Conclusions and the Future

As explained in the introduction, the objectives of this paper are partly to add to the worldwide literature on contemporary levels of concentration – but in our case for a small island economy, and partly to provide a reference study which yields a concise and accessible source for anyone interested in gaining a quick picture of the state of concentration and diversification of the leading firms in

Mauritius. In the main, we have confine ourselves to fact-finding at this stage, and the novelty of the work lies in the descriptive statistical framework within which it is presented. Nevertheless, it is inevitably policy relevant. In our opinion it suggests the need for continuing vigilance of concentration in individual markets, but also more research in the potential competition implications of the fact that the very largest firms have leading, possibly dominant, market shares in more than one industry – is such diversification a cause for competition concern.

Turning to the future, we view this paper as only a first step and we hope to develop it various ways. First, if we are to make definite pronouncements about the state of competition, the database needs to be further disaggregated, with the 25 broad sectors replaced by finer defined Anti-Trust Markets. Second, replicating the data for previous and future years will help us chart how markets and firm are evolving over time, with more emphasis on the "churn" in market shares and entry of new firms. Third, to add a perspective to our results, it would be helpful to draw comparisons with other small (perhaps) island economies of a roughly similar size. Fourth, and moving outside of merely structural indicators, further work would be desirable on firm profitability, cross ownership, monopsony buyer power and many other aspects of the conduct and performance of the Mauritian economy.

References

Autor *et al* (2017). "Concentrating on the Fall of the Labour Share", *AER P&P*, 107(5), 180-185

Berry C (1975), *Corporate Growth and Diversification*, Princeton: Princeton University Press.

Berry S, Gaynor M, and Scott Morton F, (2019) "Do increasing markups matter? Lessons from Empirical Industrial Organization", *Journal of Economic Perspectives*, 33.3, Summer 2019, 44-68

Clarke R, Davies S W, Dobson P and M Waterson (2002), *Buyer Power and Competition in European Retailing,* Edward Elgar, Cheltenham

Competition and Markets Authority, "The State of UK Competition", CMA 133 https://www.gov.uk/government/publications/state-of-uk-competition-report-2020

Covarrubias M, Gutiérrez G and T Philippon (2019), "From Good to Bad Concentration? US Industries over the Past 30 Years", NBER Macroeconomics Annual, 34 ed. M S Eichenbaum, Hurst E and J Parker.

Davies S W and C Morris (1991a), "A Market Share Matrix: UK Manufacturing 1986", UEA Discussion Paper 9105

Davies S W , Geroski P, Lund M and A Vlassopoulos (1991b), *The Dynamics of Market Leadership in the UK Manufacturing Industry 1979-86*, Centre for Business Strategy, London Business School

Davies S W , Lyons B R et al, (1996), *Industrial Organisation in the European Union: Structure, Strategy and the Competitive Mechanism*, Oxford University Press,

Davies S W (2021) "Competition and Concentration: charting the faultlines", CCP Working Paper 21.11

De Loecker, J, and J Eeckhout. 2017. "The Rise of Market Power and the Macroeconomic Implications." *NBER Working Paper No. 23687.*

De Loecker J, and J Eeckhout. 2018. "Global Market Power." *NBER Working Paper No.24768.*

The Economist (2016) "Too much of a good thing. Profits are too high. America needs a giant dose of competition", May 26th, 2016

Furman, J. 2015. "Business investment in the United States: Facts." *Technical report, Council of Economic Advisers, Executive Office of the President of the United States.*

OECD (2018), “Market Concentration: Issues Paper by the Secretariat”, OECD, DFEA Competition Committee, DAF/COMP/WD(2018)46

Philippon T. 2019. *The Great Reversal. How America gave up on Free Markets*, Harvard University Press, Cambridge Mass.

Shapiro, C. 2019. "Protecting Competition in the American Economy: Merger Control, Tech Titans, Labor Markets" *Journal of Economic Perspectives*, Vol 33 No.3: 69-93

Annexes

A1 Notes to Table 1

The crop and animal production industry includes firms involved in the cultivation of agricultural and horticultural crops, the cultivation of all fruits and vegetables and the rearing of animals.

The textile sector includes firms engaged in the manufacture of knitted and crocheted fabrics, made-up textile articles and other textile products among others. The food sector includes firms manufacturing food, beverages and tobacco. The other manufacturing sector includes all firms involved in the manufacturing sector except those engaged in the textile and the food manufacturing sector.

The construction sector comprises of all activities involved in the processes of construction, repairs, demolition and renovation of buildings and infrastructure as well as the provision of professional services.

In the wholesale and retail trade; repair of motor vehicles and motorcycles industry, the supermarket sector includes the hypermarkets and supermarkets selling consumer goods. The wholesale and retail industry encompasses business activities involved in the wholesale of computers, electronic parts and equipment. The automobile sector includes businesses involved in the sale of new and reconditioned cars. The wholesale of fuel industry relates to wholesale firms of solid, liquid and gaseous fuels and related products. The petrol station sector covers businesses involved in the retail sale of petroleum products.

The transport and storage industry covers all related activities which provides for passenger or freight transport, whether scheduled or not, by rail, road, water or air - supporting activities such as cargo handling, storage, postal activities, etc.

The accommodation and food service industry focuses on the hotel sector which consists mostly of short-term lodging and/or food and beverages activities for immediate consumption.

The computer programming industry covers the computer programming, consultancy and related activities and information service activities. The media industry comprises of businesses involved in the motion picture, video and television programme production, sound recording, music publishing activities, programming and broadcasting activities. The telecommunication industry is made up of firms that make communication possible on a global scale, whether it is through the phone or the Internet, through airwaves or cables, through wires or wirelessly.

The financial and insurance industry includes firms which provides services involved in or closely related to units engaged in setting up and managing insurance funds for all kinds of insurance types (life and non-life), units engaged in the provision of retirement incomes as well as activities auxiliary to financial service and insurance activities.

The real estate industry includes firms which help to facilitate a transaction between the buyers and sellers of property.

The human health industry includes the provision of health care by diagnosis and treatment and the provision of residential care for medical and social reasons as well as the provision of social assistance.

In the Arts, entertainment and recreation industry, we looked at the firms involved in the betting and gambling activities.

The Professional, scientific and technical activities industry includes firms involved in the following activities: legal and accounting, head offices, management consultancy, architectural and engineering, technical testing and analysis, scientific research and development, advertising and market research, other professional, scientific and technical activities and veterinary activities.

In the Administrative and support service sector, our sample data consist of the security and the cleaning industry. The security sector includes primarily the private security activities and the security systems service activities. The cleaning sector consist of firms involved in cleaning activities, general cleaning of buildings, other building and industrial cleaning activities and landscape care and maintenance service activities.

Other industries include all other firms involved in activities that are not captured in the above-mentioned industries.

A2 Potted Bios of the Largest Firms

IBL Ltd

Incorporated in 1972, following the merger of Blyth Brothers and Ireland Fraser & Co Ltd, IBL Ltd (IBL) this is the largest Mauritian Group in terms of turnover and market capitalisation. It has over 280 brands, available in 18 countries, in various industries:agro & energy (crop and animal production & Others), building & engineering (construction), Commercial & distribution (wholesale and retail trade), financial services, hospitality & services (hotel), life & technology (ICT), logistics, seafood (food manufacturing)and property. Its main shareholders are Espérance & Compagnie Limitée, Société Portland, Swan Life Ltd and Belle Mare Holding Limited holding 10.8%, 7.4%.7.0& and 5.5% of shares respectively.

Ciel group

Ciel, the second largest group, has been operating on the Mauritian market since 1912. Today, an international Mauritian Group, it is present in more than 10 emerging markets across Africa & Asia across the following sectors: agriculture (crop and animal production), finance (insurance and financial services), healthcare (health), hotels & Resorts (hotels), property and textile. It has a cascade holding structure. Its main shareholders are the Mercoeur Investment Ltd, FFP Invest, Hugnin Freres Ltd, Di Cirne Holding Ltd and Les Amarres Invesment Ltd. They hold 7.97%, 6.81%, 6.28%, 5.11% and 5.02% respectively. The rest, 68.81%, are owned by the public. Its redeemable restricted A shares are owned 98.66% by Deep River Ltd. The rest 1.34% are owned by the others/public.

Air Mauritius Ltd

In operation since 1967, Air Mauritius Ltd is the national airline of Mauritius. It provides both international and domestic scheduled air services for the carriage of passengers, freight and mail and the provision of ancillary services for aviation covering over 23 destinations.

Eclosia Group

Incorporated some 50 years ago in the farming industry, the Eclosia Group has expanded and is today active in the food (food manufacturing), commerce (wholesale and retail trade), logistics, business services (professional services), education and hotels & leisure sectors (hotels). Its activities cover the African and the Indian ocean region. The Eclosia Group is owned 61% by Michel de Spéville and 39% by the ENL Group.

ENL Ltd

ENL Ltd is a family-controlled group in business for over 200 years. It manages a diverse portfolio of more than 120 international and homegrown brands in the agro-industry (crop and animal production), real estate, hospitality (hotel), logistics, fintech (financial services) and commerce (wholesale and retail trade) industry. The holding firm of ENL is L'Accord Limited, a limited-liability public firm while the ultimate control of the Firm remains with Société Caredas, a société civile.

Vivo Energy Ltd

Vivo Energy Ltd is established in Mauritius since 2011 following the acquisition of the Shell Firm of East Africa Limited. The latter started its marketing operation of the Shell brand in 1905.Today, Vivo Energy Ltd is distributor of all Shell branded fuels and lubricants. It operates in retail, commercial fuels, Marine and Aviations, liquefied petroleum gas and lubricants. Vivo Energy Mauritius Holdings BV holds directly 75% of the share of the Firm. No other person holds 5% or more of the share capital.

Mauritius Telecom Group

Mauritius Telecom started its operation in 1992 following the merger of the former Overseas Telecommunications Services Ltd and Mauritius Telecommunication Services Ltd. It is the major provider of fixed-line, mobile, internet, TV and mobile money services in Mauritius. Its main shareholders are Orange S.A from France, The Government of Mauritius, SBM Investments Managers Ltd and National Pensions Fund. They hold 40%, 33,49%, 19% and 6.55% respectively. The rest, 0.96% are owned by the employees of the Mauritius Telecom.

The Leal Group

The Leal & Co Ltd is a family firm founded in 1970. The group consist of 18 firms present across 8 clusters namely automobile, engineering (Construction), pharmaceuticals (Health), consumer goods (wholesale and retail trade), information technology, energy, logistics and chemicals (other manufacturing). It has also expanded cross borders in the Seychelles, Réunion, Madagascar, French Polynesia and New Caledonia. The group is owned by Société Clency Leal.

New Mauritius Hotels Ltd

Founded in 1952, the New Mauritius Hotels Ltd is involved in the hotel sector. It owns eight hotels in Mauritius and one in Morroco. Its main shareholder are Rogers and Firm Limited, ENL Limited, Swan Life Ltd and Herbert Couacaude holding 22.93%, 15.25%, 10.60% and 6.35% respectively. The New Mauritius Hotels is an associated firm of ENL LTd.

Princes Tuna (Mauritius) Ltd

Incorporated in 1999, Princes Tuna (Mauritius) Ltd (PTM) is involved in the manufacturing, processing and canning of tuna in Mauritius. It was created the acquisition of the Mauritius Tuna Fishing and Canning Enterprises (a joint venture between Mitsubishi Corporation and Ireland Blyth Limited (IBL) established in 1972) by Princes Group, a major Food and Drink organization in the UK. Their products are exported mainly to the US, UK and EU. PTM contributes approximately 1% of the Mauritian GDP. PTM is owned by Princes Limited (UK), IBL Ltd, Seafood Hub Limited (a subsidiary of IBL) and The State Investment Corporation Limited. They hold 51%, 23%, 20% and 5% of the share respectively.